Draft Environmental Impact Assessment Report For Proposed Synthetic Resin (UF, PF & MF) Manufacturing Plant

Project Proponent

M/s SAWARIYA CHEMICAL

Village – Gokul Vita; Mouza - Binnaguri & P.O – Kumar Vita
District - Jalpaiguri; West Bengal; PIN: 735135

Prepared By

ENVIRONMENTAL CONSULTANCYAND LABORATORY

A QCI-NABET Accredited Environmental Consulting Organization

Unit No. 206, 224, 225 Jai Commercial Complex, Eastern Express Highway, Opposite Cadbury Factory, Khopat, Thane (West) – 400 061
Tel: 022 2534 2776, 0484 4011173 , Fax: 022 25429650,
Email: kolkata@ultratech.in, Website: www.ultratech.in

Accredited By: NABET- Quality Council of India

Certificate No.: NABET/EIA/2023/RA 0194

SAWARIYA CHEMICAL

Village - Gokul Vita
Post - Kamar Vita, PS. - NJP
Dist. Jalpaiguri, Pin - 735135
Mob.: 94340 44386
GSTIN NO. : 19ADVFS0418C1ZY

TO WHOM IT MAY CONCERN

I, RASHMI AGARWALon behalf of M/s Sawariya Chemical do hereby confirm that M/s. ULTRA-TECH (NABET Accredited EIA Consultants, NABET Certificate No. NABET/EIA/2023/RA0194) have prepared the Environmental Impact Assessment Report for the "Proposed Synthtic Resin (UF, PF & MF) Manufacturing Plant, Vill – Gokul Vita; Mouza – Binnaguri& P.O- Kumar Vita, District – Jalpaiguri; West Bengal, PIN: 735135".

I hereby undertake the ownership of this EIA report on behalf ofM/s Sawariya Chemical. I also confirm that the M/s Sawariya Chemical shall be fully accountable for any misleading technical information in this report.

Yours sincerely,

For M/s Sawariya Chemical

MRS. RASHMI AGARWAL

Executive Director

SAWARIYA CHEMICAL
Rashmi Agarwal
Partner

Quality Council of India

National Accreditation Board for Education & Training

CERTIFICATE OF ACCREDITATION

ULTRA-TECH, Thane

206, 224-225, Jai Commercial Complex, Eastern Express Highway, Opp. Cadbury, Khopat, Thane West - 400 601

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3.	Thermal power plants	4	1 (d)	B
4.	Metallurgical industries	8	3 (a)	A
5.	Cement plants	9	3 (b)	A
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8.	Sugar Industry	25	5 (j)	B
9.	Ports, harbours, break waters and dredging	33	7 (e)	A
10.	Highway	34	7 (f)	A
11.	Building and construction projects	38	8 (a)	B
12.	Townships and Area development projects	39	8 (b)	B

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Sr. Director, NABET	Certificate No.	Valid till
Dated: Feb 26, 2021	NABET/EIA/2023/RA 0194	March 09, 2023

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National Accreditation Board for Testing and Calibration Laboratories

CERTIFICATE OF ACCREDITATION

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has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2017

"General Requirements for the Competence of Testing & Calibration Laboratories"

for its facilities at

25/11 A, K. P. ROY LANE, KOLKATA, WEST BENGAL, INDIA

in the field of

TESTING

Certificate Number: TC-5850

Issue Date: 29/05/2022 **Valid Until:** 28/05/2024

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.
(To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)

Name of Legal Identity : BHARAT FOUNDATION

Signed for and on behalf of NABL

N. Venkateswaran
Chief Executive Officer

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EXECUTIVE SUMMARY

Chapter 1: Introduction

M/s Sawariya Chemical has installed a plant for production of Synthetic Resin with a capacity of **1250 MT/Month**, in the land of **0.43 Acre** at R.S. Plot No 407; L.R. Plot No 550; Mouza – Binnaguri, Village – Gokul Vita, Pargana – Baikunthapur, Dist – Jalpaiguri, West Bengal, PIN: 735135.

Because of high market demand, the project proponent is willing to produce three types of synthetic resin i.e. Urea-Formaldehyde Resin (U-F Resin), Phenol-Formaldehyde Resin (P-F Resin) and Melamine-Formaldehyde Resin (M-F Resin). The production capacity of U-F Resin will be 10 Ton/day and P-F & M-F Resin will be 20 Ton/day each.

The proposed synthetic resin manufacturing plant comes under Sr. No. 5 (f) of EIA Notification, 14th September 2006 and subsequent amendments. The said synthetic resin manufacturing plant of **M/s Sawariya Chemical** falls in Category 'B' and as the plant has already been installed, the project is being treated as a Violation case.

The application for TOR had been submitted to MoEF&CC portal vide Proposal No SIA/WB/IND3/74306/2022 on 25th March, 2022 and the ToR has been obtained vide letter no 1227/AEN/T-II-1/028/2022 dated 29th June 2022 under violation category. ToR copy is enclosed as **Annexure-I**.

Chapter 2 - Project Description

M/s Sawariya Chemical is willing to install a plant for production of Synthetic Resin with a capacity of **1250 MT/Month**, in the land of **0.43 Acre** at R.S. Plot No 407; L.R. Plot No 550; Mouza – Binnaguri, Village – Gokul Vita, Pargana – Baikunthapur, Dist – Jalpaiguri, West Bengal.having its registered office in Kolkata. The proprietor of the firm is Smt. Rashmi Agarwal, wife of Sri Sanjay Kumar Agarwal, is resident of Green Valley, Bhanu Nagar, P.O – Siliguri, Dist. - Jalpaiguri – 734001, The proprietor of the firm is from highly reputed business family of Siliguri having wide business experience.

The Location map is shown below in **Fig E.1** and Google image of the project is shown in **Fig E.2.**

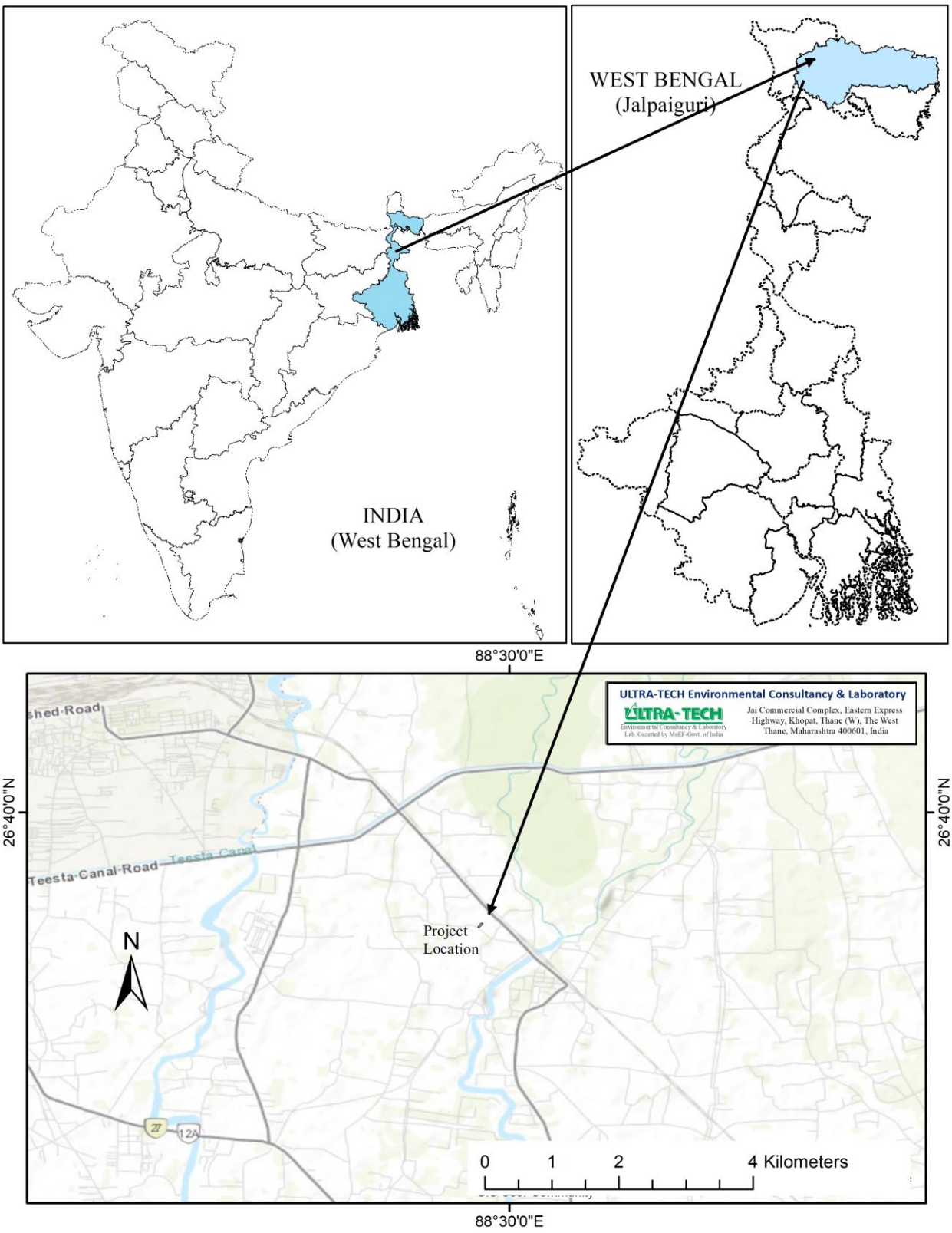


Figure E.1: Location Map of M/s Sawariya Chemical

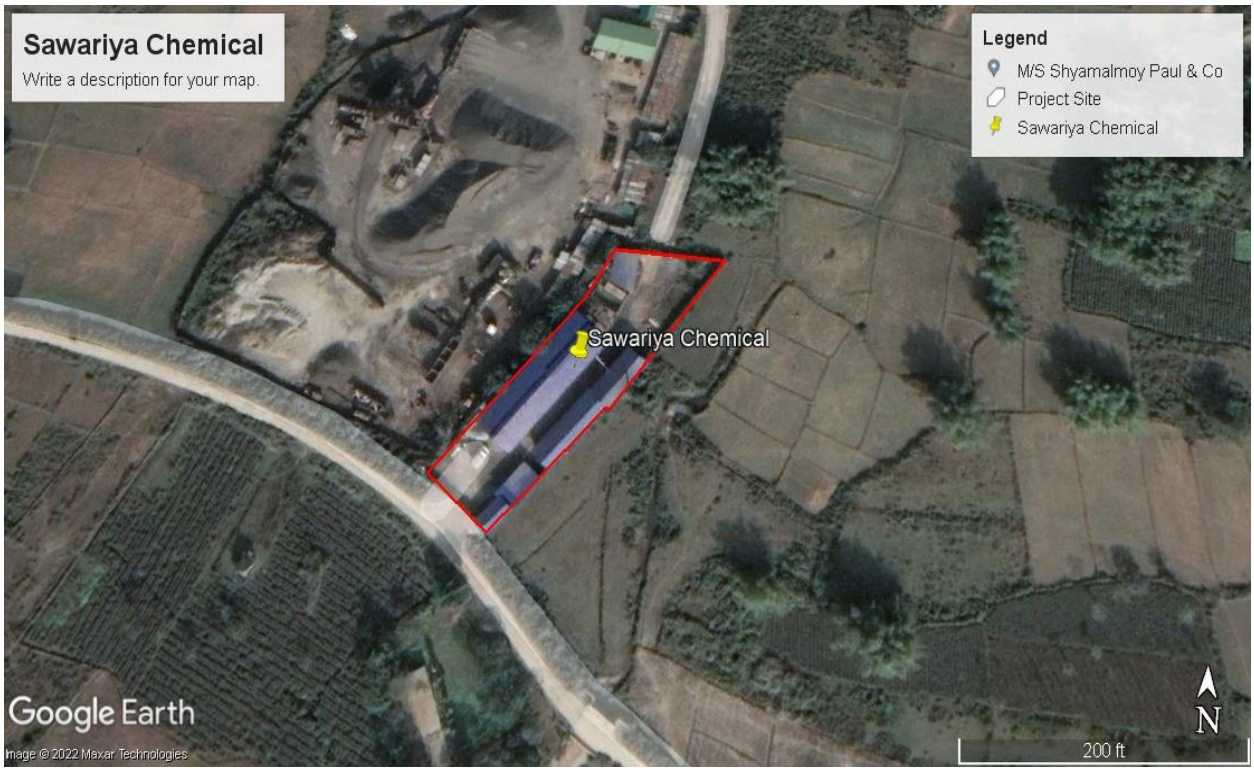


Figure E.2: Google Earth Image of Project Location

Project Layout

The proposed project is located at Village– Gokul Vita, Pargana – Baikunthapur, Dist – Jalpaiguri, West Bengal. .The layout is presented in **Figure E.3**.

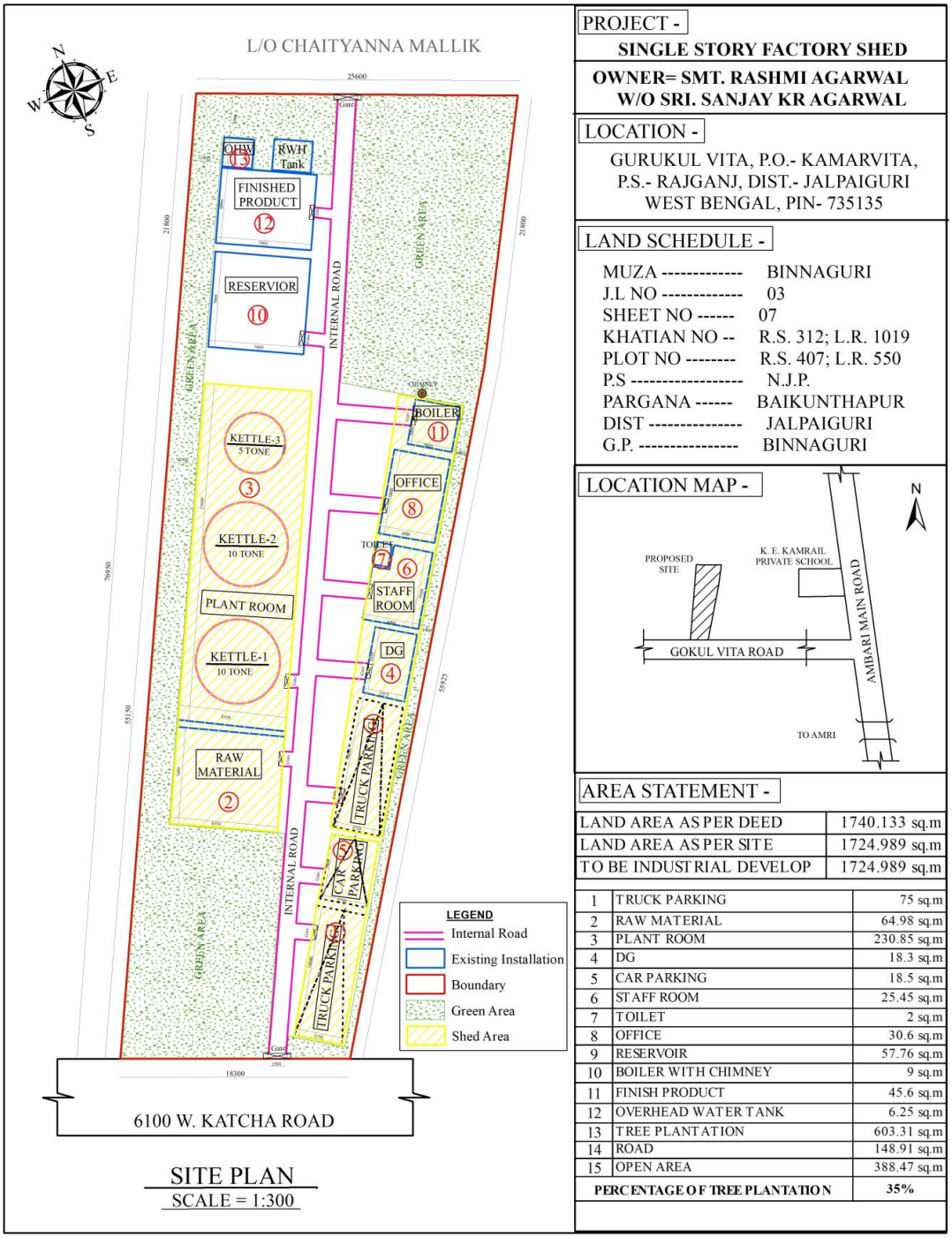


Figure E.3: Layout Plan of Project Site

1. Production details

The plant is proposed to design for the production of U-F Resin, P-F Resin and M-F Resin. The raw material details and the production capacity of each product are mentioned in table 2.4 and 2.5 respectively. The plant and machinery have been designed with required specification considering volume of reaction, material of construction and are located at appropriate positions. Adequate

ventilation, air conditioning and Air Filtration systems have been planned to prevent environmental hazards. Plant facilities have been designed as per the safety norms with appropriate emergency escapes. The detail of production capacity is mentioned in **Table E.1.**

Table E.1: Production Capacity

S.N.	Name of the product	Production Capacity (MT/Month)	Production Capacity (MT/Annum)	Storage Capacity (MT)	Mode of Storage
1	Urea-Formaldehyde Resin	250	3000	70	PVC Tank
2	Phenol-Formaldehyde Resin	500	6000	140	PVC Tank
3	Melamine-Formaldehyde Resin	500	6000	140	PVC Tank
	Total	**1250**	**15000**	**350**	

2. Basic Requirements

i. Raw Materials

Following raw materials are required for proposed products as mentioned in **Table E-2**. The properties of the Raw materials, quantity required and mode of storage & transport are mentioned in **Table E-2**. Details & MSDS of Hazardous Raw Materials Requiredare provided in **Table E-3.**

Table E.2: Chemical Name, Physical Form and Required Quantity & Mode of Storage of Raw Materials

SL	Raw materials	Chemical Name	Form	Quantity (MT/Month)	Source	Mode of Transport	Max. Storage (MT)	Mode of Storage
1	Formaldehyde	Formaldehyde	Liquid	769.22	Imported / Local	Shipment /Truck	215.38	HDPE Tank
2	Industrial Urea	Carbonyl diamide	Solid	70	Local	Road	19.6	Woven PP Bag
3	Phenol	Carbolic Acid	Liquid	226.34	Imported / Local	Shipment /Truck	63.38	HDPE Drum
4	Melamine	1,3,3-triamino-2,4,6-triazine	Solid	193.85	Local	Road	54.28	HDPE Drum
5	Caustic Soda	Sodium Hydroxide	Solid	27.60	Local	Road	7.73	Woven PP Bag
6	Acetic Acid	Acetic Acid	Liquid	5.63	Local	Road	1.58	HDPE Drum

Table E.3: Details & MSDS of Hazardous Raw Materials Required

Full name of the raw materials	Physical Phase	Main properties (refer MSDS)						Flammability
		B.P °C	F.P °C	LD_{50} Mg/kg	Specific Gravity (water=1)	IDLH (ppm)	Vapour density (air=1)	
Formaldehyde	Clear Liquid	90-100	Insoluble polymer gradually forms.	100	1.08	20	1.067	Flammable
Industrial Urea	White Solid	131-135	NA	8471	NA	1	NA	Non Flammable
Phenol	Colourless Liquid	182	42.8	317	1.07	5	3.2	Flammable
Melamine	White Crystalline Solid	Not available	>93.3	3161 mg/kg	1.573	NA	4.34	Flammable
Caustic Soda	Colourless Liquid	110 - 144	NA	1350	1.11 – 1.53	NA	NA	Non Flammable
Acetic Acid	Liquid	117-118	NA	3310	1.049	50	2.10	Flammable

ii. Land

The land area for the proposed expansion project located at R.S. Plot No 407; L.R. Plot No 550; Mouza – Binnaguri, Village – Gokul Vita, Pargana – Baikunthapur, Dist – Jalpaiguri, West Bengal is industrial land.

The total land, purchased for the proposed project is **1724.98** sqm which will be utilised as per following area statement.

Table E.4: Area Statement

S.N.	Description	Area (SQM)	% Utilization
1	Plant Shed & Office building	408.48	23.68
2	Green Area	584.31	33.87
4	Parking Area	112.5	6.52
5	Road Area	138.91	8.05
6	Service Area	112.47	6.52
7	Open Area	368.31	21.35
Total Plot Area		**1724.98**	**100.00**

iii. Water

The total water requirement will be around 7.78 KL per day, out of which 0.68 KL will be used for domestic purpose from where around 0.48 KL sewage water will be generated which will be flowed to septic tank followed by soak pit. For industrial use, around 4.29 KL water will be required out of which 2.02 KL will be used in production process, 0.87 KL will be used in boiler, 0.7 KL will be required for cooling water makeup and around 0.7 KL will be used for kettle washing. Around 1.3 KL waste water is expected to be generated from boiler blow down & cooling tower blow down, which will be stored in a storage tank and will be reused for greenbelt development & dust suppression. Effluent generated from the kettle washing (around 0.7 KLD) will be reused in the process. So there will be no discharge of waste water.

iv. Power

Total Power requirement for the proposed project will be about 70 KVA in double shift basis of 6 hours each, for 300 days per annum. The power will be supplied from WBSEDCL. Additionally a D.G. set of 63 KVA will be used in case of emergency or power failure. Diesel will be used as a fuel for D.G. set.

v. Fuel

Fuel is required for Boiler and DG Set (Stand by). Requirement and source of fuels are mentioned in **Table E.5.**

Table E.5: Requirement and Source of Fuel

S.N	Fuel Type	Fuel used	Qty.	Source	Mode of Transport
1	Coal	Boiler (0.3TPH)	400 kg/day	Local	Road
2	Diesel	DG Set (63KVA)	7.3 Lit/Hr	Local	Road

vi. Man Power

The project shall require skilled and unskilled labourers which is available locally. Normally there are several teams of skilled labours who work on contractual basis and take care of the entire production. Unskilled labourers shall be employed on daily wages.

Requirement of skilled and semi-skilled labours shall be around 10 people and 5 persons as unskilled.

vii. Capital Cost

Total cost of the project will be **82 Lakhs**.

- **Pollution Potential and Management**

The proposed project will have potential of pollution mainly due to the wastewater generation & disposal, flue gas emission from utilities and hazardous waste generation & disposal. These potentials of pollution are described below under respective heading with necessary details.

Water Pollution

The total waste water generated will be around 2.48 KLD out of which 0.48 will be generated from domestic use which will be treated in septic tank followed by soak pit. Rest 1.3 KLD will be generated from the industrial activities which will be stored in a storage tank and will be reused for plantation & dust suppression. The waste water generation & recycling process will be as below:

- The unit will maintain **Zero Effluent Discharge.**
- The industrial waste water will be generated from kettle washing and blow down from boiler and cooling tower
- Waste water from kettle washing will be collected in storage tank and will be reused.

The water regime is given in **Table E-6.**

Table E-6: Water Regime of Proposed Project

SN	Utility	Water Consumption (KL/day)	Waste Water Generation (KL/day)
1	**Domestic***	**0.68**	**0.48**
2	**Industrial*#**		
	A. Process*#	2.02	-
	B. Kettle washing*	0.7	0.7
	C. Boiler*	0.87	0.7
	D. Cooling Tower*	0.7	0.6
	Total (A+B+C+D)	**4.29**	**2**
3	**Plantation & Dust Suppression*#**	**2.81 (1.51*+1.3#)**	**0**
	Total Water Requirement (KLD)		**7.78**
	Total Fresh Water Requirement (KLD)		**5.78**
	Total Wastewater Generated (KLD)		**2.48**
	Total Wastewater Recycled (KLD)		**2**

*** - Fresh Water**

 # - Recycled Water

Air Pollution

A. Flue Gas Emission

Flue gas emission will be from stack attached to the boiler, where emission will generate due to the combustion of coal as fuel. The main probable pollutants are SPM, SO_2 and NO_X from this combustion. To combat emission from the combustion, the unit has proposed to install multi cyclone bag filter to control particulate matters and Wet scrubber for gaseous pollutants. The outlet of the multi cyclone bag filter and the scrubber will be connected to an induced draft fan and finally to the proposed stack of 30 m height to control and disperse the air pollutants within the satisfactory level.

The unit will also have DG set of 63 KVA where Diesel will be used as fuel. It will be operated only in case of power failure or non-availability of power supply. The DG set will be equipped with stack with a height of 2 m above the roof which is meeting the norms of CPCB.

B. Fugitive Emission

The main source of Fugitive Emission are filling, cleaning, purging, sampling, opening, pressure relief, emptying or draining of materials and from storage transfer and handling system are valve stems, flanges, connections and open ends, sampling points and pumps seals. To control fugitive emission, following steps will be implemented in the proposed unit:

- Close handling system provided for transfer of chemicals.
- Pneumatically transfer of liquid raw materials in rector.
- Raw material will be stored in the covered structure.
- Regular maintenance of valves, pipes etc
- Regular monitoring of methanol and Formaldehyde concentration in work area.
- PPE will be provided to the workers.
- Greenbelt will be developed around the plant to arrest the fugitive emission.

Solid Waste

A. Non-Hazardous Solid Waste:

The unit will employ 15 persons when fully operational (including laborers and administrative staff). Municipal solid waste will be generated @0.1 kg/day/person. Hence the quantity of MSW generated will be 1.5 Kg/Day which will be disposed of as per MSW Rules.

Table E-7: Non-Hazardous Solid Waste

SN	Waste	Quantity	Disposal
1	Dry Garbage	0.6 Kg/day	As per MSW Rules
2	Wet Garbage	0.9 Kg/day	As per MSW Rules

B. Industrial Solid Waste:

The unit will obtain membership of active Common Environmental Infrastructure TSDF at Haldia for proper disposal of hazardous waste. The unit has provided dedicated storage area for the hazardous waste storage within premises having impervious floor and roof cover system. The details of hazardous waste generation and handling / Management are given in in **Table E-8**.

Table E-8: Details of Hazardous Waste generation and Disposal

SN	Waste	Category No.	Quantity	Disposal
1.	Used Oil	5.1	20 Lit/Year	Collection, Storage, and reuse as lubricant in plant & machineries or sale to registered recycler
2.	Discarded Containers/ barrels/Plastic	33.1	500 No/Year	Collection, Storage and sent to authorized recycler after decontamination
3.	Resin Residue	23.1	0.2 MT/Year	Collection, Storage and disposal at TSDF site
4.	Plastic Waste	-	4 MT/Year	Collection, storage and sale to register recycler
5.	Fly Ash	37.2	0.15 MT/Day	Collection, Storage and sent brick manufacturers for reprocessing

Noise & Vibration

The main noise generating source in the plant will be operation of boiler, TFH, material handling, process plant, D.G. set, other machineries etc. All these sources will generate continuous noise. However, the noise transmitted outside the plant boundary will be low because most of the noise generating equipment will be in closed structures provided with acoustic enclosure. Equipment will be statically and dynamically balanced. Greenbelt will be developed around the periphery of the plant. Ear muff, ear plug will be provided to all workers working at noisy area.

Aesthetics

There will be no nuisance from noise. DG set will be run only occasionally. There are no crushing, pulverizing operations. There will be no nuisance from noise. DG set will be run only occasionally. There are no crushing, pulverizing operations.

Odour

Odour can be of some sensitivity in chemical industries. However, in this case majority input is odorless, and only few are pungent nature but less in quantity and handled in closed fashion.

Chapter 3 - Baseline Environmental Status

- Study Period: January 2022 to March2022
- Study Area : 10 Km radius surrounding the project site

- ***Ambient Air quality***

The baseline status of the ambient air quality has been established through field monitoring data on PM_{10}, $PM_{2.5}$, Sulphur dioxide (SO_2), oxides of nitrogen (NO_X), NH_3, O_3 and CO at 8 locations within the study area.

Results

Values of PM_{10} in the background environment ranged from 83.40µg/m^3 to 86.50µg/m^3. The value of PM_{10} was found to be within NAAQ standard of 100 µg/m^3.The values of $PM_{2.5}$ range from 28.50 µg/m^3 to 30.00 µg/m^3. The value of $PM_{2.5}$ was found to be within NAAQ standard of 60 µg/m^3.The values of Sulfur-dioxide levels were found to vary from 5.90µg/m^3 to 6.00µg/m^3. The values of SO_2 were found to be well within NAAQ standard of 80µg/m^3.The value of Nitrogen oxide ranged from 27.8µg/m^3 to 29.20µg/m^3. The values of oxides of Nitrogen were observed to be well within the NAAQ standard of 80µg/m^3. The range of CO was between 0.50 to 0.90 mg/m^3 which is also within the standard.

- ***Noise Level***

The noise monitoring was conducted at 8 locations in the study area during monitoring period. 8 sampling locations were selected for the sampling of noise.

Results

The values of noise level parameters like 52.5Leq (day) and 38.26Leq (night), were monitored during study period and it's found that both inside (industrial) and outside (residential) of project area the day and night equivalent noise level is as per the standards given by the CPCB.

Permissible noise limits for residential area prescribed by CPCB are 55 dB(A) during day time and 45 dB(A) during night time and for Industrial area 75 dB(A) during day time and 70 dB(A) during night time. Recorded noise levels are within the permissible limits.

- ***Water quality:***

Ground water collected from 8 locations and surface water collected from 8 locations in the study area during monitoring period.

Results

Ground water samples analyzed during the study period indicate that all parameters are found are also within the IS 10500:2012 limits.

Surface water samples analysed during the study. As per the CPCB water quality criteria for surface water the SW2, SW4, SW6, SW8 falls under Class E and SW1, SW3, SW5, SW7, falls under Class D.

- ***Soil quality***

Representative soil samples from study area were collected at 8 locations.

Results

The Values has been observed that the pH of the soil in the study area ranged from 7.13 to 8.41 the maximum pH observed at S7, whereas the minimum was observed at S6. The electrical conductivity was observed to be in the range of 1015 to 1291 µ mhos/cm, the maximum Electrical Conductivity observed at S6 and minimum Electrical Conductivity was observed at S7. The Potassium values range between 0.010 to 0.022 mg/kg, with the maximum was observed at S6 and the minimum observed at S7. The Sodium values range between 0.015 to 0.027 mg/kg with the maximum was observed at S6 and the minimum observed at S5. The Nitrogen values range between 0.062 to 0.095 mg/Kg, with the maximum was observed at S6 and the minimum observed at S3. The total organic carbon value ranges from 3.03% to 3.39 % with maximum was observed at S1 with minimum was observed at S2.

Ecology and biodiversity

Project site is located at R.S. Plot No 407; L.R. Plot No 550; Mouza – Binnaguri, Village – Gokul Vita, Pargana – Baikunthapur, Dist – Jalpaiguri, West Bengal, PIN: 735135. As per guidelines of MoEF for Environmental Impact Assessment, the study area was restricted up to 10 km periphery of the project site.

Flora:

Floristically, the district is fairly rich. Dominant tree species in Study area are Banyan (*Ficus benghalensis*), Peepal (*Ficus religiosa*), Gulmohar (*Delonix regia*), Radhachura (*Peltophorumpterocarpum*), Amaltas (*Cassia fistula*), Jarul (*Lagerstroemia sepciosa*) , Sissoo (*Dalbergia sissoo*), Raintree (*Samaneasaman*), Akashmani (*Acacia auriculiformis*), Seemal (*Bombax ceiba*), Mango (*Mangifera indica*), Jackfruit (*Artocarpusheterophyllus*), Tamarind (*Tamarindusindica*), Chhatim (*Alstoniascholaris*) and so on. Out of all the floral species commonly found, there are no endemic or endangered ones.

Fauna:

Field observations of fauna were carried out. The commonly available mammals, reptiles, amphibians birds, butterflies within 10 km surroundings were enumerated. Around 15 mammal (including fishing cat), 10 Amphibian and reptile, 5 butterfly species were found during the study period. 30 species of avifauna was also recorded in the study area mostly comprising of common local species.

- ***Socio Economic***

Sex Ratio

The sex ratio is the male to female population ratio. The population share of males and females is 50% and 49%, respectively.

Demography

The project location has a total population of 345718 people, covering an area of sq. km with 76024 numbers of households.

Religion

The major religion in the project area is Hinduism, which accounts for 81.51% of the population. Islam is the second most popular religion in the region, with over 11.51% of the people practising it. Christianity is followed by 4.81%, Jainism by 1.40%, Sikhism by 0.04 %, Buddhism by 1.31 %, and 0.61 % specified 'Other Religion.'

SC and ST Population

The 2011 Socioeconomic and Caste Census (SECC) was carried out in preparation for the 2011 Indian Census. Following a discussion in both Houses of Parliament in 2010, the Manmohan Singh Government approved the 2011 Socioeconomic and Caste Census. According to the Census data 51% of the overall population is in the Unreserved Group. Aside from that, 49% of the entire population was classified as Schedule Castes/Tribes.

Chapter 4- Anticipated Environmental Impact Assessment, Prediction and Mitigation Measures

- ***During Consturction***

Environmental Impact:

Total construction activity involves construction of factory sheds, installation of boiler, resin kettle, DG set, APC devices etc and erection of storage tanks, Office buildings, ETP etc. Therefore there will be no significant impact on environment during construction phase.

The construction Phase involves the following activities

- Erection of plant and Construction
- Installation of equipments
- Transportation
- Material Handling
- Employment of Labour

Air, Noise level, Soil and flora and fauna parameters are likely to be affected by above said activities.

Mitigation Measures:

- The construction of proposed units would result in the increase of SPM concentrations, which can be controlled by frequent sprinkling of water.
- It will be ensured that diesel powered vehicles will be properly maintained to comply with exhaust emission requirements.
- For the labours, proper sanitation facility will be available.
- The noise control measures during the construction phase include provision of caps on the construction equipment and regular maintenance of the equipment.

- ***During operation***

Environmental Impacts:

Air: The impact due to the construction activities will be short time or for limited period. The main sources for impact of air quality during construction period is due to movement of vehicles and construction equipment at site, dust emitted during levelling, grading, earthmoving, foundation works, transportation of construction material etc. Hence, during the construction phase, particulate matter (PM_{10}& $PM_{2.5}$) would be the main pollutants. Particulate matter in an ambient air will increase since the top soil is loose and local meteorological conditions. The emissions from vehicles and construction equipment could also be of some concern on a local level.

Water: The total water requirement will be around 7.78 KL per day, out of which 0.68 KL will be used for domestic purpose from where around 0.48 KL sewage water will be generated which will be flowed to septic tank followed by soak pit. For industrial use, around 4.29 KL water will be required out of which 2.02 KL will be used in production process, 0.87 KL will be used in boiler, 0.7 KL will be required for cooling water makeup and around 0.7 KL will be used for kettle washing. Around 1.3 KL waste water is expected to be generated from boiler blowdown & cooling tower blowdown, which will be stored in a storage tank and will be reused for greenbelt development & dust suppression. Effluent generated from the kettle washing (around 0.7 KLD) will be reused in the process. So there will be no discharge of waste water.

Soil: In the proposed unit, during operational phase, there is very less chance of soil contamination. Other concern will be soil waste including MSW and The other source of industrial waste generation from proposed activity.

Noise: During construction phase, construction equipment, including dozer, scrapers, concrete mixers, generators, vibrators and power tools, and vehicles will be the major source of noise. Most of construction activities are expected to produce noise level within the prescribed limit. The noise generated from various sources will be of short duration and only at day time period. Therefore, no significant impact is envisaged in the construction phase.

Biological Environment: The impact on ecology and biodiversity will be insignificant during the construction phase. No tree will be destroyed.

Socio Economic Environment: The socio-economic impacts during the construction phase of the proposed unit would result due to migrant workers, induced development etc. Increase in floating population. This project will provide temporary employment of skilled and highly skilled manpower. The local people will have employment opportunities in related service activities like petty commercial establishments, small contracts/sub-contracts and supply of construction materials for buildings and ancillary infrastructures etc. consequently, this will contribute to economic up-liftment of the area. Normally, the construction activity will benefit the local population in a number of ways, which include the increase in requirement of construction skilled, semi-skilled and un-skilled workers, tertiary sector employment and provision of goods and services for daily needs including transport.

Mitigation Measures:

a) Air –

The dust generated will also be fugitive in nature, which can be controlled by frequent sprinkling of water. The impacts will be localized and short time in nature and the areas outside the project are not likely to have major impact with respect to ambient air quality. The construction of proposed units would result in the increase of SPM concentrations due to fugitive dust. Frequent water sprinkling in the vicinity of the construction sites would be under taken and will be continued after the completion of plant construction as there is scope for heavy truck mobility. It will be ensured that diesel powered vehicles will be properly maintained to comply with exhaust emission requirements.

b) Water-

The action plan is prepared to ensure that there is no discharge of effluent creating nuisance during rainy season.

- There will be no unattended storage of effluent.
- Pre-monsoon inspection shall be carried out to ensure that there will not be any rain-wash pollution in the eventuality of rain run on or rain run-off.
- The ETP and sludge beds also will be taken care off during pre-monsoon inspection.
- Planned storm water drainage network will be provided and maintained to avoid contamination of rain water with factory waste water and other waste materials.
- Control of water taps, hose pipe washings, leakages from pump glands and flanged joints and overflow of vessels are monitored and controlled.
- Treated waste water from ETP will be partially utilized for as makeup for cooling water and the rest will be evaporated. So there will be no discharge of Treated Waste Water

c) Soil-

- RCC flooring will be done at manufacturing and materials storage area.
- The preventive maintenance will be planned to avoid the failure of valve, pipe lines and other component of transferring line
- All the chemical handling will be carried out on proper RCC area to prevent from soil contamination.
- Municipal Solid waste will be disposed off as per MSW Rules.
- The unit has provided dedicated storage area for the hazardous waste storage within premises having impervious floor and roof cover system.

d) Noise:

- Accoustic enclosures for the DG sets will be used to reduce the noise.
- Ear-Muffs will be provided to the labours when required.

e) Biological Environment:

Study of biological environment is one of the most important aspects for Environmental Impact Assessment. In view of the need for conservation of environmental quality and biodiversity study, biological environment is one of the most important aspects for Environmental Impact Assessment. Ecological systems show complex inter-relationships between biotic and abiotic components including dependence, competition and mutualism. Biotic components comprise of both plant and animal communities, which interact not only within and between them but also with the abiotic components viz. physical and chemical components of the environment. Generally, biological communities are the indicators of climatic and edaphic factors. The biological environment includes mainly terrestrial ecosystem and aquatic ecosystem.

f) Socio Economic Environment:

The socio-economic impacts during the construction phase of the proposed unit would result due to migrant workers, induced development etc. Increase in floating population. This project will provide temporary employment of skilled and highly skilled manpower. The local people will have employment opportunities in related service activities like petty commercial establishments, small contracts/sub-contracts and supply of construction materials for buildings and ancillary infrastructures etc. consequently, this will contribute to economic up-liftment of the area. Normally, the construction activity will benefit the local population in a number of ways, which include the increase in requirement of construction skilled, semi-skilled and un-skilled workers, tertiary sector employment and provision of goods and services for daily needs including transport.

- Local people will be given preference for employment depending on their suitability;
- All the applicable guidelines under the relevant Acts and Rules related to labour welfare and safety will be implemented during the construction phase;
- The contractors will be advised to provide fire wood/kerosene/LPG to the workers to prevent cutting of nearby trees for firewood; and
- The construction site will be secured with fencing and is having guarded entry points.

Chapter 5 - Analysis of Alternatives

The resin plant of M/s Sawariya Chemical has come within the same premises where the proponent is operating a laminate manufacturing unit. Hence there was no need to find a new site for the proposed resin plant as a suitable site had already been found and set up (for laminate manufacturing). Site analysis had been done prior to setting up the laminate manufacturing unit.

Chapter 6 - Environmental Monitoring Program

M/s Sawariya Chemical has adopted comprehensive environmental monitoring plan which is essential to take into account the changes in the environment. The objective of monitoring is:

- To verify the result of the impact assessment study in particular with regards to new developments.
- To follow the trend of parameters which have been identified as critical
- To check or assess the efficiency of controlling measures

- To ensure that new parameters, other than those identified in the impact assessment study, do not become critical through the commissioning of new project.

Chapter 7 - Additional Studies

Details of QRA and DMP have been discussed in the chapter.

Natural and Community Resource Augmentation Plan (NCRAP)

Resource Augmentation Plan

The specific resource augmentation plan with budget would be prepared in accordance with the directive of May 30, 2018 of the Department of Environment, Govt. of WB. It may include some of the following activities:

- Improvement of local solid waste management facilities e.g. installation of composters for municipal/panchayet market areas with specific consent letters from the respective municipalities/panchayet body.
- Improvement and maintenance of water bodies.
- Plantation in surrounding areas/ development of parks/playground
- Drinking water, sanitation or solid waste management facilities for the local community
- Any other project for improving environment.

Final heads or way of implementation will be decided as per valuable instruction of the SEAC committee members.

Chapter 8 - Project Benefits

It is seen that the Project is aimed to fulfil the objective of Sustainable Development. It will improve economic status of the nearby area in the district by improving physical, social infrastructure, providing employment, Social Environment Development Activities and other benefits.

Chapter 9 – Environment Cost Benefit Analysis

Not required at Scoping Stage.

Chapter 10 - Environment Management Plan (EMP)

The management of M/s Sawariya Chemical will take all the necessary steps to control and mitigate the environmental pollution in the planning stage of the project. While implementing the project M/s Sawariya Chemical will follow guidelines specified by CPCB under the Corporate Responsibility for Environmental Protection (CREP) for proposed unit. The EMP task will likely be administered by the "Health, Safety and Environment (HSE) Department", who will have the authority where necessary to "stop the job" if an environmentally detrimental activity is being conducted. The EMP operation/implementation will be the responsibility of the "HSE Officer", who will be coordinating, arranging the collection and reporting of the results of all emissions, ambient air quality, noise and water quality monitoring etc.

Chapter 11 –Disclosure of Consultants Engaged

This EIA report is prepared on behalf of the proponents, taking inputs from proponent's office staff, Architects, Project Management Professionals etc. by Environmental Consultants **M/s. Ultra-Tech Environmental Consultancy and Laboratory, Thane**.

CHAPTER 1: INTRODUCTION

1.1. INTRODUCTION:

M/s Sawariya Chemical has installed a plant for production of Synthetic Resin with a capacity of **1250 MT/Month**, in the land of **0.43 Acre** at R.S. Plot No 407; L.R. Plot No 550; Mouza – Binnaguri, Village – Gokul Vita, Pargana – Baikunthapur, Dist – Jalpaiguri, West Bengal.

Because of high market demand, the project proponent is willing to produce three types of synthetic resin i.e. Urea-Formaldehyde Resin (U-F Resin), Phenol-Formaldehyde Resin (P-F Resin) and Melamine-Formaldehyde Resin (M-F Resin). The production capacity of U-F Resin will be 10 Ton/day and P-F & M-F Resin will be 20 Ton/day each.

The proposed synthetic resin manufacturing plant comes under Sr. No. 5 (f) of EIA Notification, 14th September 2006 and subsequent amendments. The Proposed production of synthetic resin manufacturing plant of **M/s Sawariya Chemical** falls in Category 'B'.

The application for TOR had been submitted to MoEF&CC portal vide Proposal No SIA/WB/IND3/74306/2022 on 25th March, 2022 and the ToR has been obtained vide letter no 1227/AEN/T-II-1/028/2022 dated 29th June 2022..ToR copy is enclosed as **Annexure-I**.

1.2. JUSTIFICATION OF PROJECT

1.2.1. Purpose of EIA

As per EIA Notification dated 14thSeptember, 2006 and its amendments thereon, proposed Resin manufacturing activity falls under schedule 5(f) Synthetic Organic Chemicals Industry and hence need to obtain prior Environmental Clearance from MoEF&CC. The Proposed production of synthetic resin manufacturing plant of **M/s Sawariya Chemical** falls in Category 'B'.

The application for TOR had been submitted to MoEF&CC portal vide Proposal No SIA/WB/IND3/74306/2022 on 25th March, 2022 and the ToR has been obtained vide letter no 1227/AEN/T-II-1/028/2022 dated 29th June 2022.ToR copy is enclosed as **Annexure-I**.

The EIA study is carried out to assess the pollution potential and evaluate the adequacy and efficiency of proposed Pollution Control & Environmental Management System. The main objectives of the study are:

1) To assess the background environmental status,
2) To identify potential sources of pollution,
3) To predict and evaluate the impact on environment along with pollution control measures taken
4) To prepare a comprehensive Environment Management Plan.

1.3. METHODOLOGIES FOR EIA

Taking into consideration proposed project activities and guidelines, an area of 10 km radius from the centre of the project has been selected and is designated as the study area for the purpose of EIA studies.

1.3.1. Baseline Environmental Conditions

The samples of ambient air, ground and surface water, soil and noise data have been collected and analysed as per the standard methods for establishing the baseline data and to determine the impact of proposed activity on the same.

Ambient Air Environment

The air environment around the plant was studied by setting up eight locations within the study area of 10 km radius from the project site and collection and monitoring the site specific meteorological data, viz. wind speed, wind direction, humidity, rainfall and ambient temperature was carried out. Design of network for ambient air quality monitoring locations is based on guidelines provided by CPCB. The ambient air samples were collected and analysed for PM_{10}, $PM_{2.5}$, SO_2, NOx, O_3, NH_3, TVOC for identification, prediction, evaluation and assessment of potential impact on ambient air environment.

Ground and Surface Water Environment

The water required for domestic and industrial use is being made available from the ground water. Hence, to assess the physico-chemical quality of the water, a number of water samples were collected and analysed for pollution parameters viz., pH, TDS, Turbidity, Fluorides, Chlorides, Sulphates, Hardness, Alkalinity etc.

Noise Environment

Noise pollution survey was conducted in the study zone. The anticipated noise sources were vehicular and some industrial activities, which are likely to be increased due to the proposed expanded activity. Noise levels were also recorded in surrounding villages for evaluating general scenario of the study area. Hourly equivalent sound levels (Leq) were also recorded for calculating Day and Night noise levels in the surrounding villages.

Soil Environment

Soil sampling and analysis was carried out to assess physico-chemical characteristics of the soils and delineate existing cropping pattern, existing land use and topography, within the study area.

Biological Environment

Keeping in view, the importance of biological component of total environment due to the proposed project, biological characterization of terrestrial and aquatic environments, changes in species diversity of flora and fauna in terrestrial as well as aquatic systems were studied for impact analysis due to proposed project activity, if any.

Socio-economic Environment

Demographic and related socio-economic data was collected from census handbook to assess socio-economic status of the study area. Assessment of impact on significant historical, cultural, and archaeological sites/places in the area and economic and employment benefit arisen out from the project is given special attention.

1.3.2. Identification of Pollution Source

Detailed study of manufacturing process for proposed scenario is carried out along with input and output of materials, water, and wastewater as well as infrastructure facilities available.

1.3.3. Evaluation of Pollution Control and Environmental Management System

The qualitative and quantitative analysis of various pollution sources as well as evaluation of pollution control system is carried out.

1.3.4. Evaluation of Impact

A comprehensive evaluation of environmental impact with reference to proposed activities is carried out.

1.3.5. Preparation of Environmental Management Plan

A comprehensive Environmental Management Plan has been prepared covering all the aspects of pollution prevention measures, Air and Water Pollution Control measures, Hazardous Waste Management, Environmental Surveillance and Environmental Management Plan.

1.4. STRUCTURE OF REPORT

The objective of the EIA study is preparation of Environment Impact Assessment (EIA) report based on the guidelines of the Ministry of Environment Forests and Climate Change (MoEFCC), CPCB and WBPCB. It incorporates the following.

- **Chapter 1** is an Introduction to the Industry, their premises and surrounding areas. It also expresses the basic objectives and methodologies for EIA studies and work to be covered under each Environmental component.

- **Chapter 2** presents a Description of Project and Infrastructure facilities including all industrial and environmental aspects of M/s. Sawariya Chemical Industries as well as manufacturing process details. This chapter also gives information about raw material storage and handling, water and wastewater quantitative details, air pollution and control system, Hazardous Waste generation, storage facility and disposal and utilities for proposed plant capacity. It also provides information about proposed Environmental Management Facilities available at the project site.

- **Chapter 3** covers Baseline Environmental Status including meteorological details, Identification of baseline status of Environmental components of the surrounding area covering air, water and land environment. Also presents a study of land use pattern, Biological Environment & Socio-Economic Environment giving details about the district and the study area in terms of land use pattern, biological environment, and socio-economic environment.

- **Chapter 4** deals with Identification and Prediction of Impact, which provides quantification of significant impacts of the proposed activities of plant on various environmental components. Evaluation of the proposed pollution control facilities has been presented.

- **Chapter 5** deals with Analysis of Alternatives

- **Chapter 6** deals with Environmental Monitoring Programme

- **Chapter 7** describes Additional Studies I.e. Risk analysis and Disaster management plan that shall be adopted by the company.
- **Chapter 8** Describes Benefits of the Project
- **Chapter 9** describes the Environment cost benefit analysis if in the scoping stage
- **Chapter 10** describes Environment Management Plan (EMP) to be adopted for mitigation of anticipated adverse impacts if any and to ensure acceptable impacts
- **Chapter 11**. Summary of the Project
- **Chapter 12** describes Details of Consultants Engaged

1.5. TOR COMPLIANCE

Table 1.1: ToR Compliance

<table>
<tr><th>SN</th><th colspan="2">Description</th><th>Compliance in the Draft EIA Report</th></tr>
<tr><td colspan="4">TOR Conditions</td></tr>
<tr><td colspan="4">A. Standard Terms of Reference</td></tr>
<tr><td>1</td><td colspan="2">Executive Summary</td><td>Executive Summary is enclosed in the beginning of this EIA/EMP report.</td></tr>
<tr><td>2</td><td colspan="2">Introduction</td><td></td></tr>
<tr><td></td><td>i.</td><td>Details of the EIA Consultant including NABET accreditation</td><td>ULTRA-TECH ENVIRONMENTAL CONSULTANCY AND LABORATORY (Gazetted ByMoEF) Unit No. 206, 224, 225 Jai Commercial Complex, Eastern Express Highway, Opp Cadbury Factory, Khopat, Thane (West) – 400 06. Accredited EIA Consultant Organization by NABET, QCI, New Delhi at S. No.146 (MoEF&CC) List of Accredited EIA Consultant Organizations (Rev. 62; February 05, 2018).</td></tr>
<tr><td></td><td>ii.</td><td>Information about the project proponent</td><td>M/s Sawariya Chemical at land R.S. Plot No 407; L.R. Plot No 550; Mouza – Binnaguri, Village – Gokul Vita, Pargana – Baikunthapur, Dist – Jalpaiguri, West Bengal PIN: 735135</td></tr>
<tr><td></td><td>iii.</td><td>Importance and benefit of the project</td><td>Addressed in chapter 8.</td></tr>
<tr><td>3</td><td colspan="2">Project Description</td><td></td></tr>
<tr><td></td><td>i.</td><td>Cost of the project and time of completion</td><td>Project Cost: 82 Lakh.
Completion time: The commercial operation date (COD) is envisaged in six (6) months reckoned from the effective zero date.</td></tr>
<tr><td></td><td>ii.</td><td>Product with capacities for the proposed projects</td><td>
<table>
<tr><th>SN</th><th>Name of the product</th><th>Production Capacity(MT/Month)</th><th>Production Capacity(MT/Annum)</th><th>Storage Capacity (MT)</th></tr>
<tr><td>1</td><td>Urea-Formaldehyde Resin</td><td>250</td><td>3000</td><td>70</td></tr>
<tr><td>2</td><td>Phenol-Formaldehyde Resin</td><td>500</td><td>6000</td><td>140</td></tr>
</table>
</td></tr>
</table>

SN	Description	Compliance in the Draft EIA Report
TOR Conditions		

			3	Melamine - Formaldehyde Resin	500	6000	140
				Total	**1250**	**15000**	**350**

	iii.	If expansion project, details of existing products with capacities and weather adequate land is available for expansion, reference of earlier EC if any

Not Applicable

	iv.	List of raw materials required and their source along with the mode of transportation

Raw materials	Chemical Name	Form	Quantity(MT/Month)	Mode of Transport
Formaldehyde	Formaldehyde	Liquid	769.22	Shipment /Truck
Industrial Urea	Carbonyl diamide	Solid	70	Road
Phenol	Carbolic Acid	Liquid	226.34	Shipment /Truck
Melamine	1,3,3-triamino-2,4,6-triazine	Solid	193.85	Road
Caustic Soda	Sodium Hydroxide	Solid	27.60	Road
Acetic Acid	Acetic Acid	Liquid	5.63	Road

	v.	Other chemicals and materials required with quantities and storage capacities

Not applicable

	vi.	Details of emission, effluents, hazardous waste generation and their management	Emission	The main source of air pollution will be the flue gas from Steam Boiler, Thermic Fluid Heater and D.G Set contains PM, SO_2 and NO_X as air pollutants. To combat emission from the combustion, the unit has proposed to install multi cyclone bag filter to control particulate matters and Wet scrubber for gaseous pollutants. The outlet of the multi cyclone bag filter and the scrubber will be connected to an induced draft fan and finally to the proposed stack of 2 m height to control and disperse the air pollutants within the satisfactory level.
			Effluent	The total water requirement will be around 7.78 KL per day, out of which 0.68 KL will be used for domestic purpose from where around 0.48 KL sewage water will be generated which will be flowed to septic tank followed by soak pit. For industrial use, around 4.29 KL water will be required out of which 2.02 KL will be used in production process, 0.87 KL will be used in boiler, 0.7 KL will be required for cooling water makeup and around 0.7 KL will be used for kettle washing. Around 1.3 KL waste water

<table>
<tr><th>SN</th><th>Description</th><th>Compliance in the Draft EIA Report</th></tr>
<tr><td colspan="3">TOR Conditions</td></tr>
<tr><td></td><td></td><td></td><td>is expected to be generated from boiler blowdown & cooling tower blowdown, which will be stored in a storage tank and will be reused for greenbelt development & dust suppression. Effluent generated from the kettle washing (around 0.7 KLD) will be reused in the process. So there will be no discharge of waste water.</td></tr>
<tr><td></td><td></td><td></td><td>Hazardous Waste
<table>
<tr><th>SN</th><th>Waste</th><th>Quantity & Unit</th></tr>
<tr><td>1.</td><td>Used Oil</td><td>30 Lit/Year</td></tr>
<tr><td>2.</td><td>Discarded Containers/barrels/Plastic</td><td>600 No/Year</td></tr>
<tr><td>3.</td><td>Resin Residue</td><td>0.25MT/Year</td></tr>
<tr><td>4.</td><td>Plastic Waste</td><td>4.8 MT/Year</td></tr>
<tr><td>5.</td><td>Fly Ash</td><td>1.5 MT/Day</td></tr>
<tr><td></td><td>ETP Sludge</td><td>10MT/Year</td></tr>
</table></td></tr>
<tr><td></td><td>vii</td><td>Requirement of water, power, with source of supply, status of approval, water balance diagram, man-power requirement (regular & contract)</td><td>
<table>
<tr><th>Particulars</th><th>Demand</th><th>Source</th></tr>
<tr><td>Water</td><td>7.78 KLD</td><td>Ground Water</td></tr>
<tr><td>Power</td><td>70 kVA</td><td>WBSEDCL</td></tr>
<tr><td>Man Power</td><td>15</td><td>Nearby areas</td></tr>
</table></td></tr>
<tr><td></td><td>viii</td><td>Process description along with major equipments and machineries. Process flow sheet (quantitative) from raw material to products to be provided.</td><td>The process description for U-F Resin, M-F Resin and P-F resin has been addressed in point 2.10 of chapter 2 of the EIA/EMP report.</td></tr>
<tr><td></td><td>ix.</td><td>Hazard identification and details of proposed safety system.</td><td>Hazard identification and details of proposed safety systems is given in Chapter -7 of the EIA/EMP report</td></tr>
<tr><td></td><td>x.</td><td>Expansion/modernization proposal</td><td>Not applicable.</td></tr>
<tr><td></td><td></td><td>a. Copy all environmental clearance(s) including Amendments thereto obtained for the project from MOEF & CC/SEIAA shall be attached as an annexure. A certified copy of the latest monitoring report of the regional office of the Ministry of Environment and Forests as per circular dated 30th May 2012 on the status of compliance of conditions stipulated in all of the environmental Clearance including Amendments shall</td><td>Not applicable.</td></tr>
</table>

SN	Description		Compliance in the Draft EIA Report
TOR Conditions			
		be provided. In addition, status of compliance of Consent to Operate for the ongoing / existing operation of the project from SPCB shall be attached with the EIA – EMP report	
		b. In case the existing project has not obtained environmental clearance, reasons for not taking EC under the provisions of the EIA notification 1994 and / or EIA notification 2006 shall be provided. Copies of consent to establish / No objection Certificate and Consent to operate (in case of units Operating prior to EIA notification 2006, CTE and CTO of FY 2005 – 2006) obtained from the SPCB shall be submitted. Further, compliance report to the conditions of consents from the SPCB shall be submitted.	
4	Site Details		
	i.	Location of the project site covering village, Taluka/ Tehsil, District and state, Justification for selecting the site, whether other sites are considered.	M/s Sawariya Chemical is a proprietorship concern having its office at Village Gokul Vita, Mouza – Binnaguri, P.O – Kamar Vita, P.S– Bhaktinagar, Dist. - Jalpaiguri., West Bengal PIN: 735135. The industry has following favourable conditions of the proposed unit: ➢ Vicinity to Market ➢ Availability of Land Area ➢ Availability of Water supply ➢ Availability of Local Labour ➢ Availability of Power ➢ Well-developed Transport Infrastructure
	ii.	A toposheet of the study area of radius of 10 km and site location on 1:50,000 / 1:25,000 scale on an A3/A2 sheet. (including all eco-sensitive areas and environmentally sensitive places)	The toposheet of the study area of radius of 10 km and site location is given in chapter 3 in Figure 3.6

<table>
<tr><th>SN</th><th colspan="2">Description</th><th>Compliance in the Draft EIA Report</th></tr>
<tr><td colspan="4">TOR Conditions</td></tr>
<tr><td></td><td>iii</td><td>Details w.r.t option analysis for selection of site</td><td>Based on our analysis it may be inferred that

✓ The project is technically feasible and financially viable.
✓ The overall financial liquidity and profitability parameters of the project appeared to be reasonable and satisfactory.
✓ We conclude the capital expenditure of the company as a viable option subject to the weakness and threats associated with a business venture.
✓ The operation of plant has significant positive impact on the socio-economic environment of the area. It helps to sustain the development of this area including further development of physical infrastructure facilities.</td></tr>
<tr><td></td><td>iv</td><td>Co-ordinates (lat-long) of all four corners of the site</td><td>Co-ordinates :-26°39'5.32"N,88°29'45.90"E</td></tr>
<tr><td></td><td>v</td><td>Google map-Earth downloaded of the project site</td><td>Addressed in Figure 2.3 in Chapter 2.</td></tr>
<tr><td></td><td>vi.</td><td>Layout map indicating existing units as well as proposed units indicating storage area, plant area, green belt area, utilities etc. If located within an industrial area/Estate/Complex, Layout of Industrial area indicating location of unit within the industrial area / Estate.</td><td>Addressed in Figure 2.4 in Chapter 2 of the EIA/EMP report.</td></tr>
<tr><td></td><td>vii.</td><td>Photographs of the proposed and existing (if applicable) plant site. If existing, shows photographs of plantation / greenbelt, in particular.</td><td></td></tr>
<tr><td></td><td>viii.</td><td>Land use break up of total land of the project site (identified and acquired), government / private – agricultural, forest, wasteland, water bodies, settlements, etc</td><td>
<table>
<tr><th>S.N.</th><th>Description</th><th>Area (SQM)</th><th>% Utilization</th></tr>
<tr><td>1</td><td>Plant Shed & Office building</td><td>408.48</td><td>23.68</td></tr>
<tr><td>2</td><td>Green Area</td><td>584.31</td><td>33.87</td></tr>
<tr><td>4</td><td>Parking Area</td><td>112.5</td><td>6.52</td></tr>
<tr><td>5</td><td>Road Area</td><td>138.91</td><td>8.05</td></tr>
<tr><td>6</td><td>Service Area</td><td>112.47</td><td>6.52</td></tr>
<tr><td>7</td><td>Open Area</td><td>368.31</td><td>21.35</td></tr>
<tr><td colspan="2">Total Plot Area</td><td>1724.98</td><td>100.00</td></tr>
</table>
</td></tr>
<tr><td></td><td>ix.</td><td>A list of major industries with name and type within study area (10 km radius) shall be</td><td>M/S Shyamalmoy Paul & Co- 0.10Km
Maa Tara Saw Mill- 0.62 Km
Land use at project site is industrial.</td></tr>
</table>

SN	Description		Compliance in the Draft EIA Report
TOR Conditions			
		incorporated. Land use details of the study area.	
	x.	Geological features and geo-hydrological status of the study area shall be included.	Geological features and Geo-hydrological status of the study area is given in chapter -3 of EIA report
	xi.	Details of the drainage upto 5 km radius of the study area. If the site is 1 km radius of any major river, peak rainfall data of apst 30 years. Details of flood level of the project site and maximum Flood level of the river shall also be provided. (mega green field project)	Addressed in Section 3.8 and **Figure 3.12** in Chapter 3 of EIA report.
	xii.	Status of acquisition of the land. If acquisition is not complete, stage of the acquisition process and expected time of complete possession of the land	Addressed in Chapter 2 Land use is industrial and already acquired by the project proponent.
	xiii.	R & R details in respect of land in line with state government policy.	Not Applicable
5	Forest and Wildlife related issues (if applicable):		
	i.	Permission approval for the use of forest land (forestry clearance), if any, and recommendations of the state Forest Department.(if applicable).	Not applicable
	ii.	Land use map based on High resolution satellite imagery (GPS) of the proposed site delineating the forestland (in case of projects involving forest land more than 40 ha).	No forest land is involved in the proposed expansion project. Land use map based on High Resolution Satellite Imagery (GPS) of the proposed expansion has been given in **Figure.3.9** of Chapter-3 of EIA/ EMP Report.
	iii.	Status of Application Submitted for obtaining the stage l forestry clearance along with the latest status shall be submitted.	Not applicable
	iv	The projects to be located within 10 km of the National parks , Sanctuaries, Biosphere Reserves , Migratory Corridors of Wild Animals , the project Proponent shall submit the map duly authenticated by Chief Wildlife	Not applicable

SN	Description		Compliance in the Draft EIA Report
TOR Conditions			
		Warden showing these features vis – a - vis the project location and the recommendations or comments of the chief Wildlife Warden – thereon .	
	v.	Wildlife Conservation plan duly authenticated by the chief Wildlife Warden of the State Government for conservation of Schedule l fauna , if any exists in the study area .	Not applicable
	vi.	Copy of application submitted for clearance under the Wildlife (Protection) Act 1972, to the Standing Committee of the National Board for Wildlife.	Not applicable
6	Environmental status		
	i.	Determination of atmospheric inversion level at the project site and site – specific micro – meteorological date using temperature, relative humidity, hourly wind speed and direction and rainfall.	Site - Specific Micro Meteorological data (Temperature, Relative Humidity, Hourly Wind Speed and Direction, Rainfall) were collected during (January 2022 to March 2022) has been given in **Table 3.1** of chapter -3
	ii.	AAQ date (except monsoon) at 8 location for $PM_{10,}$ $PM_{25,}$ $SO_{2,}$ $NO_{X,}$ CO and other Parameters relevant to the project shall be collected .The monitoring stations shall be based CPCB guidelines and take into account the pre – dominant wind direction , population zone and sensitive receptors including reserved forest .	➢ One – season data (January 2022 to March 2022) has been generated & collected. ➢ AAQ data includes PM10, PM2.5, NOX, SO2, CO and other parameters relevant to the project were generated. ➢ The monitoring stations were selected taking into account the dominant wind direction, population zone and sensitive receptors etc. The monitoring station selected is as described in Table 3.4 of chapter-3.
	iii.	Raw data of all AAQ measurement for 12 weeks of all stations as per frequency given in the NAQQM Notification of Nov. 2009 along with – min., max ., average and 98% values for each of the AAQ parameters from date of all AAQ stations should be provided as an annexure to the EIA Report .	Detail is given in **Annexure 2.**
	iv	Surface water quality of nearby River (60m upstream and	8 surface water samples were collected as grab samples and were analyzed for various parameters as per CPCB/

SN	Description		Compliance in the Draft EIA Report
TOR Conditions			
		downstream) and other surface drains at eight locations as per CPCB/MOEF & CC guidelines.	MoEF&CC guidelines. The monitoring location has been given in Table 3.12 and the analysis has been given in Table 3.13 of EIA/ EMP report. The same has been enclosed as **Annexure – 2**
	v.	Whether the site falls near to polluted stretch of river identified by the CPCB/MOEF&CC.	No
	vi.	Ground water monitoring at minimum at 8 locations shall be included.	8 locations of ground water samples have been analysed for various parameters as per CPCB/ MoEF&CC guidelines. The monitoring locations have been given in Table 3.9 and the analysis has been given in Chapter-3, Table No. – 3.10 of EIA/ EMP report. The same has been enclosed as **Annexure – 2**
	vii.	Noise levels monitoring at 8 locations within the study area.	Noise level monitoring was carried out at 8 locations within the study area as per CPCB/ MoEF&CC guidelines. The analysis has been given in chapter-3, Table No. – 3.6 of EIA/ EMP report. The same has been enclosed as **Annexure –2**
	viii	Soil Characteristic as per CPCB guidelines.	Soil sampling was carried out for 8 locations within the study area. The analysis has been given in Chapter-3, Table No. – 3.16 of EIA/ EMP report. The same has been enclosed as **Annexure – 2**
	ix.	Traffic study of the area, type of vehicles, frequency of vehicles for transportation of materials, additional traffic due to proposed project, parking arrangement etc.	Addressed in Chapter 3 in section 3.10
	x.	Detailed description of flora and fauna (terrestrial and aquatic) existing in the study area shall be given with special reference to rareendemic and endangered species. If Schedule – I fauna are found within the study area, a Wildlife Conservation plan shall be prepared and furnished.	The study of flora and fauna (terrestrial and aquatic) existing in the study area has been given in Chapter-3, Section -3.8.4 of EIA/ EMP report.
	xi.	Socio – economic status of the study area.	Socio-Economic status of the study area has been given in Chapter-3, Section – 3.9 of EIA/ EMP report.
7	Impact Assessment and Environment Management plan		
	i.	Assessment of ground level concentration of pollutants from the stack emission based on site – specific meteorological features. In case the project is located on a hilly terrain, the AQIP Modelling shall be done using input of the	Air quality impact is envisaged due to operation of proposed Steam Boiler (0.3TPH) (using Coal) Unit. Hence, Particulate Matter (PM) and Sulphur Dioxide (SO_2) are expected as pollutants from operation. Ground level concentrations (GLCs) have been predicted using AERMOD Cloud software. The application

SN	Description		Compliance in the Draft EIA Report
TOR Conditions			
		specific terrain characteristics for determining the potential impacts of the project on the AAQ. Cumulative impact of all sources of emission (including transportation) on the AAQ of the area shall be well assessed. Details of the model used and the input data used for modelling shall also be provided. The air quality contours shall be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any.	incorporates popular U.S. EPA air dispersion models AERMOD and ISCST3 into one integrated graphical interface. The model uses rural dispersion and regulatory defaults options as per guidelines on air quality models (PROBES/70/1997-1998). Addressed in Chapter 4
	ii.	Water Quality Modelling – in case, if the effluent is study should be conducted for the drain water taking into consideration the upstream and downstream quality of water of the drain .	Not applicable
	iii.	Impact of the transport of the raw materials and end products on the surrounding environment shall be assessed and provided. In this regard, options for transport of raw materials and finished products and wastes (large quantities) by rail or rail – cum road transport or conveyor – cum – rail transport shall be examined.	Addressed in Chapter 4
	iv	A note on treatment of wastewater from different plant operations, extent recycled and reused for different purposes shall be included, Complete scheme of effluent treatment, Characteristics of untreated and treated effluent to meet the prescribed standards of discharge under E (p) Rules.	The total water requirement will be around 7.78 KL per day, out of which 0.68 KL will be used for domestic purpose from where around 0.48 KL sewage water will be generated which will be flowed to septic tank followed by soak pit. For industrial use, around 4.29 KL water will be required out of which 2.02 KL will be used in production process, 0.87 KL will be used in boiler, 0.7 KL will be required for cooling water makeup and around 0.7 KL will be used for kettle washing. Around 1.3 KL waste water is expected to be generated from boiler blowdown & cooling tower blow-down, which will be stored in a storage tank and will be reused for greenbelt development & dust suppression. Effluent generated from the kettle washing (around 0.7 KLD) will be reused in the process. So there will be no discharge of waste water.

<table>
<tr><th>SN</th><th colspan="2">Description</th><th>Compliance in the Draft EIA Report</th></tr>
<tr><td colspan="4">TOR Conditions</td></tr>
<tr><td></td><td></td><td></td><td>Details of water requirement are given in Table-2.14. Water balance diagram is given in Figure: 2.9.</td></tr>
<tr><td></td><td>v.</td><td>Details of stack emission and action plan for control of emissions to meet standards.</td><td>Air quality impact is envisaged due to operation of proposed Steam Boiler (0.3TPH) (using Coal) Unit. Hence, Particulate Matter (PM) and Sulphur Dioxide (SO_2) are expected as pollutants from operation.</td></tr>
<tr><td></td><td>vi.</td><td>Measures for fugitive emission control.</td><td>Bag filter is proposed as air pollution control measures to proposed boilers. Also, stacks of adequate height are proposed attached to boilers to disperse flue gases.</td></tr>
<tr><td></td><td>vii.</td><td>Details of hazardous waste generation and their storage, utilization and disposal .Copies of MOU regarding utilization of solid and hazardous waste shall also be included. EMP shall include the concept of waste – minimization, recycle/ reuse/ recover techniques, Energy conservation, and natural resource conservation.</td><td>
<table>
<tr><th>SN</th><th>Waste</th><th>Quantity</th><th>Disposal</th></tr>
<tr><td>1.</td><td>Used Oil</td><td>20 Lit/Year</td><td>Collection, Storage, and reuse as lubricant in plant & machineries or sale to registered recycler</td></tr>
<tr><td>2.</td><td>Discarded Containers/ barrels/ Plastic</td><td>500 No/Year</td><td>Collection, Storage and sent to authorized recycler after decontamination</td></tr>
<tr><td>3.</td><td>Resin Residue</td><td>0.2 MT/Year</td><td>Collection, Storage and disposal at CHWIF</td></tr>
<tr><td>4.</td><td>Plastic Waste</td><td>4 MT/Year</td><td>Collection, storage and sale to register recycler</td></tr>
<tr><td>5.</td><td>Fly Ash</td><td>0.15 MT/Day</td><td>Collection, Storage and sent to TSDF or brick manufacturers for reprocessing</td></tr>
</table>
</td></tr>
<tr><td></td><td>viii</td><td>Proper utilization of fly ash shall be ensured as per Fly Ash Notification, 2009. A detailed plan of action shall be provided.</td><td>Not applicable</td></tr>
<tr><td></td><td>ix.</td><td>Action plan for the green belt development plan in 33% area i.e. land with not less than 1,500 trees per ha. Giving details of species, width of plantation , planning schedule etc . shall be included. The green belt shall be around the project boundary and a scheme for greening of the roads used for the project shall also be incorporated.</td><td>The proposed green belt will be developed on an area of 584.31 Sq.m.of land which is about 33.87% of the entire project area. Details are addressed in chapter 10 in section 10.7.4.2. of the EIA/EMP report.</td></tr>
<tr><td></td><td>x.</td><td>Action plan for rainwater harvesting measures at plan site shall be submitted to harvest rainwater from the roof tops and storm water drains to recharge</td><td>Rain water will be collected from the roof of sheds and office building. The same will be directed towards the proposed water storage tank of capacity 15 Cu.M will be sufficient as daily fresh water demand is 5.78 KLD. The water from this tank shall be used in sprinkling for dust</td></tr>
</table>

SN	Description		Compliance in the Draft EIA Report
TOR Conditions			
		the ground water and also to use tops and storm water drains to recharge the ground water and also to used for the various activities at the project site to conserve fresh water and reduce the water requirement from other sources.	suppression and gardening purpose. Addressed in chapter 10 in section 10.2.
	xi.	Total capital cost and recurring cost/annum for environmental pollution control measures shall be included.	Addressed in Chapter 10, Table 10.3
	xii.	Action plan for post – project environmental monitoring shall be submitted.	Addressed in chapter 6 in table 6.2 of the EIA/EMP report.
	xiii.	Onsite and offsite Disaster (natural and Man – made) preparedness and Emergency Management plan including Risk Assessment and damage control. Disaster management plan should be linked with District Disaster Management plan.	Addressed in chapter 7 of the EIA/EMP report.
8	Occupational health		
	i.	Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers.	Addressed in Chapter 10 in Section 10.9 Proposed Occupational Health & Safety policy attached as
	ii.	Details of exposure specific health status evaluation of worker , If the workers health is being evaluated by pre – designed format , chest x rays , Audiometry , Spirometry, Vision testing (Far & Near vision , colour vision and any other ocular defect) ECG, during pre-placement and periodical examinations give the details of the same . Details regarding last Month analysed data of abovementioned of the parameters as per age, sex, duration of exposure and department Wise.	Have been discussed in Chapter 7 & 10 of EIA-EMP Report.
	iii.	Details of existing Occupational & Safety Hazards. What are the	Have been discussed in Chapter 7 & 10 of EIA-EMP Report.

SN	Description		Compliance in the Draft EIA Report
TOR Conditions			
		exposure levels of above mentioned hazards and whether they are within Permissible Exposure level (PEL). If these are not within PEL, what measures the company has adopted to keep them within PEL so that health of the workers can be preserved.	
	iv.	Annual report of health status of workers with special reference to Occupational Health and Safety.	Have been discussed in Chapter 7 & 10 of EIA-EMP Report
9	Corporate Environment Policy		
	i.	Does the company have a well laid down Environment policy approved by its Board of Directors? It so, it may be detailed in the EIA report.	Addressed in Section 10.4 of chapter 10 of the EIA/EMP Report
	ii.	Does the Environment policy Prescribe for standard operating process procedures to bring into focus any infringement / deviation /violation of the environmental or forest norms/ conditions? If so, it may be detailed in the EIA.	
	iii.	What is the hierarchical system or Administrative order of the company to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions? Details of this system may be given.	
	iv	Does the company have system of reporting of non – compliance / violations of environmental norms to the Board of Directors of the company and / or shareholders or stakeholders at large? This reporting mechanism shall be detailed in the EIA report.	
10	Details regarding infrastructure facilities such as sanitation, fuel, restroom etc. To be provided to the labour force during construction as well as to the casual		Addressed in Chapter 10 of the EIA/EMP report.

SN	Description	Compliance in the Draft EIA Report
TOR Conditions		
	workers including truck drivers during operation phase.	
11	Environmental Management Plan (EMP)	
	Adequate funds) shall be earmarked towards the Environmental Management Plan based on Public Hearing issues and item wise details along with time bound action plan shall be included, Socio-economic development activities need to be elaborated upon. The office Memorandum issued by the MOEF&CC vide F.no. 22-65/2017-1A, 111 dated 30/09/2020 should be strictly followed.	Addressed in Chapter 10 in Table 10.4
12	Any litigation pending against the project and / or any direction / order passed by any court of Law against the project, if so , details thereof shall also be included. Has the unit received any notice under the section 5 of Environment (protection) Act. 1986 or relevant sections of Air and Water Acts? If so, details thereof and compliance / ATR to the notice (s) and present status of the case.	Not applicable
13	A tabular chart with index for point wise compliance of above TOR	Addressed in Chapter 1 in section 1.5
B. Specific Terms of Reference		
1	Details on solvents to be used, measures for solvent recovery and for emissions control.	Not Applicable
2	Details of process emissions from the proposed unit and its arrangements to control.	The main source of air pollution will be the flue gas from Steam Boiler (0.3TPH) using Coal contains PM, SO_2 and NOx as air pollutants. It will be managed through Bag filter Induced draft fan and adequate stack height will be given as per CPCB norms.
3	Ambient air quality data should include VOC, other process specific pollutants like NH3, Chlorine, HCL, HP.r, H2s, HF etc. (as applicable)	Not applicable.
4	Work zone monitoring arrangement for hazardous chemicals.	Addressed in Chapter 6 of the EIA/EMP report
5	Detailed effluent treatment scheme including segregation of effluent streams for units adopting "Zero' liquid discharge.	Addressed in Section 2.11.3 of Chapter 2 of the EIA/EMP report.
6	Action Plan for odour control to be submitted.	Air Ventilation System provided in the factory shade to mitigate the odour pollution.
7	A copy of the Memorandum of	Project Proponent will apply for TSDF membership.

SN	Description	Compliance in the Draft EIA Report
TOR Conditions		
	Understanding signed with cement manufacturers indicating clearly that they co-process organic solid/hazardous waste generated.	
8	Authorization/Membership for disposal of liquid effluent in CETP and soild/hazardous waste in TSDF, if any.	Project Proponent will apply for TSDF membership.
9	Action plan for utilization of MEE/dryers salts.	Not applicable
10	Material Safety Data sheet for all the Chemicals are being used/will be used.	Given as Annexure 5
11	Authorization/Membership for the disposal of solid/hazardous waste in TSDF	Project Proponent will apply for TSDF membership
12	Details of incinerator if to be installed.	Not applicable
13	Risk assessment for storage and handling of hazardous chemicals/solvents. Action plan for handling & safety system to be incorporated.	Addressed in chapter 7
14	Arrangements for ensuring health and safety of workers engaged in handling of toxic materials.	Addressed in Chapter 10 of the EIA/EMP report.
C. Additional TOR for Violation Projects:		
1	Project description, its important and the benefits.	Project description is given in Chapter 2 of the EIA report.
2	Project site details (location on toposheet of the study area of 10m, coordinates, Google Map, layout map land use geological features status of the study area, drainage.	
3	Land use as per the approved Master Plan of the area. Permission/ approvals required from the land owning agencies. Development authorities, local body, water supply and sewage boards etc.	Details are given in Chapter 2 of EIA/EMP report
4	Land acquisition status and R & R details.	Not applicable.
5	Forest and wildlife and eco-sensitive zones. If any in the study area of 10 km. clearance require under the Forest (Conservation) Act 1980, the Wildlife (Protection) Act, 1972 and /or the Environment (Protection) Act, 1986.	Not applicable
6	Baseline environmental study for ambient air (PM10, PM2.5, SO2, NOx, CO), water (both surface and ground) noise and soil for one month (except	Baseline Environmental study report is given in Chapter 3 of the EIA report. The report is given in **Annexure 2**.

SN	Description	Compliance in the Draft EIA Report
TOR Conditions		
	monsoon period) as per MOEF&CC / CPCB guidelines at minimum 5 locations in the study area of 10 km.	
7	Details on flora and fauna & socio-economic aspects in the study area.	The details of flora & fauna are given in section 3.8.4 of chapter 3 of the EIA report.
8	Likely impact of the project on the environment parameters (ambient air, surface & ground water, land, flora and fauna and socio- economic etc).	The details are given in chapter 4 of the EIA report.
9	Source of water for different identified purposes with the permissions required from the concerned authorities, both for surface water and the ground water (by CGWA) as the case may be, rain water harvesting etc.	
10	Waste water management (treatment, reuse and disposal) for the project and also the study area.	The detail is given in section 2.11.3 of chapter 2 of the EIA report.
11	Management of solid waste and the construction and demolition waste for the project vis-à-vis the Solid Waste Management, 2016 and the Construction Demolition Rules, 2016.	Not applicable
12	Energy efficient measures (LED lights, solar power, etc.) during construction as well as during operational phase of the project.	Solar light is going to be used.
13	Assessment of ecological damage with respect to air, water, land and other environmental attributes. The collection and analysis of data shall be done by an environmental attributes. The collection and analysis of data shall be done by an environmental laboratory duly notified under the Environment (protection) Act 1986 or an environmental laboratory accredited by NABL or a laboratory of a Council of Scientific and Industrial Research (CSIR) institution working in the field of environment.	The ecological damage is given in section 7.10 of chapter 7 in the EIA/EMP report.
14	Preparation of EMP comprising remediation plan and natural and community resources augmentation plan corresponding to the ecological damage assessed and economic benefits derived due to violation.	The details of the EMP are mentioned in section 10.10 of Chapter 10 of the EIA report.
15	The remediation plan and the natural and	The ecological damage is given in section 7.10 of chapter

SN	Description	Compliance in the Draft EIA Report
TOR Conditions		
	community resources augmentation plan to be prepared as an independent chapter in the EIA report by the accredited consultants.	7 in the EIA/EMP report.
D.	Additional Conditions:	
i)	Notary Affidavit as per the enclosed format given in Annexure-B.	
ii)	Comparative statement of the salient features (existing and proposed) of the total project.	Not applicable
iii)	Remedial Plan	The ecological damage is given in section 7.10 of chapter 7 in the EIA/EMP report.
iv)	Community Augmentation plan	The ecological damage is given in section 7.10 of chapter 7 in the EIA/EMP report.
v)	Authenticated documents for the total project cost for the entire project and cost incurred till submission of EIA/ EMP.	It is given in chapter 2 of the EIA report.
vi)	Gross turn- over of the project period till submission of EIA/EMP.	Not applicable

CHAPTER 2 -PROJECT DESCRIPTION

2.1. INTRODUCTION

M/s Sawariya Chemical is willing to install a plant for production of Synthetic Resin with a capacity of **1250 MT/Month**, in the land of **0.43 Acre** at R.S. Plot No 407; L.R. Plot No 550; Mouza – Binnaguri, Village – Gokul Vita, Pargana – Baikunthapur, Dist – Jalpaiguri, West Bengal, PIN: 735135.

The proposed synthetic resin plant will be set up with an installed capacity to manufacture around 1250 MT per month. The proportion of U-F resin, P-F Resin and M-F Resin production is proposed to be at 20:40:40 ratios.The total plot area of the unit is 1740.15Sq.m (0.43 Acres). Copy of land documents is attached as **Annexure-III**.

2.2. PROJECT LOCATION

M/s Sawariya Chemical is a proprietorship concern having its office at Village Gokul Vita, Mouza – Binnaguri, P.O – Kamar Vita, P.S– Bhaktinagar, Dist. - Jalpaiguri., West Bengal PIN: 735135. The geographical location and Environmental Setting of the project is as mentioned in **Table 2.1**. The industry has following favourable conditions of the proposed unit:

- Vicinity to Market
- Availability of Land Area
- Availability of Water supply
- Availability of Local Labour
- Availability of Power
- Well-developed Transport Infrastructure

The connectivity map is shown below in **Fig 2.1** and Location map have been shown in **Fig 2.2.** Google image of the project is shown in **Fig 2.3.**

Table 2.1: Geographical Location and Environmental Setting of the Project

SN	Component	Description
1	Plant Location	R.S. Plot No 407; L.R. Plot No 550; Mouza – Binnaguri, Village – Gokul Vita, Pargana – Baikunthapur, Dist – Jalpaiguri, West Bengal, PIN: 735135.
2	Approx Site Centre Point Coordinates	26°39'5.32"N, 88°29'45.90"E
3	Village/District/State	Gokul Vita /Jalpaiguri /West Bengal
4	**Climatic conditions at Bagdogra IMD station (2021)**	
5	Maximum temperature	34^{o}C
6	Minimum temperature	14^{o}C
7	Annual rainfall (total)	3160 mm
8	Predominant wind directions	North, North East
9	Plant site elevation above MSL	103 m
10	Present land use at the site	Land use pattern is industrial
11	Nearest highway	AH-2: 7.85 km (W) NH-31: 4.25 km (SW)

SN	Component	Description
12	Nearest Railway Station	Ambari falakata: Aerial distance - 1.78 km (SE) Road distance – 2 km New Jalpaiguri: Aerial distance – 6.27 km (NW) Road distance – 11.1 km
13	Nearest Airport	Bagdogra Airport : Aerial distance – 16.8 km (W) Road distance – 28.4 km
14	Nearest major water bodies	Korotoya River: 0.87 km (SE)
15	Nearest town/City	Siliguri: 6.94 km (NW)
16	Nearest village	Gokul Vita
17	Protected areas as per Wildlife Protection Act, 1972 (Tiger reserve, Elephant reserve, Biospheres, National parks, Wildlife sanctuaries, community reserves and conservation reserves)	Baikunthapur Forest – 0.86 km, NE
18	Reserved / Protected Forests	Not Available within 10 km
19	National/International Boundaries	India-Bangladesh International Boundary – 8.48 km, SW.
20	Defence Installations	Not Available within 10 km
21	Seismicity	The proposed project is located in Seismic Zone IV and all designs will be as per IS Codes

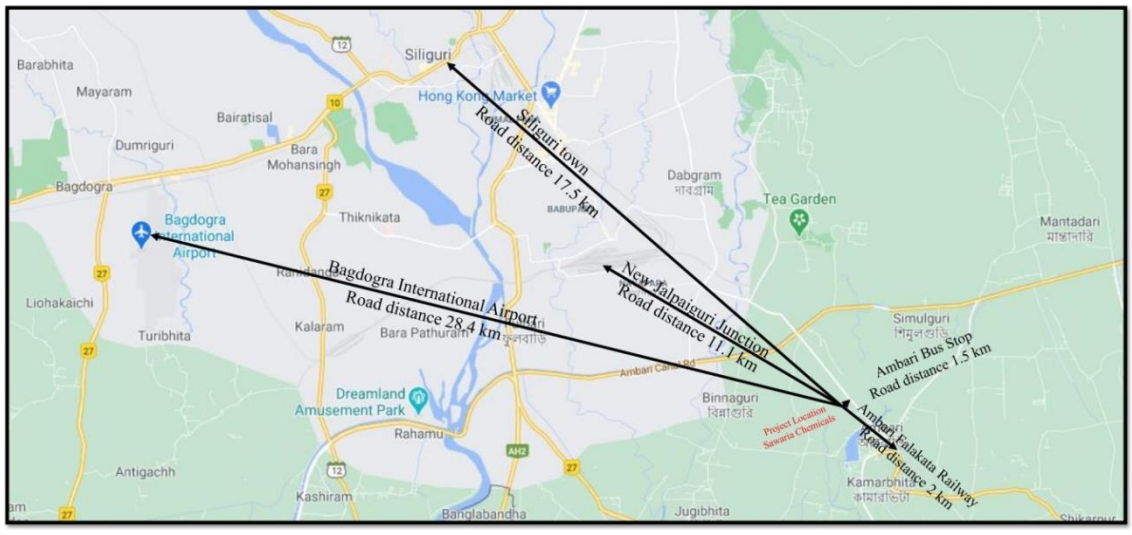


Figure 2.1: Connectivity Map

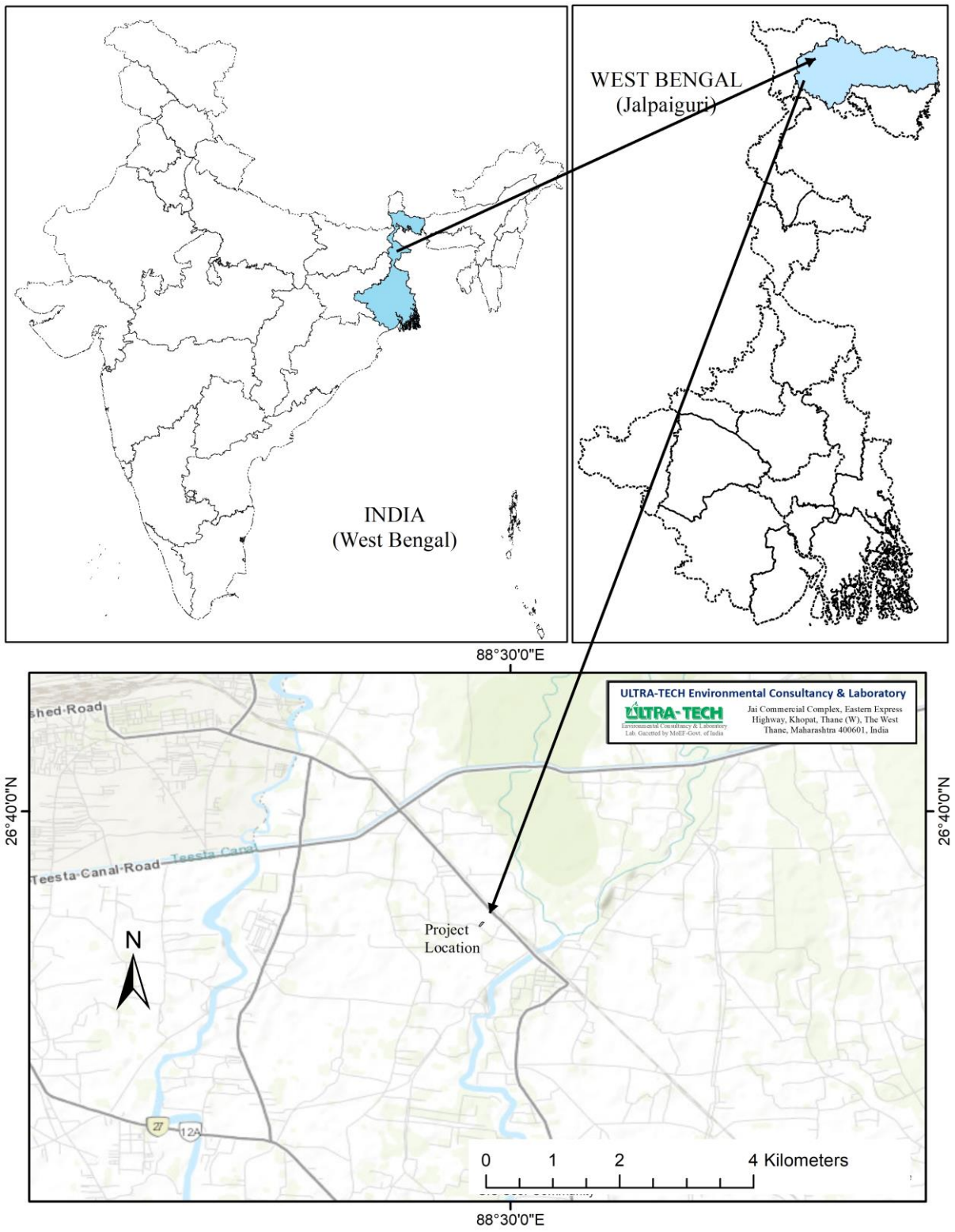


Figure 2.2: Location Map

Figure 2.3: Google Earth Image

2.3. TOPOGRAPHY

The Jalpaiguri district is located 26° 16 ’ and 27° 0 ’ North latitude and 88 ° 4 ’ and 89 °53 ’ East longitude . It is situated in the northern part of the state of West Bengal and shares international borders with Bhutan and Bangladesh in the northeast and south respectively. The remaining borders are shared with the district of Darjeeling in the west & northwest, Kalimpong district in the north, Coochbehar district in the Southeast and Alipurduar district in the west.

The topography of the district is diverse and is crisscrossed with rivulets, rivers, plains and hills. The topography of the project site is relatively flat. The soil is moderately alluvial. Loamy sand is predominant. The soil structure can be described as neither granular nor angular.

The proposed project is located in Seismic Zone IV as per IS: 2002 and all designs will be as per IS Codes.

2.4. LAND USE PATTERN

The land area for the proposed project is located at R.S. Plot No 407; L.R. Plot No 550; Mouza – Binnaguri, Village – Gokul Vita, Pargana – Baikunthapur, Dist – Jalpaiguri, West Bengal. It is an industrial land and the land has been purchased with constructed sheds. Hence, no change in land use is envisaged.

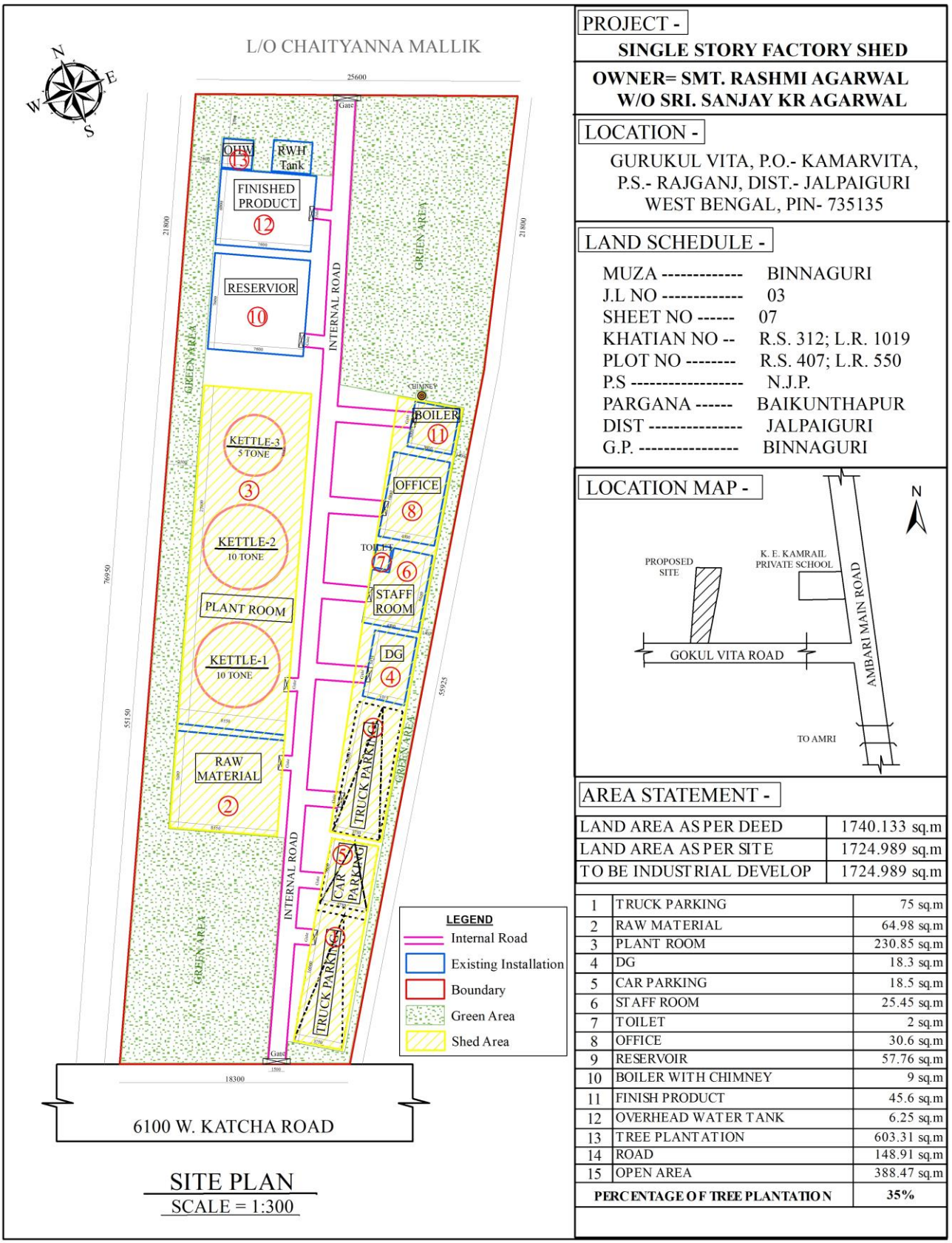
2.5. LAND BREAKUP

The total land area is **1724.98** sq.m. The break-up of the plot area is as mentioned below:

Table 2.2: Plot Break-Up Details

S.N.	Description	Area (SQM)	% Utilization
1	Plant Shed & Office building	408.48	23.68
2	Green Area	584.31	33.87
4	Parking Area	112.5	6.52
5	Road Area	138.91	8.05
6	Service Area	112.47	6.52
7	Open Area	368.31	21.35
Total Plot Area		**1724.98**	**100.00**

The layout plan is shown in **Figure 2.4**.



PROJECT -

SINGLE STORY FACTORY SHED

OWNER= SMT. RASHMI AGARWAL
W/O SRI. SANJAY KR AGARWAL

LOCATION -

GURUKUL VITA, P.O.- KAMARVITA,
P.S.- RAJGANJ, DIST.- JALPAIGURI
WEST BENGAL, PIN- 735135

LAND SCHEDULE -

MUZA ----------	BINNAGURI
J.L NO ----------	03
SHEET NO ------	07
KHATIAN NO --	R.S. 312; L.R. 1019
PLOT NO --------	R.S. 407; L.R. 550
P.S ----------	N.J.P.
PARGANA ------	BAIKUNTHAPUR
DIST ----------	JALPAIGURI
G.P. ----------	BINNAGURI

LOCATION MAP -

AREA STATEMENT -

LAND AREA AS PER DEED	1740.133 sq.m
LAND AREA AS PER SITE	1724.989 sq.m
TO BE INDUSTRIAL DEVELOP	1724.989 sq.m

1	TRUCK PARKING	75 sq.m
2	RAW MATERIAL	64.98 sq.m
3	PLANT ROOM	230.85 sq.m
4	DG	18.3 sq.m
5	CAR PARKING	18.5 sq.m
6	STAFF ROOM	25.45 sq.m
7	TOILET	2 sq.m
8	OFFICE	30.6 sq.m
9	RESERVOIR	57.76 sq.m
10	BOILER WITH CHIMNEY	9 sq.m
11	FINISH PRODUCT	45.6 sq.m
12	OVERHEAD WATER TANK	6.25 sq.m
13	TREE PLANTATION	603.31 sq.m
14	ROAD	148.91 sq.m
15	OPEN AREA	388.47 sq.m
PERCENTAGE OF TREE PLANTATION		**35%**

Figure 2.4: Schematic Plant Layout

2.6. SITE ALTERNATIVES

Site selection was guided by many factors like infrastructure, availability of land, water sources, fuel transportation, power availability etc. Specific site selection criteria for the proposed project are given below;

- All basic facilities like availability of water, electricity, transport, communication system and other infrastructure facilities are available.
- Availability of trained and skilled manpower nearby because of the proximity to various city/town.

With all this consideration, this site was ranked first and adopted. The site layout is fixed on this land of **1724.98** sq.m. For greenery 584.31sq.m area which is around 33.87% of the total plot area is earmarked.

2.7. JUSTIFICATION OF PROPOSED PRODUCTION

Urea Formaldehyde and related amino resins are considered a class of thermosetting resins of which urea-formaldehyde resins make up 80% produced globally. Examples of amino resins use include in automobile tires to improve the bonding of rubber to tire cord, in paper for improving tear strength, in moulding electrical devices, jar caps, etc.

Melamine formaldehyde is a hard, thermosetting plastic material made from melamine and formaldehyde by polymerization. It is then used to cross-link with alkyd, epoxy, acrylic, and polyester resins, used in surface coatings.

Phenol Formaldehyde Resins (PF) or Phenolic Resins are synthetic polymers obtained by the reaction of phenol or substituted phenol with formaldehyde. Used as the basis for Bakelite, PFs were the first commercial synthetic resins (plastics). They have been widely used for the production of molded products including billiard balls, laboratory countertops, and as coatings and adhesives. They were at one time the primary material used for the production of circuit boards but have been largely replaced with epoxy resins and fibreglass cloth, as with fire-resistant FR-4 circuit board materials.

2.8. PRODUCT PROFILE

The plant is proposed to design for the production of U-F Resin, P-F Resin and M-F Resin. The raw material details and the production capacity of each product are mentioned in **Table 2.3** and **Table 2.4** respectively. The plant and machinery have been designed with required specification considering volume of reaction, material of construction and are located at appropriate positions. Adequate ventilation, air conditioning and Air Filtration systems have been planned to prevent environmental hazards. Plant facilities have been designed as per the safety norms with appropriate emergency escapes.
The detail of production capacity is mentioned in **Table 2.3** and the physical and chemical properties of products are described in **Table 2.4**.

Table 2.3: Production Capacity

S.N.	Name of the product	Production Capacity (MT/Month)	Production Capacity (MT/Annum)	Storage Capacity (MT)	Mode of Storage
1	Urea-Formaldehyde Resin	250	3000	70	PVC Tank
2	Phenol-Formaldehyde Resin	500	6000	140	PVC Tank
3	Melamine-Formaldehyde Resin	500	6000	140	PVC Tank
Total		**1250**	**15000**	**350**	

Table 2.4: Physical and Chemical Properties of the Products

SN	Products	State	Main Properties (refer MSDS)						
			B.P	F.P	LEL/ UEL	TLV	LD50 / LC50	Sp. Gravity	Vapour Density
1	Phenol Formaldehyde	Semi Solid	>212 °F	>230 °F	1%	0.75ppm	2900mg/kg & 2501ppm/1hr	1.2	>1
2	Melamine Formaldehyde	Semi Solid	>212 °F	>200° F	1%	1 ppm	5000mg/kg & 500mgm/24hr	0.75	--
3	Urea Formaldehyde	Semi Solid	244° F	113°F	NA	0.3-20ppm	5,628 mg/kg & 800 mg/kg	`1.01	2.55

2.9. RAW MATERIALS

Following raw materials are required for proposed products as mentioned in **Table 2.5**. The properties of the Raw materials, quantity required and mode of storage & transport are mentioned in **Table 2.5**. Details & MSDS of Hazardous Raw Materials Requiredare provided in **Table 2.6.**

Table 2.5: Chemical Name, Physical Form and Required Quantity& Mode of Storage of Raw Materials

SN	Raw materials	Chemical Name	Form	Quantity (MT/Month)	Source	Mode of Transport	Max. Storage (MT)	Mode of Storage
1	Formaldehyde	Formaldehyde	Liquid	769.22	Imported / Local	Shipment /Truck	215.38	HDPE Tank
2	Industrial Urea	Carbonyl diamide	Solid	70	Local	Road	19.6	Woven PP Bag
3	Phenol	Carbolic Acid	Liquid	226.34	Imported / Local	Shipment /Truck	63.38	HDPE Drum
4	Melamine	1,3,3-triamino-2,4,6-triazine	Solid	193.85	Local	Road	54.28	HDPE Drum
5	Caustic Soda	Sodium Hydroxide	Solid	27.60	Local	Road	7.73	Woven PP Bag
6	Acetic Acid	Acetic Acid	Liquid	5.63	Local	Road	1.58	HDPE Drum

Table 2.6: Details & MSDS of Hazardous Raw Materials Required

Full name of the raw materials	Physical Phase	Main properties (refer MSDS)						Flammability
		B.P °C	F.P °C	LD_{50} Mg/kg	Specific Gravity (water=1)	IDLH (ppm)	Vapour density (air=1)	
Formaldehyde	Clear Liquid	90-100	Insoluble polymer gradually forms.	100	1.08	20	1.067	Flammable
Industrial Urea	White Solid	131-135	NA	8471	NA	1	NA	Non Flammable
Phenol	Colourless Liquid	182	42.8	317	1.07	5	3.2	Flammable
Melamine	White Crystalline Solid	Not available	>93.3	3161 mg/kg	1.573	NA	4.34	Flammable
Caustic Soda	Colourless Liquid	110 - 144	NA	1350	1.11 -1.53	NA	NA	Non Flammable
Acetic Acid	Liquid	117-118	NA	3310	1.049	50	2.10	Flammable

2.10. MANUFACTURING PROCESS

The project proponent is willing to install a unit for the production of three types of synthetic resin i.e. Urea-Formaldehyde Resin (U-F Resin), Phenol-Formaldehyde Resin (P-F Resin) and Melamine-Formaldehyde Resin (M-F Resin). The production capacity of U-F Resin will be 10 Ton/day and P-F & M-F Resin will be 20 Ton/day each. The unit will run in two batch per day basis. 1 no. of Resin kettle of 5 Ton capacity & 2 nos. of Resin kettle of 10 Ton and a vertical boiler with capacity of 300 kg/hr are proposed to be installed. Other than the plant machineries, PVC tanks with required capacity are going to be placed on the storage area for storage of raw materials.

The list of major plant machineries are mentioned in **Table 2.7**

Table 2.7: List of Plant Machineries

Sl. No	Plant Machinery Details		
	Machinery	Specification	Quantity
1	Vertical Boiler	Capacity 300 kg/hr	1
2	Resin Kettle	Capacity 5 Ton	1
3	Resin Kettle	Capacity 10 Ton	2
4	DG Set	Capacity 63 KVA	1

A brief description comprising of manufacturing process along with mass balance of the Product is mentioned herewith as follows:

2.10.1. Detailed Process Of Manufacture & Formulation Of Resin:

2.10.1.1. Urea Formaldehyde Resin:

Urea formaldehyde resins are poly-condensation products of the reaction of formaldehyde with urea. The relatively easy production of UF resins, their good solubility in water and absence of colour, make these thermosetting polymers irreplaceable in the manufacture of many wood based products. Due to the low resistance to humidity of UF resins, the wood products are suitable for interior use in dry condition. The specifications of the resin product such as the molar ratio of formaldehyde to urea, solid content, viscosity etc. are adjusted as per requirement. The manufacturing process diagram is depicted in **Figure 2.7**.

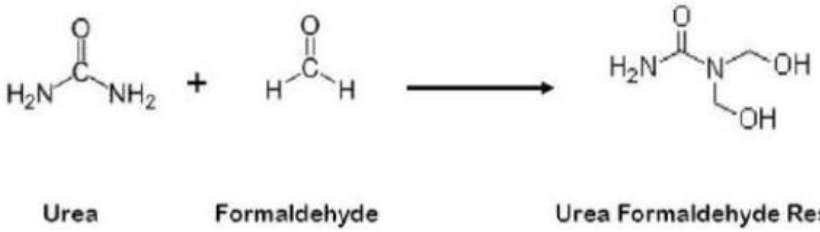
2.10.1.2. Manufacturing Process:

The process for the preparation of Urea-Formaldehyde Synthetic Resins comprises:

- The UF resin is prepared by reacting Urea with Formaldehyde in a molar ratio of approximately 1: 2 to 3 at pH 6 – 11.The aqueous Formaldehyde solution should contain more than 50% by weight of Formaldehyde. Urea reacts with Formaldehyde under neutral or alkaline condition to yield Monomethylol Urea, Symmetrical Dimethylol Urea and Trimethylol Urea depending on nature of reactant.
- The resinification process for UF occurs in main stages, addition/ Methylolation and condensation.
- In the Methylolation step Urea and Formaldehyde are reacted under controlled conditions using an alkaline catalyst. Typically the Methylolation step is carried out with adjustment of temperature at 80°C and pH 6 to 11. The Mythylolation stage usually results in a mixture of Mythylolated species, Monomethylol Urea, Symmetrical Dimethylol Urea and Trimethylol Urea.
- This mono and Dimethylol urea may be regarded as the monomer of the urea-formaldehyde resin.
- In the second stage these methylol urea products undergo condensation to form low molecular weight polymers. The rate of reaction depends on pH. pH is adjusted in 0.5 to 3.5 by using acid. Acid catalyses the reaction in the following ways:
  - ❖ Formation of Methylene Bridge in amino nitrogen facilities in acidic medium
  - ❖ Methylene ether linkages can also be formed in acidic medium
- Two types of acid materials can be used, which are classified as direct catalysts & latent catalysts.
- Direct catalysts are inorganic and organic acids, acid salts. They are effective at all temperatures. The latent catalysts are salts and esters which develop acidity upon heating.
- The solution is refluxed at temperature around 80°C.
- The condensation reaction proceeds to a predetermined end point and the resin intermediate is cooled at 45°C.

- At this state the reaction is arrested by raising the pH of the resin at about 6.5 to 9 and cooled to the ambient temperature by circulating water in jacket and discharged from the vessel.

2.10.1.3Chemical Reaction



2.10.1.4. Process Flow Diagram:

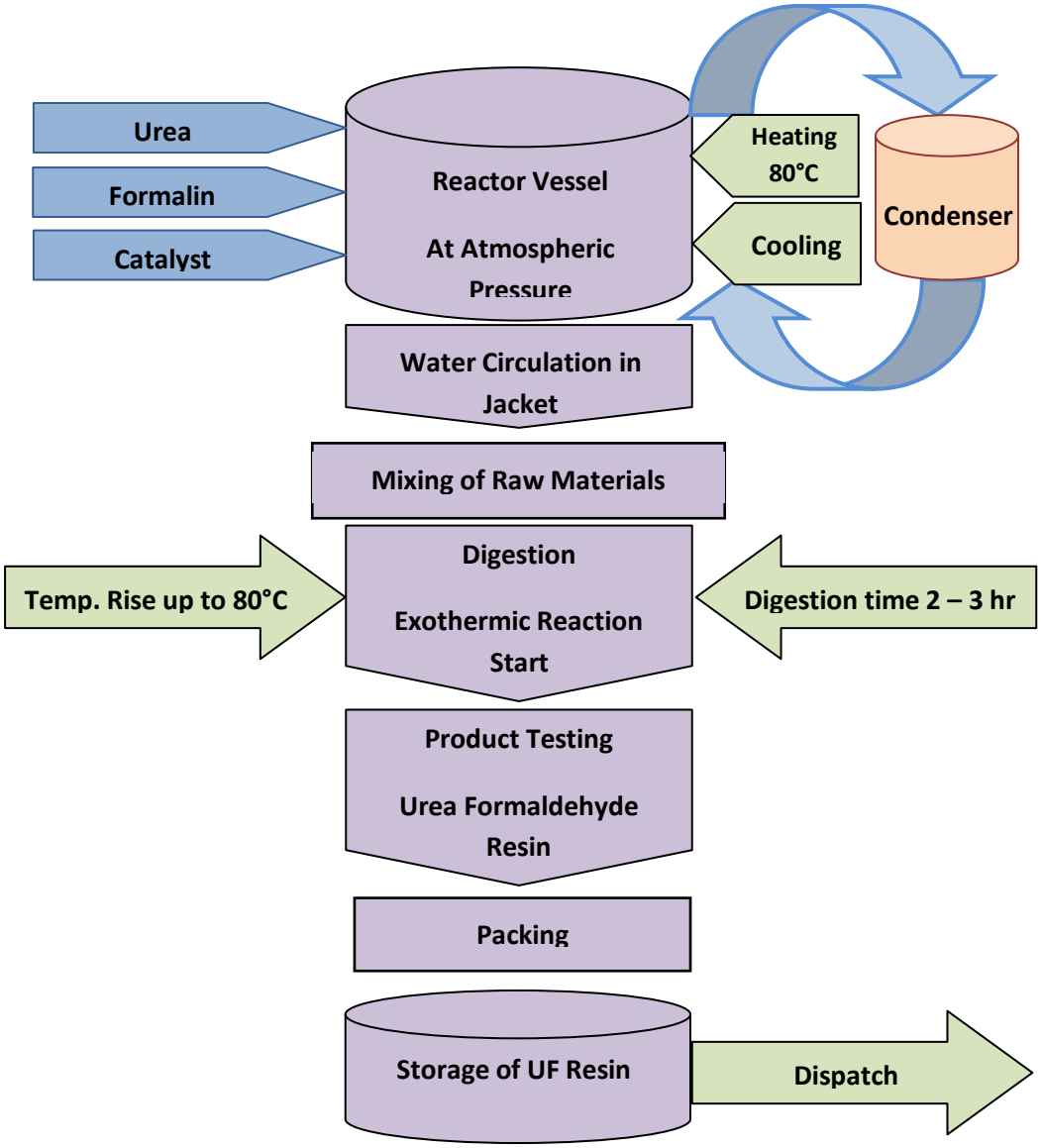


Figure 2.7: Process Flow Diagram of U-F Resin

2.10.1.5 Material Balance for U-F Resin Production:

Table 2.9: Material Balance for U-F Resin Production

Input of Raw materials	Quantity (Kg)	Output	Quantity (Kg)
Industrial Urea	1120	UF Resin	4000
Formaldehyde	2880	Process Loss	253.60
Caustic Soda	90		
Acetic Acid	90		
Water	73.6		
Total	**4253.60**	**Total**	**4253.60**

2.10.2 PHENOL FORMALDEHYDE RESIN:

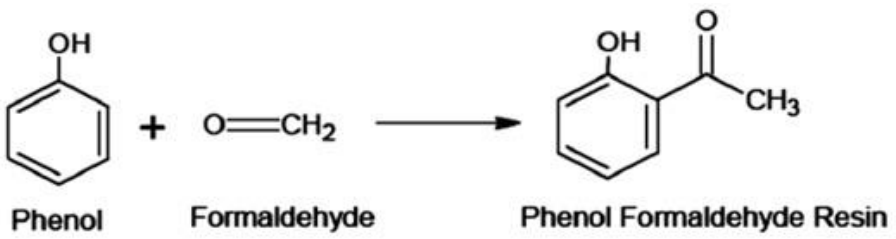
Phenol-Formaldehyde Resin, as a group is formed by a step-growth polymerization reaction and an exothermic one. It is controlled by a batch reactor as the viscosity of the material changes rapidly. Since formaldehyde exists predominantly in the solution as a dynamic equilibrium of Methylene Glycol Oligomers, the concentration of the reactive form of formaldehyde depends on temperature and pH. The manufacturing process diagram is depicted in **Figure 2.8.**

2.10.2.1 Manufacturing Process:

The process for the preparation of Phenol-Formaldehyde Synthetic Resins comprises:

- A typical phenolic-resin is produced by a batch process in a jacketed autoclave, which is also termed as a resin kettle.
- Molten phenol, formaldehyde in 1:2 ratio and the costic soda is added to the resin kettle and mixed properly. The mixture is then heated with steam (Temp – 80 – 100°C).
- The temperature is controlled by removing the excess heat by water cooling and refluxing.
- At the initial stage of reaction, the heavy viscous resin settles as the bottom layer with an aqueous layer on top.
- A combination of heat and vacuum aids the reaction mixture dehydration process.
- When the temperature reaches 130 – 150°C, the resin fuses and is removed from the kettle/ autoclave.

2.10.2.2 Chemical Reaction



2.10.2.3 Process Flow Diagram:

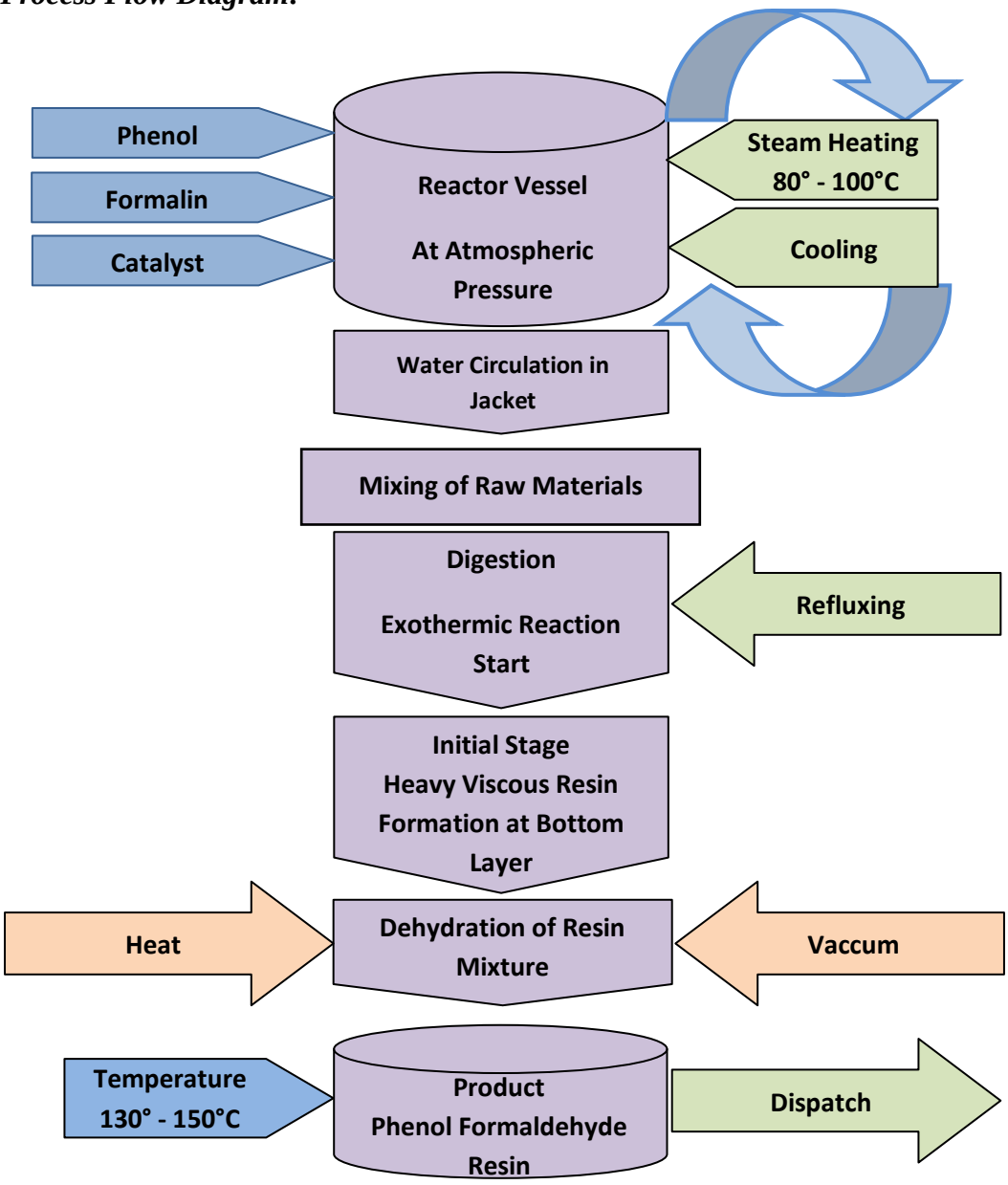


Figure 2.8: Process Flow Diagram of P-F Resin

2.10.2.4 Material Balance for P-F Resin Production:

Table 2.10: Material Balance for P-F Resin Production

Input of Raw materials	Quantity (Kg)	Output	Quantity (Kg)
Phenol	9053.63	PF Resin	20000
Formaldehyde	11157.89	Process Loss	1052.63
Caustic Soda	842.11		
Total	**21052.63**	**Total**	**21052.63**

2.10.3 MELAMINE-FORMALDEHYDE RESIN:

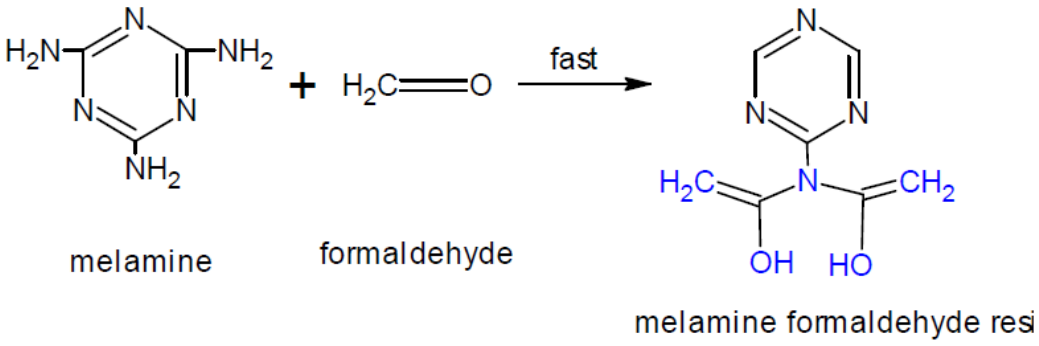
Melamine resin or melamine formaldehyde (also shortened to M-F Resin) is a resin with melamine rings terminated with multiple hydroxyl groups derived from formaldehyde. This thermosetting plastic material is made from melamine and formaldehyde. In its butylated form, it is dissolved in n-butanol and xylene. It is then used to cross-link with alkyd, epoxy, acrylic, and polyester resins, used in surface coatings.

Manufacturing Process:

The process for the preparation of Melamine-Formaldehyde Synthetic Resins comprises:

- In MF resin preparation, melamine and formaldehyde are taken in 1:2 to 1:3 molar ratio. For water soluble MF resin this ratio is 1:6 to get Hexamethoxymethylol melamine (HMM).
- It is manufactured by reacting melamine with formaldehyde in a jacketed reactor under neutral or alkaline condition.
- In first step melamine reacts with formaldehyde in aqueous solution (37 % w/w) to form methylol compounds. The reaction is carried out under slightly alkaline condition.
- Since melamine is not soluble in water at room temperature. It is necessary to heat the mixture to about 85°C for obtaining methylol compounds.
- In the preparation of water soluble resins, the solution of methylol compound is further heated under alkaline condition until the desired viscosity or solubility characteristics are obtained from increased molecular weight.
- Liquid formaldehyde is taken in the reaction vessel and melamine powder is added slowly with stirring. After about 15 minutes caustic soda solution is added and the mixture is heated by steam. The temperature is controlled at about 85°C.
- Then the product is made alkaline by adding caustic soda solution (20% strength) and subsequently cooled to room temperature. Finally, it is stored in a storage barrel.

Chemical Reaction



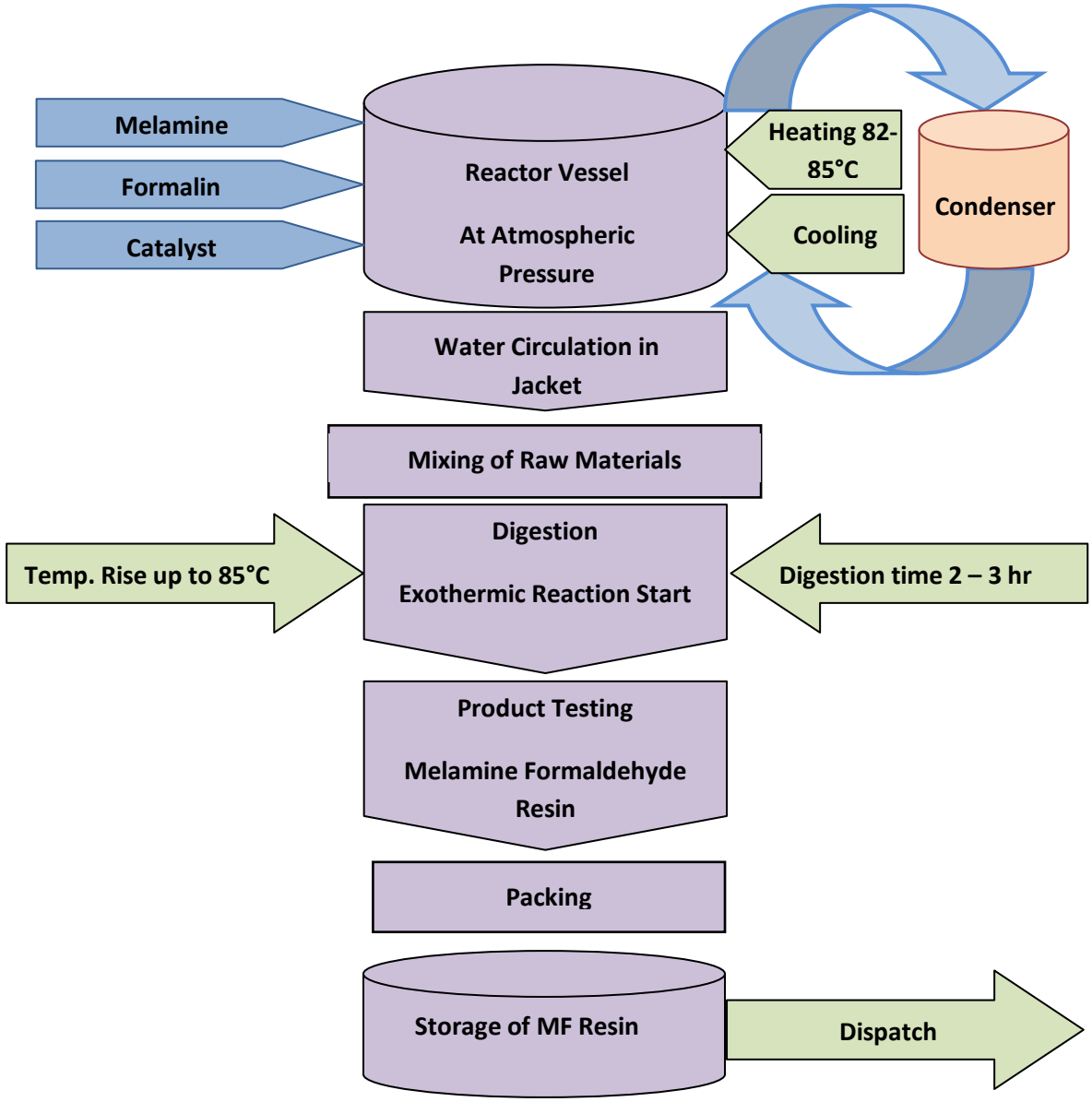


Figure 2.9: Process Flow Diagram of P-F Resin

Material Balance for M-F Resin Production:

Table 2.11: Material Balance for M-F Resin Production

Input of Raw materials	Quantity (Kg)	Output	Quantity (Kg)
Melamine	4652.44	MF Resin	12000
Formaldehyde	7446.66	Process Loss	1520.84
Caustic Soda	22.03		
Water	1400		
Total	**13520.84**	**Total**	**13520.84**

2.11. Resource Requirements Projects

Component of the project includes all facilities and requirement for the operation of the project which are summarized below.

- Resource Requirement: Land, Raw materials, Water, Power, Fuel, Man power etc.
- Utility requirement: Boiler, Resin kettle, D.G. set etc.
- Treatment Facilities: Air pollution source & control facilities, Noise pollution source & control facilities, waste source & management facilities: Includes waste types and disposal strategies.

2.11.1 Land

The land area for the proposed expansion project located at R.S. Plot No 407; L.R. Plot No 550; Mouza – Binnaguri, Village – Gokul Vita, Pargana – Baikunthapur, Dist – Jalpaiguri, West Bengal is industrial land.

The total land, purchased for the proposed project is **1724.98** sqm which will be utilised as per following area statement.

Table 2.12: Area Statement

S.N.	Description	Area (SQM)	% Utilization
1	Plant Shed & Office building	408.48	23.68
2	Green Area	584.31	33.87
4	Parking Area	112.5	6.52
5	Road Area	138.91	8.05
6	Service Area	112.47	6.52
7	Open Area	368.31	21.35
Total Plot Area		**1724.98**	**100.00**

2.11.2 Raw materials

The details of raw material required are tabulated below.

Table 2.13: Raw Material Details

SN	Raw materials	Chemical Name	Form	Quantity (MT/Month)	Source	Mode of Transport	Max. Storage (MT)	Mode of Storage
1	Formaldehyde	Formaldehyde	Liquid	769.22	Imported / Local	Shipment /Truck	215.38	HDPE Tank
2	Industrial Urea	Carbonyl diamide	Solid	70	Local	Road	19.6	Woven PP Bag
3	Phenol	Carbolic Acid	Liquid	226.34	Imported / Local	Shipment /Truck	63.38	HDPE Drum
4	Melamine	1,3,3-triamino-2,4,6-triazine	Solid	193.85	Local	Road	54.28	HDPE Drum
5	Caustic Soda	Sodium Hydroxide	Solid	27.60	Local	Road	7.73	Woven PP Bag
6	Acetic Acid	Acetic Acid	Liquid	5.63	Local	Road	1.58	HDPE Drum

2.11.3 Water

The total water requirement will be around 7.78 KL per day, out of which 0.68 KL will be used for domestic purpose from where around 0.48 KL sewage water will be generated which will be flowed to septic tank followed by soak pit. For industrial use, around 4.29 KL water will be required out of which 2.02 KL will be used in production process, 0.87 KL will be used in boiler, 0.7 KL will be required for cooling water makeup and around 0.7 KL will be used for kettle washing. Around 1.3 KL waste water is expected to be generated from boiler blowdown & cooling tower blow-down, which will be stored in a storage tank and will be reused for greenbelt development & dust suppression. Effluent generated from the kettle washing (around 0.7 KLD) will be reused in the process. So there will be no discharge of waste water.

Details of water requirement are given in **Table-2.14.** Water balance diagram is given in **Figure: 2.9.**

Table 2.14: Water Balance of Proposed Project

SN	Utility	Water Consumption (KL/day)	Waste Water Generation (KL/day)
1	**Domestic***	**0.68**	**0.48**
2	**Industrial*#**		
	A. Process*#	2.02	-
	B. Kettle washing*	0.7	0.7
	C. Boiler*	0.87	0.7
	D. Cooling Tower*	0.7	0.6
	Total (A+B+C+D)	**4.29**	**2**
3	**Plantation & Dust Suppression*#**	**2.81 (1.51*+1.3#)**	**0**
	Total Water Requirement (KLD)		**7.78**
	Total Fresh Water Requirement (KLD)		**5.78**
	Total Wastewater Generated (KLD)		**2.48**
	Total Wastewater Recycled (KLD)		**2**

*** - Fresh Water**

 # - Recycled Water

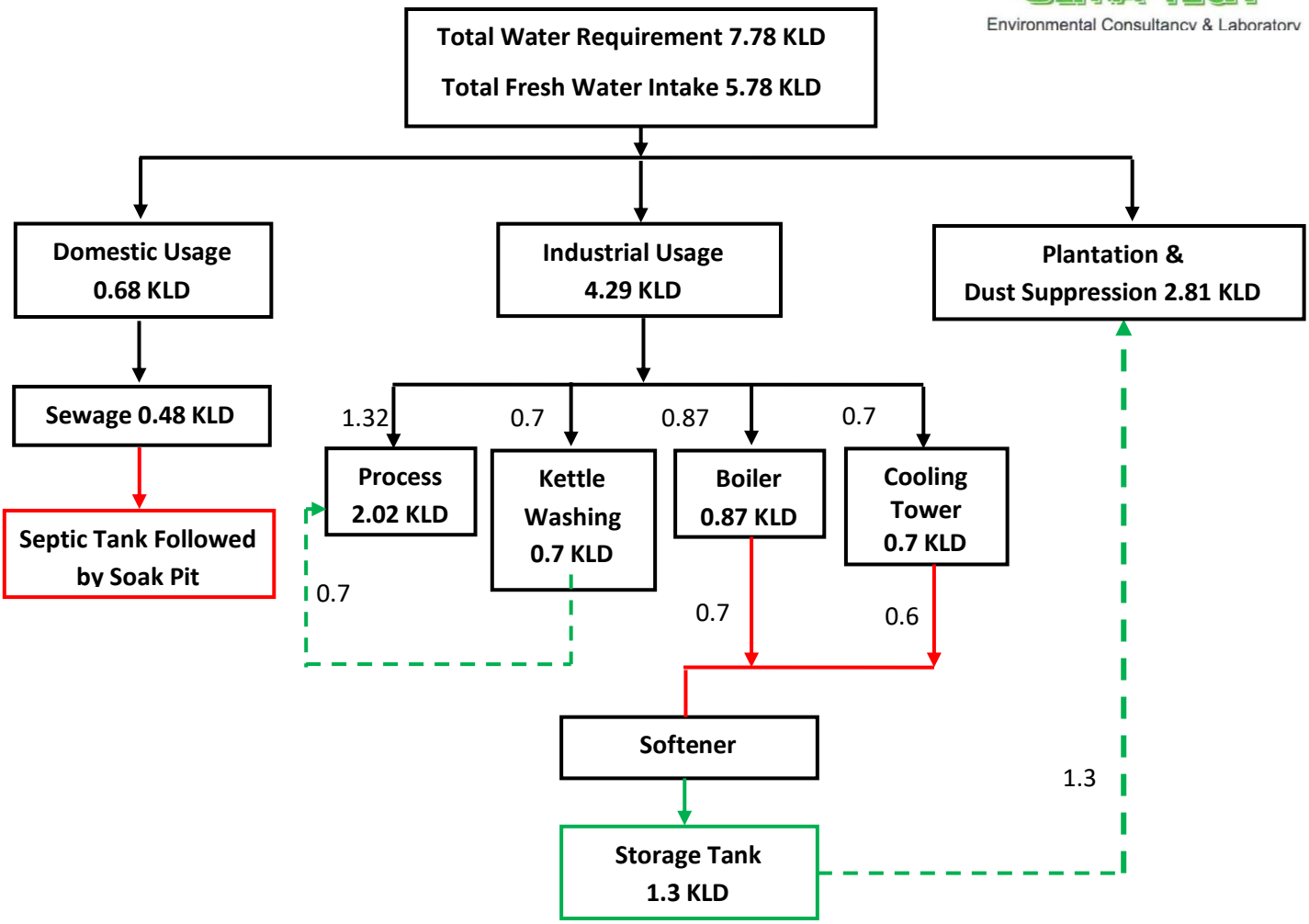


Figure 2.15: Schematic Water Balance Diagram

2.11.4 Power Demand & its Source

Total Power requirement for the proposed project will be about 70 KVA in double shift basis of 6 hours each, for 300 days per annum. The power will be supplied from WBSEDCL. Additionally a D.G. set of 63 KVA will be used in case of emergency or power failure. Diesel will be used as a fuel for D.G. set.

2.11.5 Fuel

Fuel is required for Boiler and DG Set (Stand by). Requirement and source of fuels are mentioned in **Table 2.15.**

Table 2.15: Details of Fuel Requirement

S.N	Fuel Type	Fuel used for	Qty.	Source	Mode of Transport
1	Coal	Boiler	400 kg/day	Local	Road
2	Diesel	DG Set	7.3 Lit/Hr	Local	Road

2.11.6 Man Power

The project shall require skilled and unskilled labourers which is available locally. Normally there are several teams of skilled labours who work on contractual basis and take care of the entire production. Unskilled labourers shall be employed on daily wages.

Requirement of skilled and semi -skilled labours shall be around 10 people and 5 persons as unskilled.

2.11.7 Utility requirement

The proposed utility facilities are tabulated below.

Table 2.16: List of Machineries

Sl. No	Plant Machinery Details		
	Machinery	**Specification**	**Quantity**
1	Vertical Boiler	Capacity 300 kg/hr	1
2	Resin Kettle	Capacity 5 Ton	1
3	Resin Kettle	Capacity 10 Ton	2
4	DG Set	Capacity 63 KVA	1

2.11.8 Treatment facilities

2.11.8.1Waste water

The total waste water generated will be around 2.48 KLD out of which 0.48 will be generated from domestic use which will be treated in septic tank followed by soak pit. Rest 1.3 KLD will be generated from the industrial activities which will be stored in a storage tank and will be reused for plantation & dust suppression. The waste water generation & recycling process will be as below:

- The unit will maintain **Zero Effluent Discharge.**
- The industrial waste water will be generated from kettle washing and blow down from boiler and cooling tower

Waste water from kettle washing will be collected in storage tank and will be reused.

2.11.8.2 Air pollution

A. Flue Gas Emission

Flue gas emission will be from stack attached to the boiler, where emission will generate due to the combustion of coal as fuel. The main probable pollutants are SPM, SO_2 and NO_X from this combustion. To combat emission from the combustion, the unit has proposed to install multi cyclone bag filter to control particulate matters and Wet scrubber for gaseous pollutants. The outlet of the multi cyclone bag filter and the scrubber will be connected to an induced draft fan and finally to the proposed stack of 32 m height to control and disperse the air pollutants within the satisfactory level. The unit will also have DG set of 63 KVA where Diesel will be used as fuel. It will be operated only in case of power failure or non -availability of power

supply. The DG set will be equipped with stack with a height of 2 m above the roof which is meeting the norms of CPCB.

Details of Air pollution control measures are mentioned in **Table 2.17.** Technical details of APC device is depicted in **Table 2.18.**

Table 2.17: Specification of APC Devices

S.N.	Stack Attached To	Fuel Used	Stack Height	Pollution Control System	Final Concentration
1	Boiler	Coal: 400 kg /Day	32 Meter	Multi Cyclone Bag Filter	SPM<=150 mg/nm3 SO2<=100ppm NOx<=50ppm
2	D.G. Set (63 KVA)	Diesel: 7.3 Lit/Hr	2 Meter above roof	Acoustic & Adequate Stack Height	SPM<=150 mg/nm3 SO2<=100ppm NOx<=50ppm

Table 2.18: Technical Data sheet of Bag Filter Unit

	Application		Wood Fired Boiler
1)	Capacity CMH.	:	12000
2)	Pr. drop through BF(mm wg)	:	125-150
3)	Air to Cloth Ratio ($M^3/min/M^2$)	:	1.29
4)	Inlet Dust load (gm/m^3) considered	:	5-10
5)	Outlet Emission (mg/nm^3)	:	150
6)	Total filtering area (M^2)	:	156
7)	Bag size (Ø mm X mm Long)	:	Ø150X3650
8)	Bag quantity (nos.)	:	90 (9X10)
9)	Solenoid valve(NB/Qty)	:	40/10
10)	Dry Compressed air quantity (m^3/hr at 6-8kg/cm^2 FAD)	:	30-40
11)	Sequential Timer (Ch./Qty.)	:	10/1
12)	Rotary air lock (mm X mm X Qty.)	:	200X200X1
13)	Maximum permissible temperature of bags (ºC)	:	Peak-200, Contd.-180
14)	Material of Construction	:	
	Casing (mm thk)	:	3.15
	Hopper (mm thk)	:	4
	Bag Holding Plate	:	5
	Filter bag	:	Woven Fibre Glass PTFE Coated Fabric Bag, 770GSM
	Rotary air lock	:	MS

- ***Fugitive Emission***

Fugitive Emission Control

To control fugitive emission, following steps will be implemented in the proposed unit:

- Close handling system provided for transfer of chemicals.
- Pneumatically transfer of liquid raw materials in rector.
- Raw material will be stored in the covered structure.
- Regular maintenance of valves ,pipes etc
- Regular monitoring of methanol and Formaldehyde concentration in work area.

- PPE will be provided to the workers.
- Greenbelt will be developed around the plant to arrest the fugitive emission.

2.11.8.3 Noise pollution

The main noise generating source in the plant will be operation of boiler, material handling, process plant, D.G. set, other machineries etc. All these sources will generate continuous noise. However, the noise transmitted outside the plant boundary will be low because most of the noise generating equipments will be in closed structures provided with acoustic enclosure. Equipments will be statically and dynamically balanced. Greenbelt will be developed around the periphery of the plant. Ear muff, ear plug will be provided to all workers working at noisy area. All the measures would be taken to limit the noise levels at the plant boundary within 75 dB (A) as per the stipulated limits.

The adequate precautions will be taken for abatement of noise pollutions, which are as follows.

- The unit will install latest technology based low noise D.G. Set with acoustic enclosures.
- Proper and timely oiling, lubrication and preventive maintenance will be carried out for the machineries and equipments to reduce noise generation
- All the vibrating parts will be checked periodically and serviced to reduce the noise generation. The equipment, which generates excessive noise, will be provided with enclosures etc.
- To minimize the adverse effect on the health, Ear muffs/ earplugs will be provided to the working under high noise area
- To reduce the noise generation during the transportation activities; the vehicle will be periodically serviced and maintain as per the requirement of latest trend in automobile industry. Only those vehicles with PUC's will be allowed for the transportation
- Green belt area will be developed to prevent the noise pollution outside the factory premises. It will be increased after proposed expansion
- Noise monitoring will be done regularly at different parts of the plant
- Steadily Non vibrating foundation on rubber pads, tree barriers, side cladding and machines kept centrally on plot.

2.11.8.4 Waste management

The unit will employ 15 persons when fully operational (including laborers and administrative staff). Municipal solid waste will be generated @0.1 kg/day/person. Hence the quantity of MSW generated will be 1.5 Kg/Day which will be disposed off as per MSW Rules.

The unit has provided dedicated storage area for the hazardous waste storage within premises having impervious floor and roof cover system. The details of hazardous waste generation and handling / Management are given in **Table 2.19**

Table 2.19: Details of Hazardous Waste generation and Disposal

SN	Waste	Category No.	Quantity	Disposal
1.	Used Oil	5.1	20 Lit/Year	Collection, Storage, and reuse as lubricant in plant & machineries or sale to registered recycler
2.	Discarded Containers/ barrels/Plastic	33.1	500 No/Year	Collection, Storage and sent to authorized recycler after decontamination
3.	Resin Residue	23.1	0.2 MT/Year	Collection, Storage and disposal at CHWIF
4.	Plastic Waste	-	4 MT/Year	Collection, storage and sale to register recycler
5.	Fly Ash	37.2	0.15 MT/Day	Collection, Storage and sent to TSDF or brick manufacturers for reprocessing

2.12. Project schedule

The commercial operation date (COD) is envisaged in six (6) months reckoned from the effective zero date.

2.13. Project Cost Estimates

Total cost of the project will be around **82 lakhs**. Budgetary break up is as follows:

Table 2.20: Break-up Cost of the Project

SN	Particular	Cost (Rs Lakhs)
1	Land & Land Development	30.0
2	2 nos. Resin Kettle	35.0
3	Boiler	5.0
4	Tanks	6.0
5	Electrical Installations	2.5
6	Miscellaneous	3.5
Total		**82.0**

CHAPTER 3 - BASELINE ENVIRONMENTAL STATUS

3.1 INTRODUCTION

The EIA determines the environmental consequences of the project prior to construction, assess the impact on environment due to construction, on existing baseline environmental parameters and also importantly on land use and socio-economic parameters. Baseline study is an integral part of EIA study, as it helps to identify the environmental concerns already existing in that area. The entire baseline data has been collected through actual physical surveys and observations, literature surveys, interaction with locals, government agencies and departments. This chapter describes the existing environmental settings in the study area. The purposes of describing the environmental settings of the study area are:

- To understand the project need and environmental characteristics of the area
- To assess the existing environmental quality, as well as the environmental impacts due to the proposed development around the study area
- To identify environmentally significant factors or geographical areas that could preclude any future development

This chapter describes the existing environmental status of the study area with reference to air, water, soil, meteorology, climate, hydro-geological, ecology and socio-economic profile of people in the study area. Primary data (air, water, soil and noise) was collected during **January 2022 to March 2022**and the secondary data was collected for other attributes like meteorology, ecology, socio-economics, etc.

3.2. METEOROLOGY

The study of micrometeorological conditions of the region is an essential requirement for the proper interpretation of the existing air quality status and for the prediction of impacts on air environment through mathematical models. A highly humid atmosphere and abundant rains characterise the climate of this district, with the temperature being seldom excessive. The Period from June to beginning-of-October is south-west monsoon season. October to mid-November constitutes post monsoon season. Cold season being November to February and hot season being March to May.

January is the coldest month with temperature varying between 5°C to 28°C, April is the hottest month with mean maximum temperature of 31°C and mean minimum temperature of 20°C (as per 2012 data). Lowest temperature up to 5°C and maximum temperature up to 37°C have been recorded in the year 2012. The atmosphere is highly humid throughout the year except February to May when relative humidity is as less as 50 to 70%. The rainfall generally increases from the south-west to the north-east. About 70% of the annual rainfall is received during the southwest monsoon season, June being the rainiest month. On an average there are about 102 rainy days with records of more than 400 mm rainfall in 24 hours.

3.2.1. Micro-Meteorology of Study Area

The meteorological parameters play a vital role in transport and dispersion of pollutants in the atmosphere. The collection and analysis of meteorological data, therefore, is an essential

component of environmental impact assessment studies. The long term and short term impact assessment could be made through utilization and interpretation of meteorological data collected over long and short periods. Monthly summary of meteorological data of the study area are given in the following table and the wind rose diagram prepared from secondary data is shown in **Figure 3.1.**

Table 3.1: Meteorological Data Recorded at study area

Month	Temperature, °C		Relative Humidity %		Wind Speed m/s
	Min	Max	Min	Max	Mean
January 2022	24.98	8.75	97.88	43.88	1.73
February 2022	28.88	9.53	100	31.38	2.52
March 2022	36.07	15.42	91.12	17.62	2.29

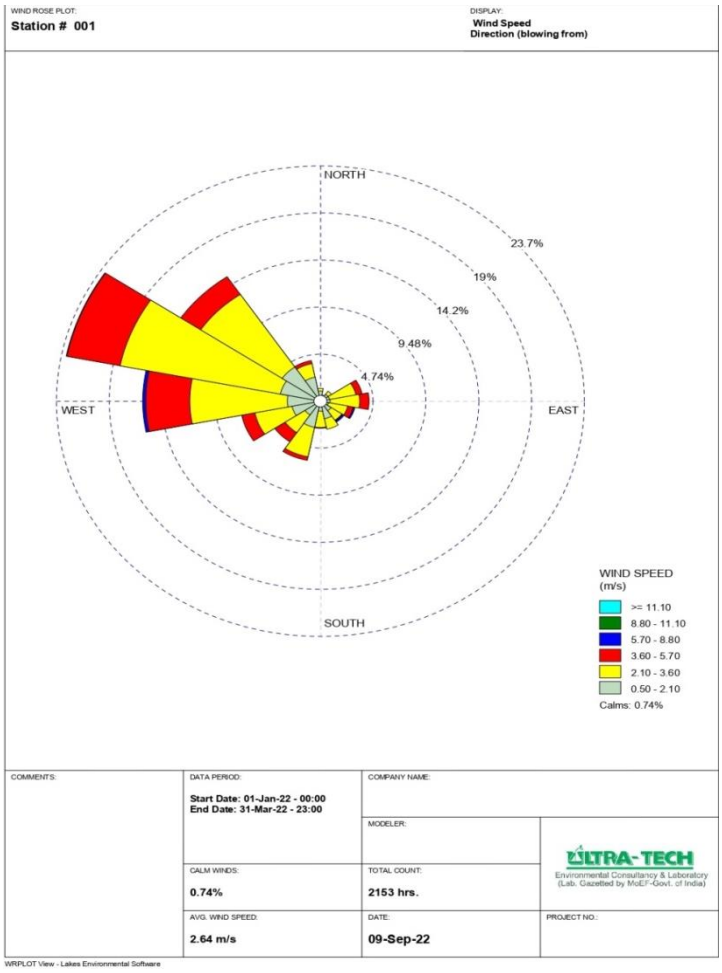


Figure 3.1: Wind Rose Diagram of Study Area (January 2022 to March 2022)

3.3. AIR QUALITY

3.3.1 Methodology of Ambient Air Monitoring

PM_{10}, $PM_{2.5}$, Sulphur dioxide (SO_2), Oxides of Nitrogen (NO_X), NH_3, O_3 and CO were the major pollutants associated with project. The baseline status of the ambient air quality has been established through field monitoring data on PM_{10}, $PM_{2.5}$, Sulphur dioxide (SO_2), oxides of nitrogen (NO_X), NH_3, O_3 and CO at 8 locations within the study area. The locations for air quality monitoring were scientifically selected based on the following considerations using climatological data.

- Meteorological conditions on synoptic scale;
- The methodology for conducting the baseline environmental survey and selection of sampling locations considered the guidelines given in the EIA manual of the MoEFCC;
- Topography of the study area;
- Representative of the regional background air quality for obtaining baseline status;and
- Representative of likely impact areas.

Monitoring was done for PM10, PM 2.5, SO2, NOx, NH3, CO. The frequency of monitoring, the techniques for sampling and analysis for these parameters are mentioned in following Table and results of monitoring are presented in **Table 3.2**.

Table 3.2: Frequency of monitoring, the techniques for Air sampling and analysis

Sampling Parameters	Sampling Frequency	Sample collection		Sample Analysis		Methodology
		Sampling equipment	Sensitivity / Detection Limit	Analytical Equipment	Sensitivity/ Detection Limit	
RSPM (PM_{10}, $PM_{2.5}$), SO_2, NOx, NH_3	24 hrs twice a week at each station	RSPM (PM_{10}), Respirable Dust Sampler	10 µg/m^3	RSPM (PM_{10}), Monopan Balance	0.0001mg	Gravimetric (HVS) IS : 5182 (Part 23) : 2006 (through Cyclonic flow Technique)
		RSPM ($PM_{2.5}$), Fine Dust Sampler	2.5 µg/m^3	Monopan Balance	0.0001g	Gravimetric Method – NAAQS Monitoring & Analysis Guidelines Volume 1 By CPCB
		SO_2: Rotameter for measurement of air flow	05 µg/m^3	SO_2: Spectrophoto meter	-	IS : 5182 (Part 2) : 2001
		NO_x: Rotameter for measurement of air flow	05 µg/m^3	NO_x: Spectrophoto meter	-	IS : 5182 (Part 6) : 2006

Sampling Parameters	Sampling Frequency	Sample collection		Sample Analysis		Methodology
		Sampling equipment	Sensitivity / Detection Limit	Analytical Equipment	Sensitivity/ Detection Limit	
	NH_3: 2Hrs twice a week at each station	Rotameter for measurement of air flow	10 µg/m^3	NH_3: Spectrophotometer	-	ISC Method 401, Ed 3rd,2016
O_3	8Hrs twice a week at each station	Rotameter for measurement of air flow	10 µg/m^3	Spectrophotometer	-	IS 5182(part 09): 1974
CO	1hrs twice a month at each station	Gas Bladder	--	Non-Dispersive Infrared Absorption Method	0.01 mg/ m^3	IS : 5182 (Part 10) : 1999

Ambient air at the monitoring location is sucked through a cyclone. Coarse and non-respirable dust is separated from the air stream by centrifugal forces acting on the solid particles and these particles fall through the cyclone's conical hopper and get collected in the sampling cap placed at the bottom. The fine dust (<10 microns) forming the PM_{10} passes the cyclone and is retained on the filter paper. A tapping is provided on the suction side of the blower to provide suction for sampling air through a set of impingers for containing absorbing solutions for SO_2 and NO_X. Samples of gases are drawn at a flow rate of 0.2 liters per minute. PM_{10} has been estimated by gravimetric method. Modified West and Gaeke method (IS-5182 part-II, 1969) has been adopted for estimation of SO_2 and Jacobs-Hochheiser method (IS-5182 part-VI, 1975) has been adopted for the estimation of NOx. Calibration charts have been prepared for all gaseous pollutants. Respirable Dust Samplers APM-451 instruments were used for monitoring Respirable fraction (<10 microns) and gaseous pollutants like SO_2, NOx, NH_3, O_3. Eight ambient air quality monitoring stations were established in the study zone of 10 km radius around the project site. The location of stations and its distance from site are presented in **Table 3.3**. The main sources of air pollution in the region are small scale industries and traffic. Laboratory monitoring reports are attached below.

Table 3.3: Location of AAQ stations

Station Code	Location	Latitude	Longitude	Distance
AAQ-1	Project Site	26°39'4.36"N	88°29'45.04"E	0 km
AAQ-2	Ambari	26°38'34.41"N	88°30'13.48"E	1.22 km
AAQ-3	Sitaguri	26°36'21.83"N	88°29'24.34"E	5.05km
AAQ-4	Binnaguri	26°38'13.93"N	88°29'9.67"E	1.85 km
AAQ-5	Gander More	26°37'27.47"N	88°28'2.32"E	4.14 km
AAQ-6	Chakiabhita	26°39'16.26"N	88°30'53.65"E	1.92 km
AAQ-7	Ambari Road	26°37'31.79"N	88°30'20.75"E	3.02 km
AAQ-8	Sahudangi	26°40'21.02"N	88°28'29.49"E	3.16km

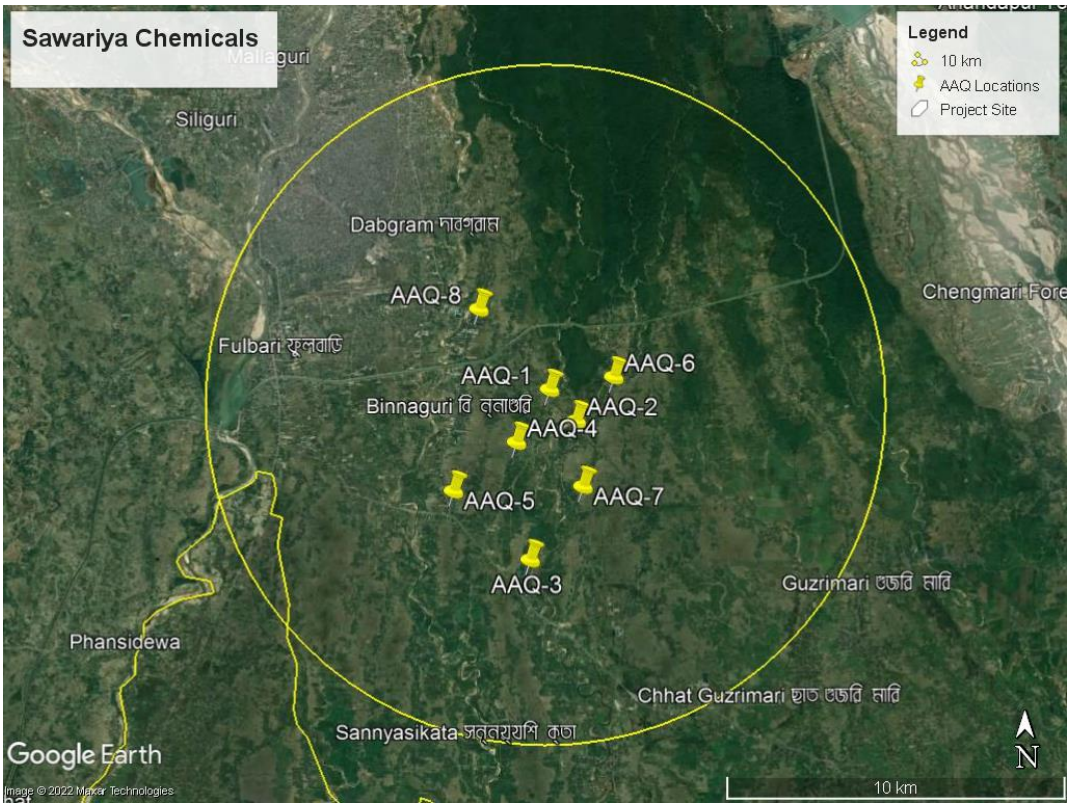


Figure 3.2: Ambient Air& Noise Monitoring Stations

Table3.4: Results for Location of AAQM stations

PM_{10} (µg/m^3)								
	AAQM - 1	**AAQM - 2**	**AAQM - 3**	**AAQM – 4**	**AAQM - 5**	**AAQM - 6**	**AAQM - 7**	**AAQM - 8**
Average	86.54	88.65	84.11	90.54	79.21	91.25	84.70	86.88
Min	91.20	98.20	91.20	94.30	83.40	96.50	88.60	90.40
Max	80.40	80.50	78.10	86.50	73.60	85.40	77.30	79.90
98 Percentile	91.20	98.15	89.95	94.30	83.40	96.08	88.50	90.04
Standard	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
$PM_{2.5}$ (µg/m^3)								

	AAQM - 1	AAQM - 2	AAQM - 3	AAQM – 4	AAQM - 5	AAQM - 6	AAQM - 7	AAQM - 8
Average	30.60	32.05	31.52	30.83	26.77	33.78	31.69	29.84
Min	37.10	39.80	35.30	32.40	28.50	37.60	35.20	38.40
Max	26.50	26.70	28.60	27.60	24.60	30.00	28.20	27.60
98 Percentile	35.23	39.28	35.20	32.30	28.34	37.60	35.10	35.28
SO_2 (µg/m^3)								
	AAQM - 1	**AAQM - 2**	**AAQM - 3**	**AAQM – 4**	**AAQM - 5**	**AAQM - 6**	**AAQM - 7**	**AAQM - 8**
Average	6.21	6.46	5.82	6.02	5.54	5.70	5.54	5.79
Min	6.90	7.40	6.20	6.30	6.00	6.30	6.00	6.40
Max	5.40	5.90	5.40	5.50	5.20	5.30	5.20	5.20
98 Percentile	6.80	7.40	6.20	6.30	5.95	6.25	6.00	6.35
NOx (µg/m^3)								
	AAQM - 1	**AAQM - 2**	**AAQM - 3**	**AAQM – 4**	**AAQM - 5**	**AAQM - 6**	**AAQM - 7**	**AAQM - 8**
Average	28.29	28.31	26.87	31.54	28.33	27.36	28.81	29.40
Min	30.20	32.60	29.20	34.10	29.70	29.20	31.40	32.50
Max	26.40	26.00	23.60	29.70	26.00	25.60	26.50	27.80
98 Percentile	30.10	31.98	28.99	33.79	29.70	29.15	30.72	31.62
CO (mg/m^3)								
	AAQM - 1	**AAQM - 2**	**AAQM - 3**	**AAQM – 4**	**AAQM - 5**	**AAQM - 6**	**AAQM - 7**	**AAQM - 8**
Average	0.62	0.63	0.63	0.62	0.64	0.65	0.63	0.66
Min	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Max	0.50	0.40	0.40	0.40	0.50	0.50	0.50	0.50
98 Percentile	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
O_3 (µg/m^3)								
Average	24.33	25.05	23.55	24.18	24.38	27.93	22.85	22.32
Min	28.60	28.40	26.20	26.70	28.40	30.40	25.50	25.00
Max	21.60	21.20	19.90	21.40	21.50	23.40	21.60	20.30
98 Percentile	28.34	28.24	26.15	26.60	28.19	30.04	25.29	24.74
NH_3 (µg/m^3)								

Average	20.54	20.71	19.91	20.65	21.00	21.64	20.62	20.53
Min	22.40	22.20	21.20	22.40	22.40	26.80	23.80	22.80
Max	19.10	19.30	19.10	19.60	19.80	19.40	19.20	19.00
98 Percentile	22.40	22.15	21.15	22.35	22.40	25.66	23.75	22.75

3.3.2 Discussions

Values of PM_{10} in the background environment ranged from 83.40µg/m^3 to 86.50µg/m^3. The value of PM_{10} was found to be within NAAQ standard of 100 µg/m^3 The values of $PM_{2.5}$ range from 28.50 µg/m^3 to 30.00 µg/m^3. The value of $PM_{2.5}$ was found to be within NAAQ standard of 60 µg/m^3.The values of Sulfur-dioxide levels were found to vary from 6.00µg/m^3 to 5.90µg/m^3. The values of SO_2 were found to be well within NAAQ standard of 80µg/m^3.The value of Nitrogen oxide ranged from29.20µg/$m^3$to 27.8 µg/m^3. The values of oxides of Nitrogen were observed to be well within the NAAQ standard of 80µg/m^3. The range of CO was between 0.50 to 0.90 mg/m^3 which is also within the standard.

3.4. NOISE

Noise in general is sound, which is composed of many frequency components of various loudness distributed over the audible frequency range. The most common and universally accepted scale is the A weighted scale which is measured as dB (A). This is more suitable for audible range of 20 to 20,000 Hz and has been designed to weigh various components of noise according to the response of a human ear. The environmental assessment of noise from the industrial activity, construction activity and vehicular traffic can be undertaken by taking into consideration various factors like potential damage to hearing, physiological responses, and annoyance and general community responses.

3.4.1. Objective

The main objective of monitoring of ambient noise levels was to establish the baseline noise levels in different zones. i. e. Residential, Industrial, Commercial and Silence zones, in the surrounding areas and to assess the total noise level in the environment of the study area.

3.4.2. Methodology

Identification of Sampling Locations

A preliminary reconnaissance survey was undertaken to identify the major noise sources in the area. The sampling location in the area was identified considering location of industry, commercial shopping complex activities, residential areas with various traffic activity and sensitive areas like hospital, court, temple and schools also near the railway track for railway noise. The noise monitoring was conducted at nine locations in the study area during monitoring period. 8 sampling locations were selected for the sampling of noise.

Table 3.5: Location of ANQM stations

Station Code	Location	Coordinates
ANQ-1	Project Site	26°39'4.36"N, 88°29'45.04"E
ANQ-2	Ambari	26°38'34.41"N, 88°30'13.48"E
ANQ-3	Sitaguri	26°36'21.83"N, 88°29'24.34"E
ANQ-4	Binnaguri	26°38'13.93"N, 88°29'9.67"E
ANQ-5	Gander More	26°37'27.47"N, 88°28'2.32"E
ANQ-6	ChakiaBhaita	26°39'16.26"N, 88°30'53.65"E
ANQ-7	Ambari Road	26°37'31.79"N, 88°30'20.75"E
ANQ-8	Sahudangi	26°40'21.02"N, 88°28'29.49"E

Equivalent sound pressure level (Leq)

The sound from noise source often fluctuates widely during a given period of time. Leq is the equivalent continuous sound level, which is equivalent to the same sound energy as the actual fluctuating sound measured in the same time period.

Instrument used for Monitoring

Noise levels were measured using an Integrating sound level meter manufactured by Cygnet (Model No. 2031). It had an indicating mode of Lp and Leq. Keeping the mode in Lp for few minutes and setting the corresponding range and the weighting network in "A" weighing set the sound level meter was run for one hour time and Leq was measured at all locations. There are different types of fields for measuring the ambient noise level, categorized as free field, near field and far field.

Free Field

The free field is defined as a region where sound wave propagates without obstruction from source to the receiver. In such case, the inverse square law can be applied so that the sound pressure level decreases by 6dB (A) as the distance is doubled.

Near Field

The near field is defined as that region close to the source where the inverse square law does not apply. Usually this region is located within a few wavelengths from the source.

Far Field

The far field is defined as that region which is at a distance of more than 1-meter from the source.

3.4.3. Noise Levels

The noise levels were monitored at nine locations selected for Ambient Air Quality Monitoring on an hourly basis during the study period. A digital noise level meter was used to record the noise levels. Leq day and Leq night noise levels were derived and reported accordingly. Day time was considered as 6:00 hrs to 22:00 hrs and night time as 22:00 hrs to 06:00 hrs. The day

time and night time equivalent noise levels at selected locations are given in **Table 3.6**. Laboratory monitoring reports are attached.

Table 3.6: Summary of Noise Level in Study Area

Location Code	Project Location	Location Coordinates	Date of monitoring (10.02.2022) (Leq in dBA)	
			Day Time	Night Time
ANQ- 1	Project site	26° 39'4.36" N, 88° 29'45.04"E	68.2	42.5
ANQ- 2	Ambari	26° 38'34.41" N, 88° 30'13.48"E	51.5	34.6
ANQ- 3	Sitaguri	26° 36'21.83" N, 88° 29'24.34"E	62.6	35.7
ANQ- 4	Binnaguri	26° 38'13.93" N, 88° 29'09.67"E	64.9	40.5
ANQ- 5	Gander More	26° 37'27.47" N, 88° 28'02.32"E	53.0	35.1
ANQ- 6	ChakiaBhita	26° 39'16.26" N, 88° 30'53.65"E	69.8	37.9
ANQ- 7	Ambari road	26° 37'31.79" N, 88° 30'20.75"E	65.7	40.3
ANQ- 8	Sahudangi	26° 40'21.02" N, 88° 28'29.49"E	64.3	39.5

3.4.4. Method of Monitoring and Parameters Measured

Noise monitoring was carried out continuously for 24-hours with one-hour interval. During each hour parameters like L_{10}, L_{50}, L_{90} and Leq were directly computed by the instrument based on the sound pressure levels. Monitoring was carried out at 'A' weighting and in fast response mode.
The important parameters to be measured are L_{eq}, L_{day}, and $L_{night.}$
L_{eq}: Latest noise monitoring equipments have the facility for measurement of L_{eq} directly. However, L_{eq}can also be calculated using the following equation:

$$L_{eq\,(hrly)} = L_{50} + (L_{10} - L_{90})^2 / 60$$

Where,
L_{10} (Ten Percentile Exceeding Level) is the level of sound exceeding 10% of the total time of measurement.
L_{50} (Fifty Percentile Exceeding Level) is the level of sound exceeding 50% of the total time of measurement.
L_{90} (Ninety Percentile Exceeding Level) is the level of sound exceeding 90% of the total time of measurement.
L_{day}: This represents L_{eq} of daytime. L_{day} is calculated as Logarithmic average using the hourly L_{eq}'s for day time hours from 6.00a.m to 10.00p.m

L_{night}: This represents $L_{eq}$of night time. L_{night} is calculated as Logarithmic average using the hourly L_{eq}'s for nighttime hours from 10.00p.m to 6.00a.m.

3.4.5. Noise Results

The values of noise level parameters like 62.5Leq (day) is lo, and 38.26Leq (night), were monitored during study period and it's found that both inside (industrial) and outside (residential) of project area the day and night equivalent noise level is as per the standards given by the CPCB.

Noise Standards

Ambient air quality standard in respect of noise have been stipulated by Govt. of India, Gazette notification vide S.O. 123(E), dated 14.2.2000 and subsequently amendments under the Environment (Protection) Act, 1986. **Table 3.7** describes ambient noise standards.

Table 3.7: Ambient Noise Level Standards

Area Code	Category of Area	Limits in dB(A), L_{eq}	
		** Day time	#Night time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone @	50	40

* As per Environment protection act.
** Day Time: 6.00a.m to 10.00p.m.
# Night Time: 10.00p.m to 6.00a.m.
@ Silence zone is defined as an area upto 100 meters around such premises as hospitals, educational institutions and courts. The silence zones are to be declared by the competent authority; Use of horns, loudspeakers and bursting of crackers shall be banned in these zones.

Permissible noise limits for residential area prescribed by CPCB are 55 dB (A) during day time and 45 dB (A) during night time and for Industrial area 75 dB (A) during day time and 70 dB (A) during night time. Recorded noise levels are within the permissible limits.

3.5. WATER ENVIRONMENT

Selected water quality parameters of ground water and surface water resources within the study area have been studied for assessing the hydrological environment to evaluate anticipated impact of the proposed project. Understanding the water quality is essential in the preparation of Environmental Impact Assessment. It also assists to identify critical issues in a view to suggest appropriate mitigation measures for implementation to curb the deterioration of various hydrological sources in the vicinity of the project.
The purpose of this study is to:

- Assess the water quality characteristics for critical parameters;
- Evaluate the impacts on agricultural productivity, habitat conditions, recreational resources and aesthetics in the vicinity; and
- Predict the likely impacts on water quality due to the project and related activities.

3.5.1. Methodology

Two surface water and nine ground water samples were examined for physicochemical, heavy metals and bacteriological parameters in order to assess the effect of industrial and other activities on surface and ground water. The samples were analyzed as per the procedures specified in 'Standard Methods for the Examination of Water and Wastewater' published by

American Public Health Association (APHA).Samples for chemical analysis were collected in polyethylene carboys. Samples collected for metal content were acidified with 1 ml HNO_3. Samples for bacteriological analysis were collected in sterilized glass bottles. Selected physicochemical and bacteriological parameters have been analyzed for projecting the existing water quality status in the study area. Parameters like Dissolved Oxygen (DO) and pH were analysed.

3.5.2. Monitoring methodology of Ground water

Table 3.8: Monitoring methodology of Ground water

SN	Parameter	Method Details	Standard Method	Method Detection Limit (mg/l)
1.	Colour	Pt-Co (Visual Comparison) Method	APHA 22nd h Edition, 2120-B	5
2.	pH	pH Meter	APHA 22nd Edition, 4500-H B	0.1
3.	Electrical Conductivity	Conductivity Meter	APHA 22nd h Edition, 2510-B	2
4.	Turbidity	Nephelometer	APHA 22nd Edition, 2130 B.	0.1
5.	Total Dissolved Solids	Gravimetry	APHA 22nd Edition, 2540 C	1
6.	Total Suspended Solids	Gravimetry	APHA 22nd Edition, 2540D	
7.	Total Hardness as CaCO3	Titrimetric	APHA 22nd Edition, 2340 C	1
8.	Total Alkalinity as CaCO3	Titrimetric	APHA 22nd Edition, 2320 B	1
9.	Arsenic (as AS)	Atomic Absorbption Spectrometry	APHA 22nd Edition, 3500As-B	0.01
10.	Potassium as K	AAS on Emission mode	APHA 22nd Edition, 3500 K-B	0.1
11.	Sodium as Na	AAS on Emission mode	APHA 22nd Edition, 3500 Na-B	0.1
12.	Calcium as Ca	EDTA Titrimetric	APHA 22nd Edition, 3500 Ca B	1
13.	Magnesium as Mg	EDTA Titrimetric	APHA 22nd Edition, 3500-Mg-B	1
14.	Chlorides as Cl^-	Argentometric Titration	APHA 22nd Edition,4500 Cl-B	1
15.	Sulphates as SO_4^{-2}	Turbidimetry	APHA 22nd Edition, 4500-SO_4-E	1
16.	Fluoride as F^-	Colorimetry	APHA 22nd Edition, 4500 F- B	0.2
17.	Iron as Fe	AAS on Emission mode	APHA 22nd h Edition, 3500 Fe B	0.06
18.	Chromium as Cr +6	Atomic Absorbtion Spectrometry	APHA 22nd Edition, 3500 Cr-B	0.05
19.	Total coliform	Multiple Tube Fermentation technique	IS: 1622-1981	2

3.5.3. Ground Water Sampling Locations

Water samples were collected from bore/open wells located within 10 Km. radius. Locations of ground water sample collection are shown in **Table 3.9**. Laboratory analysis results are shown in **Table 3.10**. Analysis was done by Standard Methods.

Table 3.9: Ground Water sampling locations

Code	Location	Coordinates
GW-1	Project Site	26°39'6.04"N, 88°29'46.45"E
GW-2	Ambari Falakata Railway Station	26°38'28.24"N, 88°30'36.79"E
GW-3	Ambari Road	26°37'33.18"N, 88°30'18.63"E
GW-4	Sitaguri	26°36'23.48"N, 88°29'17.54"E
GW-5	Gander More	26°37'29.15"N, 88°28'2.17"E
GW-6	NPJ Railway Station	26°41'06.16"N, 88°26'33.69"E
GW-7	Shikarpur	26°36'11.28"N, 88° 32'41.69"E
GW-8	Sannyasikata	26°35'05.82"N, 88° 27'32.23"E

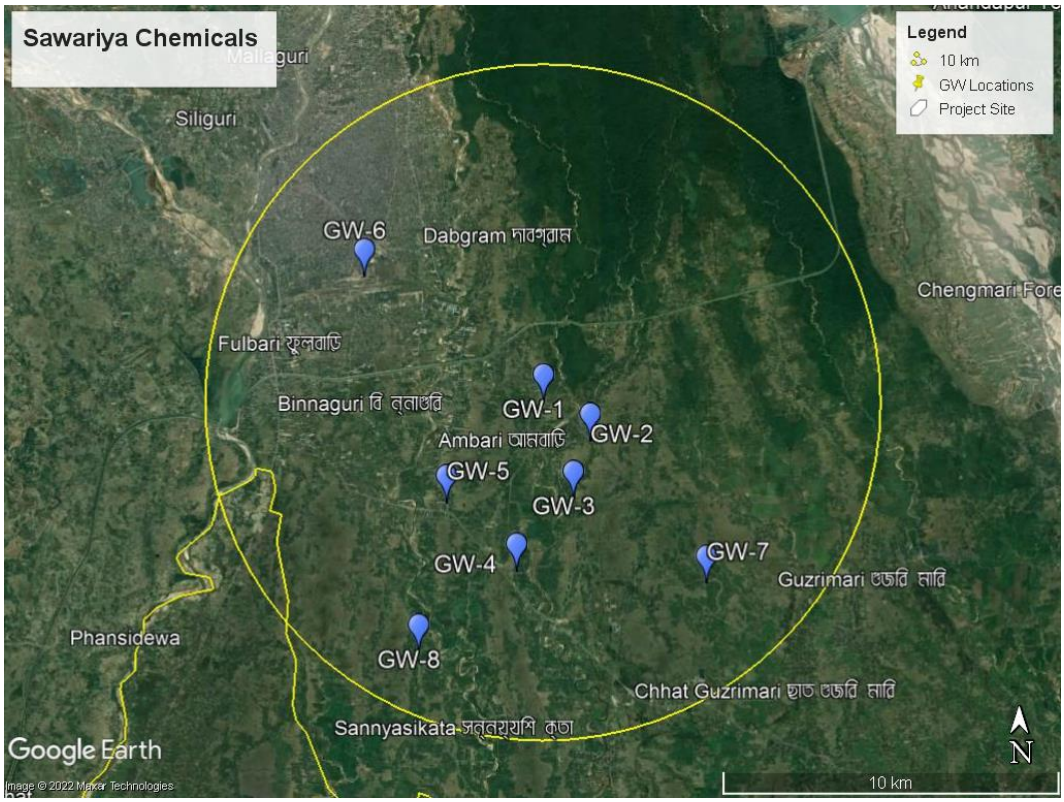


Figure 3.3: Ground Water Sampling Location

Table 3.10: Ground Water Quality Results

SN	Parameter	GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8
1	pH (at 25^0C)	7.22	7.02	6.82	7.82	7.36	7.10	6.79	6.72
2	Conductivity (µmho/cm)	151.2	460	649.0	420.0	152.6	110.9	136.5	634.0
3	Colour (Hazen)	<5	<5	<5	<5	<5	<5	<5	<5
4	Turbidity, NTU, Max	<1	<1	<1	<1	<1	<1	<1	<1
5	Total Dissolved Solid , mg/l	101.2	298.0	401.0	252.0	98.6	69.4	92.1	394.0
6	Alkalinity (as $CaCO_3$), mg/l	55.6	176.8	165.2	91.2	53.2	32.1	39.1	252.1
7	Total Hardness (as$CaCO_3$)mg/l	48.2	155.2	205.1	120.4	47.4	28.2	28.2	205.2
8	Calcium (as Ca) ,mg/l	15.2	44.1	62.2	32.1	3.0	8.2	8.8	54.2
9	Magnesium (as Mg) , mg/l	2.4	10.9	12.5	9.8	17.1	2.8	2.7	14.5
10	Chloride (as Cl), mg/l	13.4	39.3	56.9	43.5	6.64	11.7	11.6	65.8
11	Iron (as Fe), mg/l	2.6	<0.05	0.16	0.61	<0.5	7.97	0.64	0.26
12	Fluoride, (as F), mg/l	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5
13	Sulphate (as SO_4) ,mg/l	<5.0	9.8	12.4	5.6	5.5	<5.0	<5.0	13.9
14	Arsenic (as As) mg/l,	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
15	Sodium(as Na) mg/l,	15.2	57.6	52.6	29.8	11.4	9.9	10.2	37.6
16	Potassium(as K) mg./l,	4.9	16.1	14.8	9.7	4.3	3.1	3.7	9.1
17	Total Coliform Count, MPN/100ml	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent

Discussion

- pH values observed to be ranged from 6.72 to7.82. Highest value observed in GW4 and lowest value observed in GW8.
- Conductivity observed to be ranged from 649.0 to110.9 µS/cm. Highest value was observed in GW6 and lowest value observed in GW3.
- TDS observed to be ranged from92.1 to 401.0 mg/l. Highest value observed in GW3 and lowest value observed in GW7.
- Total Hardness observed to be ranged from 28.2 to 205.2 mg/l. Highest value was observed in GW8 and lowest value observed in GW6, GW7.
- Iron and Arsenic range was Below Detectable Limit (BDL)
- Coliform was not detected in any sample.

3.5.4. Monitoring methodology of Surface water

Table 3.11: Monitoring Methodology of Surface Water

SN	Parameter	Method Details	Standard Method	Method Detection Limit
1.	pH	pH Meter	APHA 22nd Edition, 4500-H B	0.1
2.	Electrical Conductivity	Conductivity Meter	APHA 22nd h Edition, 2510-B	2
3.	Turbidity	Nephelometer	APHA 22nd Edition, 2130 B.	0.1
4.	Total Suspended Solids (mg/l)	Gravimetry	APHA 22nd Edition, 2540D	5
5.	Total Dissolved Solids	Gravimetry	APHA 22nd Edition, 2540 C	1
6.	Total Alkalinity as CaCO3	Titrimetric	APHA 22nd Edition, 2320 B	1
7.	Total Hardness as CaCO3	Titrimetric	APHA 22nd Edition, 2340 C	1
8.	Dissolved Oxygen	Titrimetric	APHA 22nd Edition-4500-0-C	0.1
9.	Nitrate Nitrogen as NO3-N	Colorimetry	APHA 22nd Edition, 4500 NO_3 E	0.1
10.	Phosphate as PO4-3	Colorimetry	APHA 22nd Edition,4500 -P-D	0.01
11.	BOD (27°C, 3Days)	DO Consumption in 3 days	IS:3025,Part-44,2003	2
12.	COD	Potassium Dichromate Method	APHA 22nd Edition, 5220B	2
13.	Potassium as K	AAS on Emission mode	APHA 22nd Edition, 3500 K-B	0.1
14.	Sodium as Na	AAS on Emission mode	APHA 22nd Edition, 3500 Na-B	0.1
15.	Magnesium as Mg	EDTA Titrimetric	APHA 22nd Edition, 3500-Mg-B	1
16.	Chlorides as Cl-	Argentometric Titration	APHA 22nd Edition,4500 Cl-B	1
17.	Sulphates as SO4-2	Turbidimetry	APHA 22nd Edition, 4500-SO_4-E	1
18.	Fluoride as F-	Colorimetry	APHA 22nd Edition, 4500 F- B	0.2

SN	Parameter	Method Details	Standard Method	Method Detection Limit
19.	Boron as B	Curcumin Method	APHA 22nd Edition, 4500-B-C	0.1
20.	Iron as Fe	AAS on Emission mode	APHA 22nd h Edition, 3500 Fe B	0.06
21.	Arsenic (as AS)	Atomic Absorption Spectrometry Method	APHA 22nd Edition, 3500As-B	0.01
22.	Chromium as Cr +6 mg/l,	Atomic Absorption Spectrometry Method	APHA 22nd Edition, 3500 Cr-B	0.05
23.	Copper as Cu (mg/l)	Atomic Absorption Spectrometry Method	APHA 22nd Edition, 3500-Cu-B	0.05
24.	Phenolic Compounds mg/l,	Direct Photometric Method	APHA 22nd Edition, 5530-Phenols-D	0.01
25.	Alluminium as Al (mg/l)	Eriochrome Cyanine R Method	APHA 22nd Edition, 3500-Al-B	0.03
26.	Oil & Grease (mg/l)	Gravimetry	APHA 22nd Edition, 5520-B	10
27.	Total coliform	Multiple Tube Fermentation technique	IS: 1622	2
28.	Fecal coliform	Multiple Tube Fermentation technique	IS: 1622	2

3.5.5. Surface Water Sampling Locations:

Surface water samples were collected from ten locations. Locations of surface water sample collection are shown in **Table 3.12**. Laboratory analysis results are shown in **Table 3.13.**

Table 3.12: Surface Water Sampling Location

Code	Location	Coordinates
SW-1	Korotoya Nodi (Ambari)	26°38'51.60"N, 88° 30'14.39"E
SW-2	Sitaguri	26°36'20.44"N, 88° 29'32.97"E
SW-3	River at Rajganj	26°35'39"N, 88° 29'47"E
SW-4	Manuaganj (Pond)	26°35'51.93"N, 88° 30'24.48"E
SW-5	Bhutkir Hat (Sau River)	26°37'22.82"N, 88°27'29.09"E
SW-6	Teesta Cannel	26°40'00"N, 88°29'8"E
SW-7	Mahananda River	26°38'40.00"N, 88°24'6"E
SW-8	Jamidar Para	26°35'7.06"N, 88° 27'30.13"E

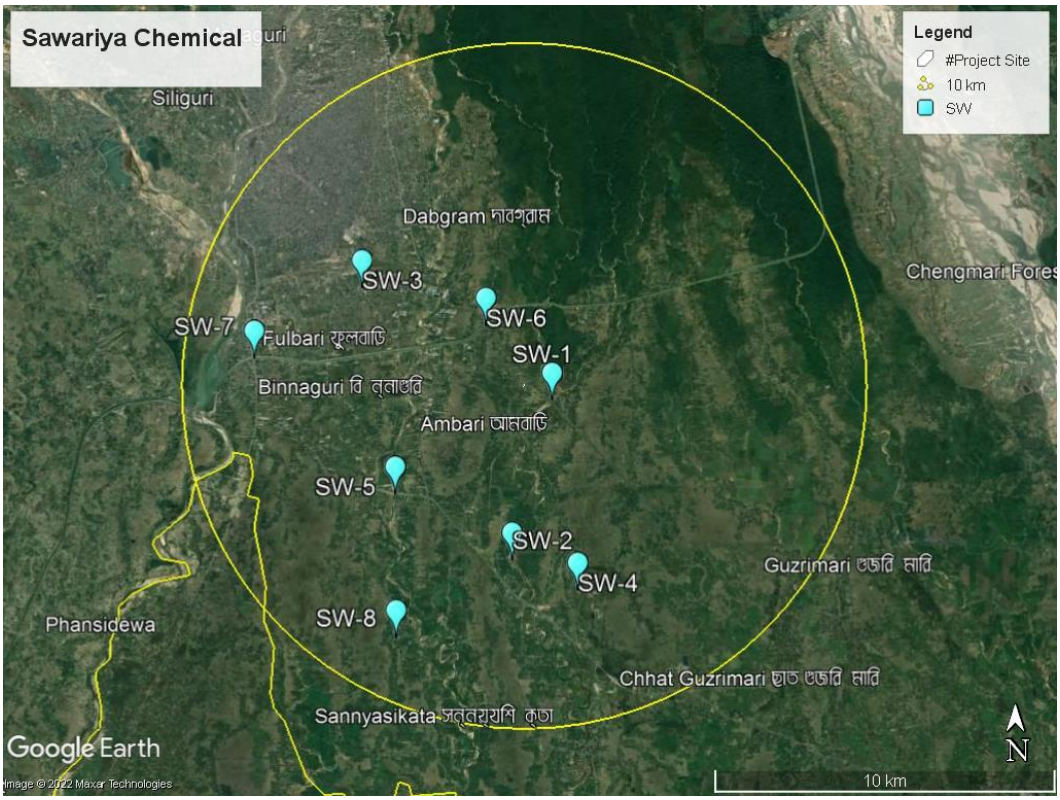


Figure 3.4: Surface Water Sampling Location

Table 3.13: Surface Water Quality Results

SN	Parameter	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
1	pH (at 25^0C)	7.80	7.44	6.99	7.19	7.98	8.57	7.82	7.24
2	Conductivity (µmho/cm)	140.6	148.5	115.8	161.1	220.6	73.9	86.9	221.7
3	Turbidity, NTU, Max	<1	<1	<1	<1	<1	<1	<1	<1
4	Total Dissolved Solid , mg/l	89.2	89.6	64.2	102.2	142.9	49.2	52.5	158.2
5	Alkalinity (as $CaCO_3$), mg/l	52.3	55.2	39.6	59.2	78.3	39.2	45.1	62.9
6	Total Hardness (as$CaCO_3$)mg/l	41.9	48.3	30.7	47.8	69.8	33.1	39.2	55.4
7	Calcium (as Ca) ,mg/l	12.8	15.1	9.0	18.5	22.1	9.1	12.5	19.2
8	Magnesium (as Mg) , mg/l	2.1	3.7	3.1	6.7	9.8	2.7	3.9	8.7
9	Chloride (as Cl), mg/l	22.3	18.2	13.5	21.0	32.8	18.3	19.2	22.1
10	Iron (as Fe), mg/l	0.11	0.09	0.14	0.19	0.13	0.12	0.14	0.17
11	Fluoride, (as F), mg/l	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
12	Sulphate (as SO_4) ,mg/l	6.6	8.1	7.7	12.2	10.2	<5.0	6.1	9.1
13	Nitrate (as NO_3) , mg/l	4.9	3.9	2.9	5.1	4.9	2.1	3.5	4.6
14	Arsenic (as As) mg/l,	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
15	Chromium as Cr +6 mg/l,	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
16	Copper as Cu (mg/l)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
17	Phenolic Compounds mg/l,	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
18	Alluminium as Al (mg/l)	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
19	Boron as B (mg/l)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
20	Sodium(as Na) mg/l,	23.7	19.8	15.7	13.4	23.4	8.4	13.4	33.1
21	Potassium(as K) mg./l,	7.1	6.9	7.6	8.9	7.3	2.7	8.9	12.1
22	Dissolved Oxygen	4.9	3.9	4.7	3.9	4.9	3.3	4.2	2.1
23	Total Suspended Solids (mg/l)	19.4	10.4	14.4	19.2	14.4	14.4	14.4	24.4
24	Oil & Grease (mg/l)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
25	Chemical Oxygen Demand (mg/l)	7.5	6.4	14.1	20.4	11.2	9.2	10.0	53.3
26	Biological Oxygen Demand 3 days at 27°C (mg/l)	4.2	3.7	6.9	9.6	4.3	3.9	3.2	2.0
27	Phosphate as PO_4^{-3}	0.92	1.02	0.88	1.68	0.89	1.02	0.78	1.87
28	Total Coliform Count, MPN/100ml	540	490	630	430	630	520	580	630
29	Faecal Coliform Count, MPN/100ml	310	380	420	290	440	360	330	410

Discussion:

- The analysis results indicate that the pH values in the range of 76.99 to 8.57, the minimum value was observed at SW3 and maximum value was observed at SW6.
- The TDS was observed in the range of 49.2 to 158.2 mg/l, the minimum TDS value was observed at SW4, and whereas maximum value was observed at SW6.
- The DO was observed in the range of 2.1 to 4.9 mg/l, the minimum DO value was observed at SW8, and whereas maximum value was observed at SW1, SW5.
- The BOD was observed in the range of 2.0 to 9.6 mg/l, the minimum BOD value was observed at SW8 and whereas maximum value was observed at SW4.
- The COD was observed in the range of 6.4 to 53.3 mg/l, the minimum COD value was observed at SW2 whereas maximum value was observed at SW8.
- The Chlorides were found to be in the range of 13.5 to 32.8 mg/l.
- Total hardness expressed as $CaCO_3$ ranges between 30.7 to 69.8 mg/l.
- The calcium & magnesium were found to be in the range of 9.0 to 22.1 mg/l and 2.1 to 9.8 mg/l, respectively.
- The Total Coliform was observed in the range of 430 to 630 MPN/100ml, the minimum value was observed at SW4, and whereas maximum value was observed at SW3, SW5, SW8.
- The Faecal Coliform was observed in the range of 290 to 440 MPN/100ml, the minimum value was observed at SW4, and whereas maximum value was observed at SW5.

Surface water samples analysed during the study. As per the CPCB water quality criteria for surface water the SW2, SW4, SW6, SW8 falls under Class E and SW1, SW3, SW5, SW7, falls under Class D.

3.6. SOIL

Soils may be defined as a thin layer of earth crust that serves as a natural medium for the growth of plants. It is the unconsolidated mineral factors. Soils serve as a reservoir of nutrients for plants and crops. It also provides mechanical anchorage and favourable filth.

3.6.1. Methodology of soil sample monitoring

Table 3.14: Monitoring Methodology for Soil Sampling

Parameters	Standard Method	Methodology	Sensitivity / Detection limit	Units	Remarks
Color	--	Visual Observation	--	--	--
Bulk Density	IS 2720 (Part 03) - 1980	Density Measurement	1.0	kg/m^3	--
Water Holding Capacity	UT/LQMS/SOP /S12	Gravimetric method	0.1	%	Analysis as per Standard Methods specified
Moisture Content	IS:2720 (Part 02) - 1973	Gravimetric method	0.1	%	

pH	IS : 2720 (Part 26) - 1987	Electrometric method	0.1	--	1:2 Soil extract
Electrical Conductivity	IS 14767 - 2001	Conductometry	0.001	mS/cm	
Organic matter	IS : 2720 (Part 22) - 1972	Titrimetric method	0.1	%	Analysis as per Standard Methods specified
Total Organic Carbon	IS : 2720 (Part 22) - 1972;	Calculation using Organic matter content	0.1	%	
Cation Exchange Capacity	USEPA 1998 SW-846,9080	Ammonium Acetate Method	1.0	meq/ 100g	
Dissolved Analytes	1:10 water extract for dissolved analytes				
Calcium as Ca	APHA 22nd Ed. 2012, 3500 Ca B	EDTA Titration Method	1.0	mg/kg	Made 10% Water Extract to be and analysed as per Standard Methods specified.
Magnesium as Mg	APHA 22nd Ed. 2012, 3500 Mg B	EDTA Titration Method	1.0	mg/kg	
Sodium as Na	APHA 22nd Ed. 2012, 3500 Na B	Flame Emission Spectrometry	1.0	mg/kg	
Potassium as K	APHA 22nd Ed. 2012, 3500 K B	Flame Emission Spectrometry	1.0	mg/kg	
Total Metals	1:100 acid (HNO_3) digested extract and estimation made on AAS				
Copper as Cu	USEPA SW-846, Update V, July 2014 Method 3050B & 7000B	Flame Atomic Absorption Spectrophotometry	5.0	mg/kg	1% acid digested sample used for metal analysis. Analysis has been carried out as per USEPA SW 846 methods.
Total Chromium as Cr			5.0	mg/kg	
Cobalt as Co			5.0	mg/kg	
Cadmium as Cd			2.0	mg/kg	
Zinc as Zn			2.0	mg/kg	
Lead as Pb			5.0	mg/kg	
Nickel as Ni			5.0	mg/kg	
Iron as Fe			10.0	mg/kg	
Manganese as Mn			10.0	mg/kg	
TCLP Metals	1:20 selective buffer extraction and measurement of extracted sample on AAS				
Copper as Cu	USEPA SW-846, Update V, July 2014 Method 1311 & 7000B	Flame Atomic Absorption Spectrophotometry	0.06	mg/L	Buffer extracted sample used for metal analysis. Analysis has been carried out as per USEPA SW 846 methods
Total Chromium as Cr			0.06	mg/L	
Cobalt as Co			0.06	mg/L	

Cadmium as Cd			0.018	mg/L	
Lead as Pb			0.06	mg/L	
Iron as Fe			0.09	mg/L	
Manganese as Mn			0.12	mg/L	
Zinc as Zn	USEPA SW-846, Update V, July 2014 Method 3050B & 7000B		0.018	mg/L	
Nickel as Ni			0.06	mg/L	
Exchangeable Cations	Soil is extracted using 1N Ammonium acetate solution in ratio 1:25 (Soil: Ammonium acetate)				
Calcium as Ca	IS 3025 (Part 40) 1991	EDTA Complexometric method	1.0	meq/ 100g	Ammonium Acetate Extract to be made as per USEPA SW846 9080 and exchangeable cations are analyzed as per Standard Methods specified.
Magnesium as Mg	IS 3025 (Part 46) 1994	By Calculation	1.0	meq/ 100g	
Sodium as Na	IS 3025 (Part 45) 1993	AAS on Emission mode	1.0	meq/ 100g	
Potassium as K	IS 3025 (Part 45) 1993	AAS on Emission mode	1.0	meq/ 100g	
Available Nutrients	--				
Available Nitrogen	Methods Manual for Soil Testing, DAC-MOA, GOI	Alkaline KMnO4 Oxidation Method	2	kg/ha	--
Available Potassium as K_2O	Methods Manual for Soil Testing, DAC-MOA, GOI & APHA 22nd Ed. 2012,3500 K B	Flame Emission Spectrometry	1	kg/ha	
Available Phosphorous as P_2O_5	Methods Manual for Soil Testing, DAC-MOA, GOI & APHA 22nd Ed. 2012, 4500 P E	Ascorbic Acid Method	5	kg/ha	--

Representative soil samples from study area were collected from 8 locations as shown in **Table 3.15**. The results of soil analysis are presented in **Table 3.16**.

Table 3.15: Soil Sampling Locations

Code	Location	Coordinates
S-1	Project Site	22°32'40.89"N, 88°3'13.99"E
S-2	Shimulguri	22°34'19.07"N, 88°6'24.51"E
S-3	Shikarpur	22°30'25.11"N, 88°6'48.17"E
S-4	Manuganj	22°30'32.99"N, 88°1'59.46"E
S-5	Bhutkir Hat	26°37'22.95"N, 88°27'26.63"E
S-6	Kamrangaguri/Fulbari	26°39'22.12"N, 88°25'00.75"E
S-7	Mahanada Ghat	26°40'37.79"N, 88°24'50.50"E
S-8	Dabgram	26°43'20.04"N, 88°28'22.86"E

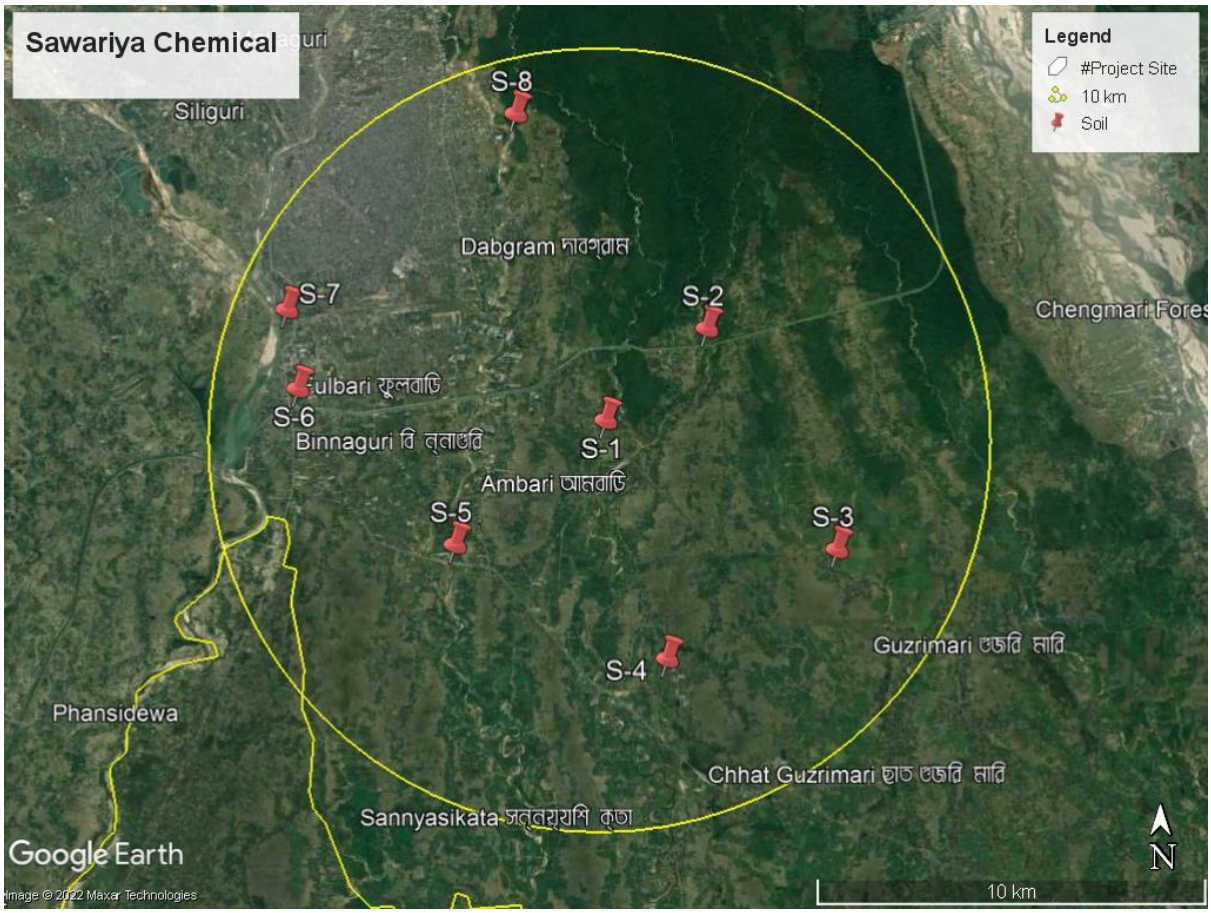


Figure 3.5: Soil Sampling Locations

3.6.2. Methodology

The soil samples were collected during monitoring period. The samples collected from the all locations are homogeneous representative of each location. At random 8 sub locations were identified at each location and soil was dug from 30 cm below the surface. It was uniformly mixed before homogenizing the soil samples. The samples were filled in polythene bags, labelled in the field with number and site name and sent to laboratory for analysis.

Table 3.16: Soil Analysis Report

SN	Sampling Location→ / Parameter ↓	S1	S2	S3	S4	S5	S6	S7	S8
1	Colour	Hue 2.5YR-5/0 gray	Hue 2.5YR-6/0 gray	Hue 5YR-5/1 gray	Hue 2.5YR-4/0 gray	Hue 5YR-7/2 Light gray	Hue 5YR-6/1 gray	Hue 5YR-4/1 Dark gray	Hue 5YR-6/1 gray
2	Texture	Silty clay	Silty clay	Silty clay	Silty clay	Silty Clay	Silty clay	Silty	Silty Clay
a	Sand (%)	22.9	15.1	14.2	13.3	17.2	14.8	12.3	15.8
b	Silt (%)	47.2	45.8	47.8	54.6	54.0	50.4	49.7	57.2
c	Clay (%)	29.9	39.1	38.0	31.1	28.8	34.88	38	27
3	pH (1:2.5 ratio)	7.87	7.89	7.91	7.36	8.03	7.13	8.41	7.71
4	Conductivity (μ mhos/cm)	1289	1137	1121	1129	1081	1291	1015	1098
5	Sodium (as Na) mg/kg	0.025	0.022	0.019	0.025	0.015	0.027	0.019	0.022
6	Potassium (as K) mg/kg	0.014	0.017	0.015	0.019	0.013	0.022	0.010	0.012
7	Calcium (as Ca) mg/kg	0.42	0.31	0.38	0.49	0.39	0.44	0.19	0.23
8	Magnesium (as Mg) mg/kg	0.20	0.15	0.17	0.23	0.22	0.29	0.13	0.15
9	Nitrogen mg/kg	0.079	0.069	0.062	0.084	0.073	0.095	0.076	0.085
10	Phosphates (as P_2O_5) mg/kg	0.051	0.037	0.031	0.038	0.029	0.044	0.021	0.035
11	Total Organic Carbon %	3.39	3.03	3.18	3.31	3.25	3.33	3.22	3.29

3.6.3. Discussion

- It has been observed that the pH of the soil in the study area ranged from 7.13 to 8.41 the maximum pH observed at S7, whereas the minimum was observed at S6.
- The electrical conductivity was observed to be in the range of 1015 to 1291 µ mhos/cm, the maximum Electrical Conductivity observed at S6 and minimum Electrical Conductivity was observed at S7.
- The Potassium values range between 0.010 to 0.022 mg/kg, with the maximum was observed at S6 and the minimum observed at S7.
- The Sodium values range between 0.015 to 0.027 mg/kg with the maximum was observed at S6 and the minimum observed at S5. The Nitrogen values range between 0.062 to 0.095 mg/Kg, with the maximum was observed at S6 and the minimum observed at S3.
- The total organic carbon value ranges from 3.03% to 3.39 % with maximum was observed at S1 with minimum was observed at S2.

Table 3.17: Standard Soil Classification

SN	Soil test	Classification
1	pH	< 4.4 Extremely acidic 4.41- 5.00 very strongly acidic 5.01-6.00 moderately acidic 6.11- 6.40 slightly acidic 6.31-7.30 Neutral 7.21- 7.70 moderately alkaline 8.31-9.0 strongly alkaline > 9.01 very strongly
2	Salinity Electrical Conductivity µS/cm 1ppm = 640 µS/cm	Upto 1.00 Average 1.1 – 1.98 harmful to germination 1.2 2.01-3.00 harmful to crops 1.3 (sensitive to salts)
3	Organic Carbon (%)	Upto 0.2 very less 0.21-0. less 0.41-0.5 medium 0.51-0.8 on an average sufficient
4	Nitrogen (kg/ha)	Upto 50 very less 51-100 less 101-150 good 151-300 Better ➢ 300 Sufficient
5	Phosphorus (kg/ha)	Upto 15 very less 16-30 less 31-50 medium 51-65 on an average sufficient 66-80 sufficient 66-80 sufficient ➢ 80 more than sufficient
6	Potassium (kg/ha)	0-120 very less 120-180 less 181-240 medium 241-300 average 301-360 average 301-360 better ➢ 360 more than sufficient

***Source: - Handbook of Agriculture, ICAR New Delhi**

3.7. LAND USE/ LAND COVER OF THE STUDY AREA:

3.7.1 Introduction

Remote sensing data is a general source of information on natural resources in a region or territory that tracks the state of those resources over time due to its continuous scope. Remote sensing is a powerful and rigorous data collection process. Satellite imaging surveys provide a great way to measure both the quantitative scale of natural vegetation and the changes in conditions brought on by climate change. Understanding the complexities of the earth's surface properties, as well as phenomena such as complex environments, is also fascinating.

3.7.2 Methodology

Land use area and land use classification analysis as follows:

1. Development of an input database.
2. Data processing and analysis.
3. End planning of development.

3.7.3 Input Data

Toposheet:

Figure 3.6 is showing the project location and its surrounding area on the toposheet of series NG 45-7 and NG 45-8 SOI (Survey of India).

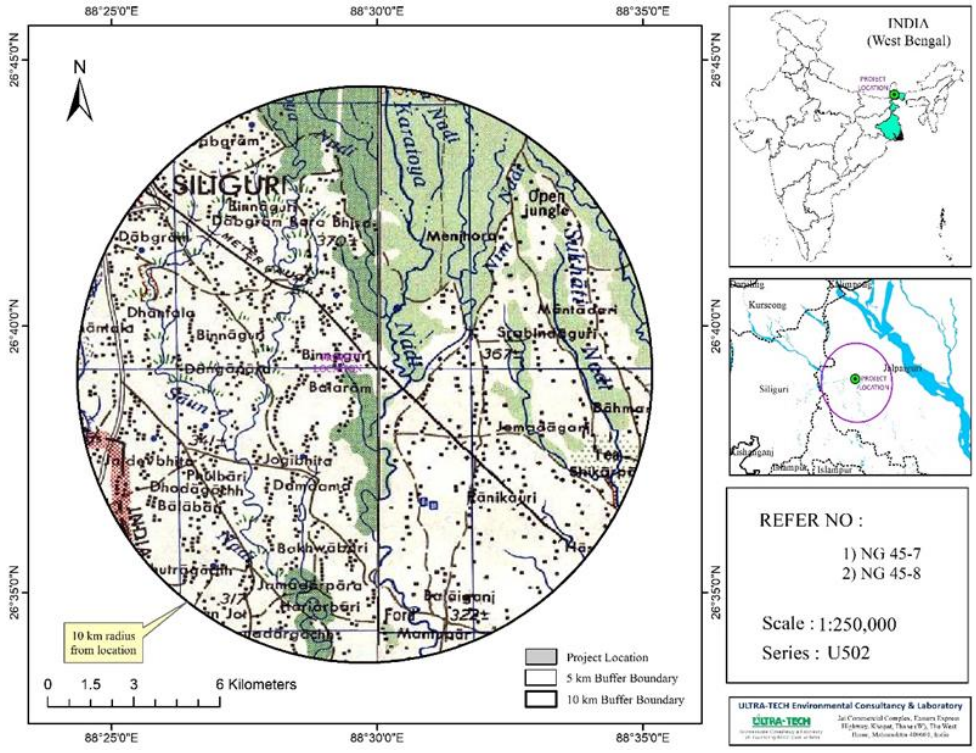


Figure 3.6: Topographical sheet covering the project location and its surroundings

Google Earth: Google Earth images have been analyzed for spatial characteristics, soil sensors, latitude, longitude, and geo-recording of satellite images.

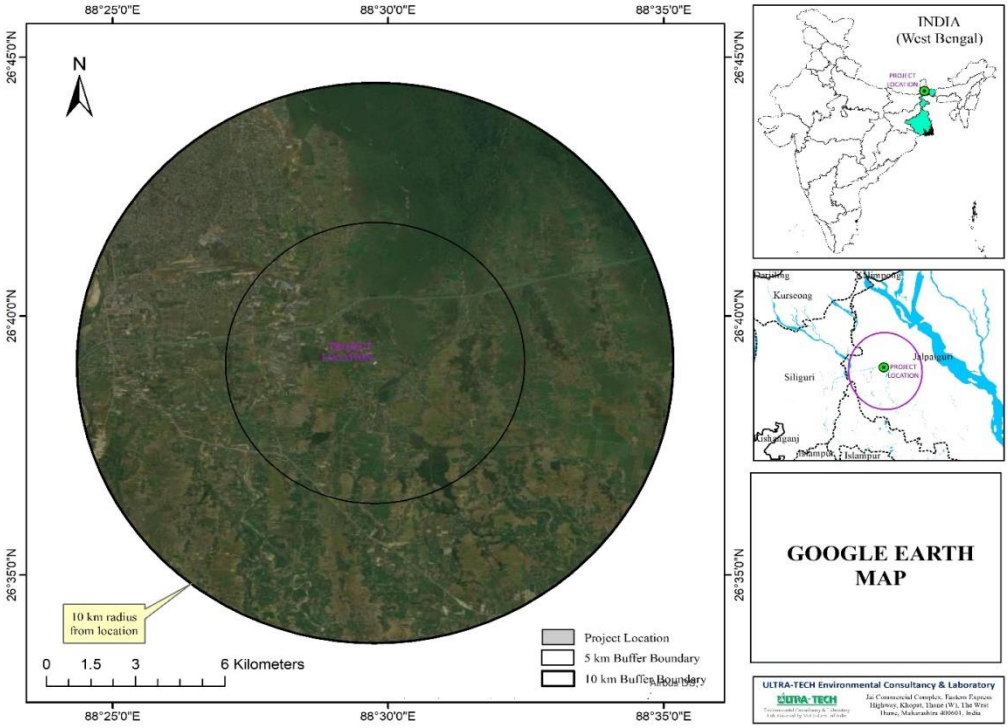


Figure 3.7: Project site on Google Earth Image

Satellite image:

Satellite data or satellite image has been downloaded to the framework and a land-use map has been created from the website of the European Space Agency https://scihub.copernicus.eu, information provided in Table. The first move was the establishment of the FCC standard (using Sentinel 2 bands B2, B3, B4, and B8) and the implementation of the LULC Classification Map of the test site around the site for the project (**Figure 3.7**). Sentinel-2 data from the above source have been downloaded to cover the whole area. Sentinel-2 has a total of 13 bands in it. Both bands vary in their spatial resolution. Radiometric and atmospheric corrections have been used to generate the reflectance file. For Sentinel-2, bands 2, 3, 4, and 8 were selected to prepare the RGB to achieve improved classification accuracy. The RGB of the sample region is prepared using the boundary form file to clip the data. Area of significance to all the adjacent scenes. Mosaicking was carried out to minimize the disparity between the various sensing dates and the impact of color issues.

The following are the specifics of the satellite image used in this study:

Entity ID	L1C_20220310T043711_N0400_R033_T45RXK
Acquisition date	10/03/2022
Tile Number	T45RXK
Agency	ESA
Platform	SENTINEL-2A
Orbit Number	33
Orbit Direction	Descending Orbit

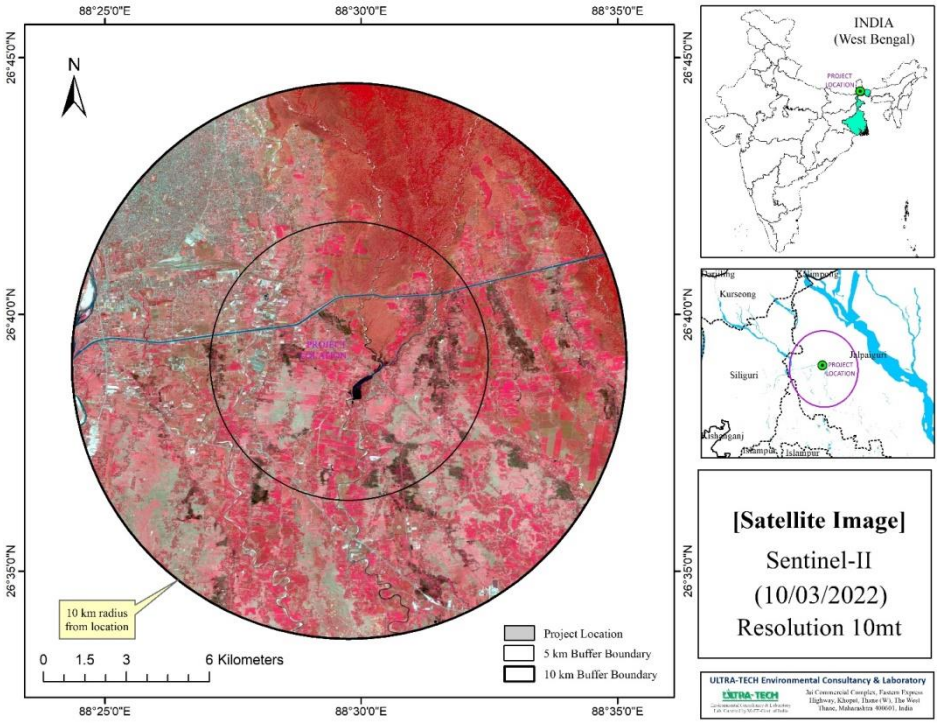


Figure 3.8: Satellite Image Map-covering the project location and its surroundings

3.7.4 Data Processing/Analysis

Restoration of image Data

Data errors, noise, and geometric distortions are added during scanning, transmitting, and recording operations and restoration processes are designed to detect and compensate for them. The aim is to make the image resemble the original scenario as closely as possible. Since each band's pixels are stored independently, image restoration is relatively simple. Picture restoration attempts to restore image data that has been blurred or corrupted in order to provide a more precise depiction of the original scene. This usually includes the initial analysis of raw image images to correct geometric distortions and calibrate the data radiometrically. Image correction and restoration procedures are often referred to since retrieval operations since they normally precede the editing and review of image data in order to extract relevant data and information.

Radiometric Corrections:

To calibrate pixel values or fix value errors, radiometric correction is used. The method improves the readability and precision of remote sensing data. When comparing various data sets over time, radiometric calibration and correction are especially important. The difference between the energy emitted or reflected from the surface to the earth as measured by aircraft or satellite instruments and the true energy emitted or reflected from the surface to the earth. This is due to the sun's azimuth, as well as elevation and ambient conditions, which can modify the sensor's capacity. In order to obtain actual or true ground radiance or reflectance values, radiometric errors must also be taken into account.

Geometric Correction:

Geometric correction is an integral step in the pre-processing of the image since the orientation of the images is calculated. However, the geometric adjustment also requires pixel values in their original location in order to change the original values. Raw digital images usually contain such extreme geometric inconsistencies that they cannot be used as diagrams. The cause of these distortions varies between altitude variance and the velocity of the sensor platform, including panoramic distortion, Earth curve and atmosphere.

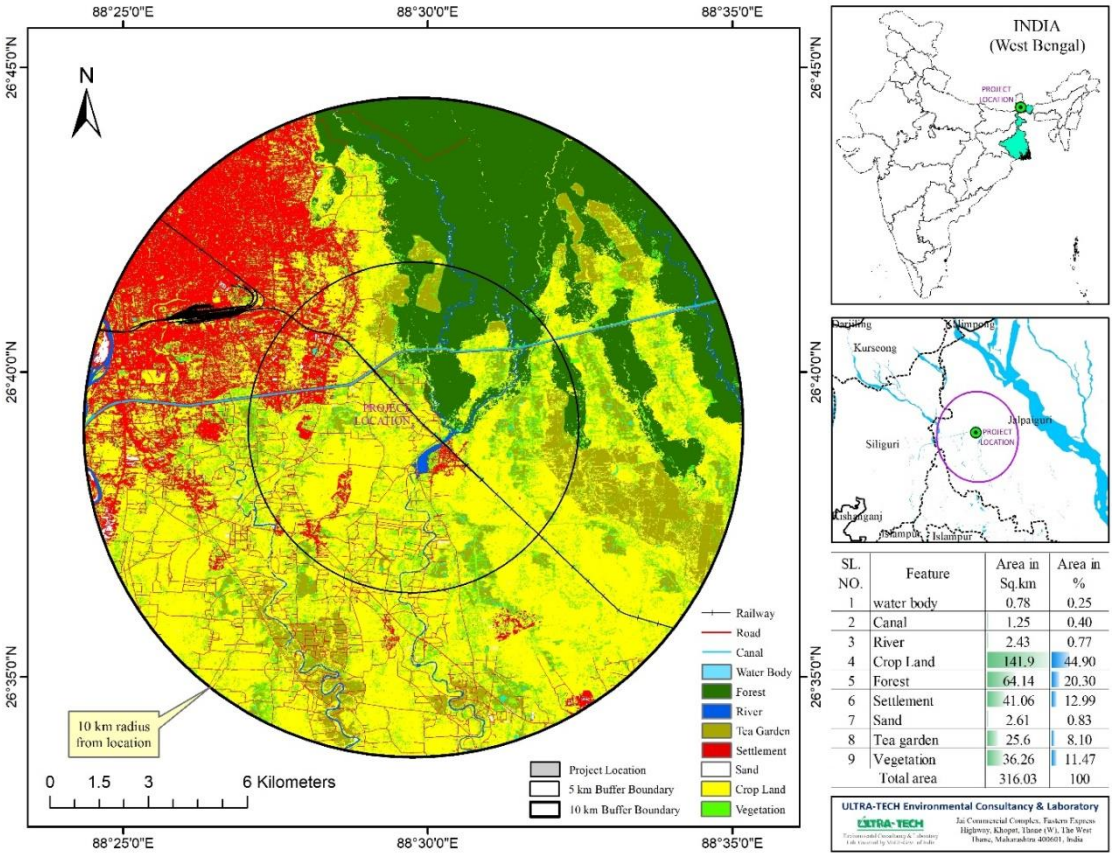
Ground Truthing:

A study of identification was carried out in order to gain a broad understanding of the field of analysis. In order to assess the accessibility of the region as well as the pattern and distribution of vegetation and its composition, it was necessary to have knowledge of current field conditions. Land validation means the formation of a connection between objects and objects observed, labeled, marked, and satellite imagery. In satellite imaging for identification, the appearance of a few species of plants on the field was associated with its tonality

3.7.5 Final Outputs:

Classifications of land use:

The land use classification of Hybrid Level-2 was carried out using the Supervised Classification System. Bands 2, 3, 4, 8 are the most appropriate ones. At the end of the study, 10 classes were derived and the picture was ranked. The pattern for graded land use is seen in **Table 3.18** and seen in **Figure 3.9**. The False Color Composite for the area as seen in **Figure 3.10**.



SL. NO.	Feature	Area in Sq.km	Area in %
1	water body	0.78	0.25
2	Canal	1.25	0.40
3	River	2.43	0.77
4	Crop Land	141.9	44.90
5	Forest	64.14	20.30
6	Settlement	41.06	12.99
7	Sand	2.61	0.83
8	Tea garden	25.6	8.10
9	Vegetation	36.26	11.47
Total area		316.03	100

Figure 3.9: Map of LULC Classification (10 Km. Radius)

Table 3.18: Land-use Classification – Area (10 Km. Radius)

SL. NO.	Feature	Area in Sq.km	Area in %
1	water body	0.78	0.25
2	Canal	1.25	0.40
3	River	2.43	0.77
4	Crop Land	141.9	44.90
5	Forest	64.14	20.30
6	Settlement	41.06	12.99
7	Sand	2.61	0.83
8	Tea garden	25.6	8.10
9	Vegetation	36.26	11.47
Total area		316.03	100

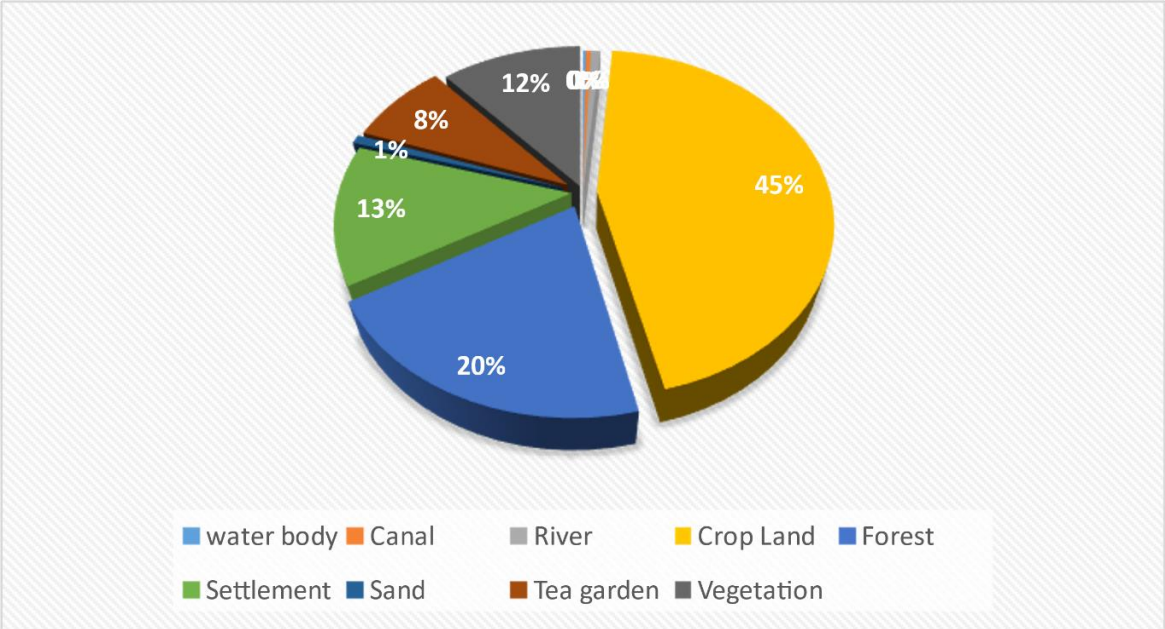


Figure 3.10: LULC Classification (10 Km. Radius)

3.7.6 Interpretation on Land use classification

Binnaguri is a cantonment town in West Bengal, India, located in the Jalpaiguri district. It is situated at 216 metres above sea level at 26° 46' N latitude and 89° 3' E longitude. Binnaguri is near to the Bhutanese border, with the Bhutanese town of Samchi 10 kilometres to the north. Binnaguri is located in the heart of Dooars nation. The Binaguri Tea Estate, Moraghat Tea Estate, Telepara Tea Garden, Huldibari Tea Garden, Banarhat Tea Garden, Karbala Tea Garden, Lakhipara Tea Garden, and Gandrapara Tea Garden are all nearby.

Settlement:

Built-up Land is defined as a human ecosystem created because of non-agricultural use. Built-up land within a distance of 10 Km from the project site, including villages, cities, panchayat, and income settlements, including buildings and industry, factories, roads, communications, water, and vegetation facilities. Out of the total area covered by the settlement and commercial sectors, the area of 41.06sq. km is part of the built-up land community, which is 12.99% of the total project area. The area around the site of the sand mining project comes under this class.

Forest and Vegetation:

Forests cover the whole state, from the northernmost tip of the Himalayas (on the slopes of the high Himalayas) to the Duars (i.e., in the foothills of the Western regions). Before delving into the many types of forests in West Bengal, it's important to understand the state's total forest acreage and forest cover. Tropical wet deciduous forest may be found in the lower portions of North Bengal, particularly in the districts of Alipurduar, Jalpaiguri, and Coochbehar (Terai region). The primary locations of the tropical wet deciduous forest are

located across the Duars and Terai region. The betel nut, champ, coconut, jackfruit, mango, mahua, sissoo, simul, teak, sal, and other species are commonly found in this forest. The aforementioned vegetation patches and forest cover occupy 36.16 square kilometres (11.47%), and 64.14 square kilometres (20.30%).

Rivers and Canals:

Rivers, streams, and canals serve a variety of agricultural, economic, transportation, environmental, and residential purposes. They also have important aesthetic, recreational, and socio-cultural benefits. The rivers cover 2.43 square kilometres, or 0.77% of the project's total area. They are given as linear land use and land cover categories for the research region (**Figure 3.10**). They demonstrate the location and density of the drainage system in the research region. The canals, which are mostly utilised for irrigation, cover 0.40% of the project area.

Water Bodies

As Inland water bodies, the region's water resources are split into rivers and canals, reservoirs, tanks and ponds, bills, oxbow lakes, derelict water, and brackish water. Aside from rivers and canals, total water bodies cover approximately 0.78 square kilometres, or 0.25% of the project area.

Crop Land

In the study region, this land use/land cover is not industrially developed; the agricultural sector dominates the economy. Agriculture in the region is remarkable for its reliance on rainfall, the dominance of seasonal crops, and the use of traditional farming practises. Croplands occupy the most of the project area, accounting for 141.9 square kilometres (44.9%).

Tea Garden

A tea garden is an outdoor location or garden where tea and light snacks are offered, or any garden linked with the consumption of tea. It is also a frequent phrase for a tea plantation, particularly in India. Tea Garden cover a moderate amount of the project area, accounting for 25.6 sq.km (8.1%) of the project area.

Sand

In arid-land conditions, erosion processes are frequently juvenile, and soils are composed of coarse-grained particles commonly referred to as sand. Where there is bare terrain or a steep surface slope, soil erosion rises. When there is significant erosion, dirt particles approach and finally fill the river channel, perhaps to a depth of several meters. Sand rivers are such rivers that are actually full with sand. That sand covers 2.61 square kilometers, or 0.83% of the project area.

3.8. Hydrogeology:

The project location is situated in the district of Jalpaiguri, which is characterized by wide extensive Quaternary alluvial deposits brought about by the south and south-easterly flowing mountain rivers and streams and forms a part of the Tista-jaldhaka-Torsha sub-basins. The area comes under one of the most promising ground water regimes amongst the existing Quaternary Alluvial terrains of the state of West Bengal.

Geology

The occurrence and development of groundwater in an area are influenced by geological formations. It acts as the basis for deposited elements that have crystallised through time. Geological formations impact the presence and development of groundwater in a given place. It acts as the basis for deposited elements that have crystallised through time. Geological formations impact the presence and development of groundwater in a given place. It acts as the basis for deposited elements that have crystallised through time. The project location is situated under the geological division of Young Alluvium (**Figure 3.11**). The stratigraphic succession of the area is composed of Younger alluvium of Holocene age. The Younger Alluvium, also known as Terai Formations is confined south of the raised terraces and they gradually merges with the axial plain of the south. This Formation particularly comprises of coarse to fine sand, gravel and clay intercalations.

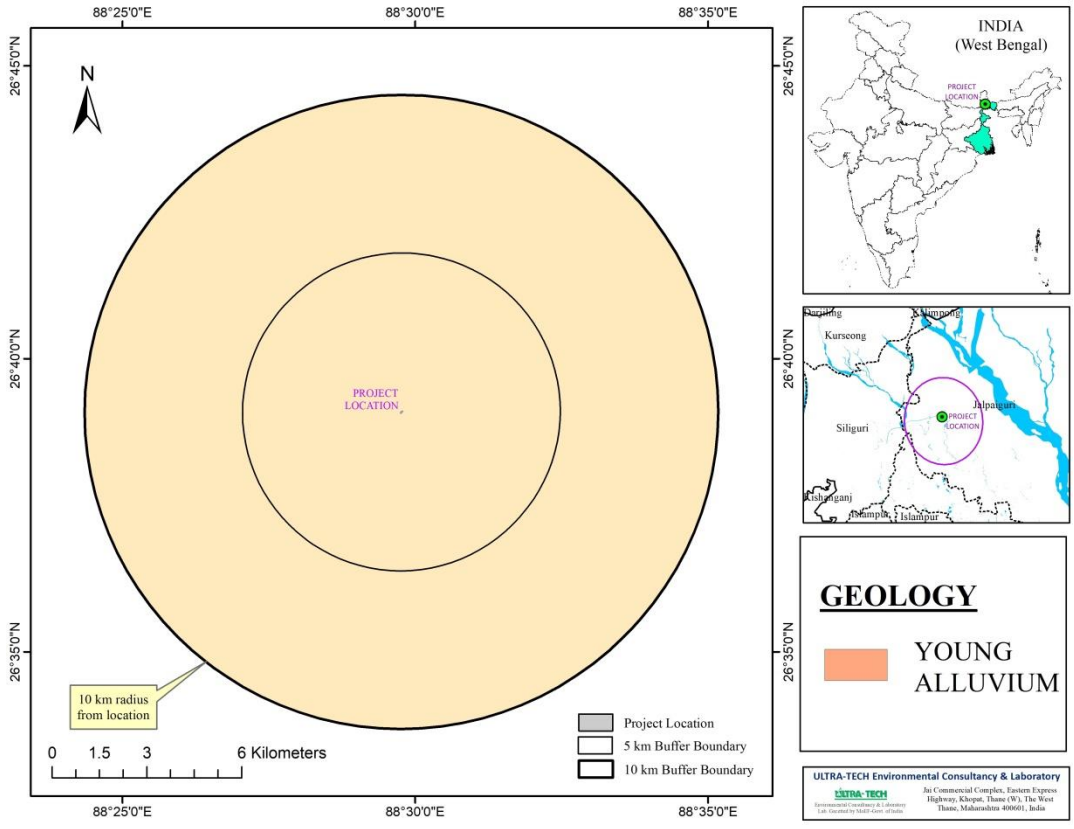


Figure 3.11: Geology of the project location

Hydrology

As far as the surface hydrology of the project location is concerned, sveral major and minor rivers drain the district. The major rivers are Teesta, Jaldhaka and Angabarsha. These rivers are generally southerly flowing. These rivers flowing over steeply sloping land surface during monsoon carry a huge quantity of boulders, pebbles; cobbles etc and these are deposited in the southern part as the topographic slopes become gentler. Most of them swell and overflow their banks causing flood and widespread damages to the human life and property all during monsoon. The minor streams emerging from the Himalayas use to dry up completely after each rainy spell enriching the unconfined ground water body in "Bhabar" formation.

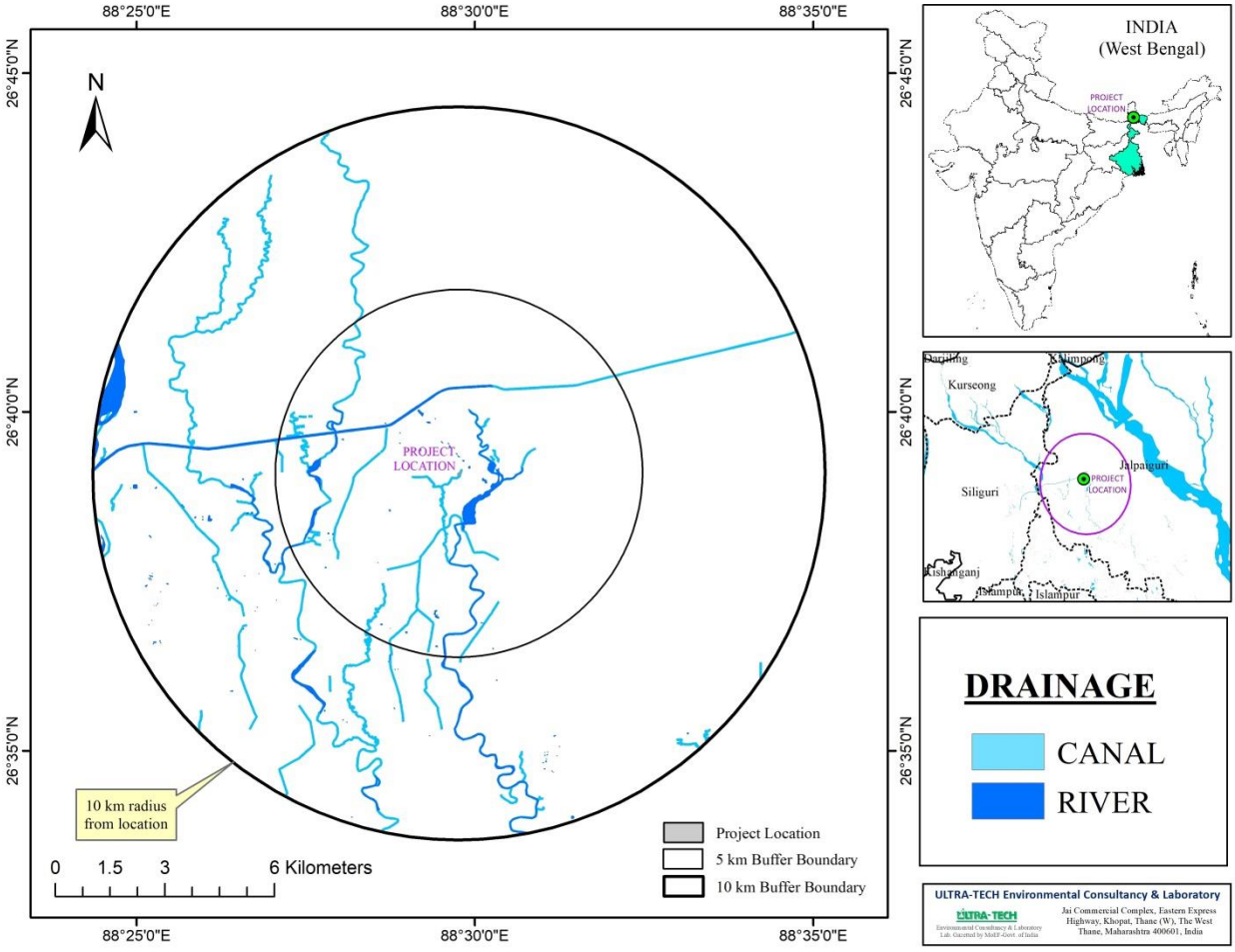


Figure 3.12: Drainage map of the project area.

Ground water levels

Ground water levels observed over time give useful information on the behaviour of the ground water regime, which is always changing owing to recharge and outflow processes. A balance between these two factors causes a decrease or increase in ground water storage. When recharge exceeds outflow, ground water storage rises, and vice versa. The fall in water level might be due to an increase in draught (for various causes) or a decrease in precipitation (reduced recharge to ground water). A rise in water level, on the other hand, may be the result

of increased rainfall and/or changes in irrigation methods. As The main water bearing formations in Jalpaiguri district are Quaternary sediments of the Holocene and Pleistocene ages. They are Older Alluvium mostly covering the Bhabar area and Younger Alluvium covering the Terai areas. The aquifers in the study area are categorized on the basis of their depth of occurrence: (a) Shallow aquifer within 50 mbgl and (b) Deeper aquifer within a depth of 50-150 mbgl. Thus, the project location is situates within the shallow aquifer zone.

Shallow aquifers are composed of coarse sand (dominant) mixed with gravel (boulders, cobbles, pebbles) and is tapped by dug wells and shallow tubewells. It is regionally extended. Groundwater in shallow aquifer occurs in unconfined to semiconfined conditions. In Bhabar zone comprising mostly the blocks of Mal, Metelli, Nagrakata, some parts of Dhupguri and Rajganj, no definite sand layers or clay horizons could be established due to very poor assortment of sediments. The sediments show better sorting and stratification and exhibit alteration of sand and clay in the Terai zone.

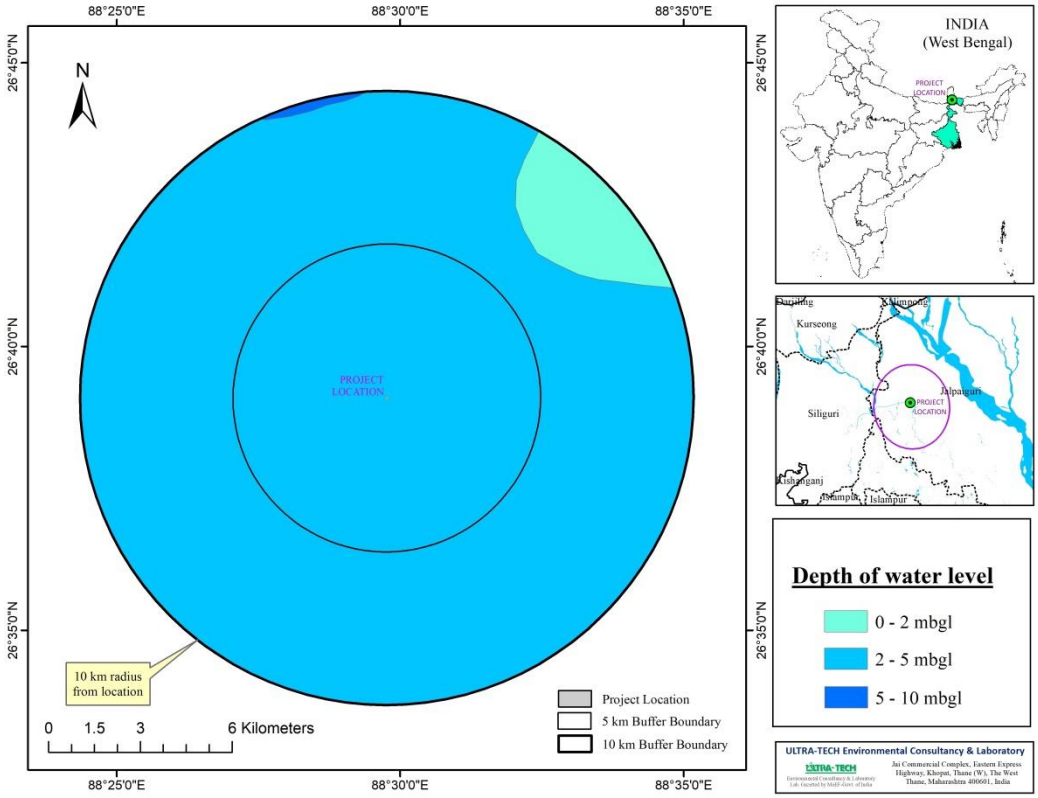


Figure 3.13: Below Ground level of the project location during pre-monsoonal months.

As per the following figures the water level scenario is most viable during the premosoonal month of the May (Fig.3) depth to water level ranges of 2 to 5 mbgl are recorded in amajority of the wells, 0 to 2 mbgl in found across the northeastern edge of the project area, and depth to water level ranges of 5 to 10 mbgl in approximately northern edges of the project area in the state (fig.3).During the post-monsoonal months the wells situated in the northeastern, edges of the region had depths to water levels of 0 to 2 mbgl (fig.4), and the rest of the region's ewells had depths to water levels of 2 to 5 mbgl (fig.4).

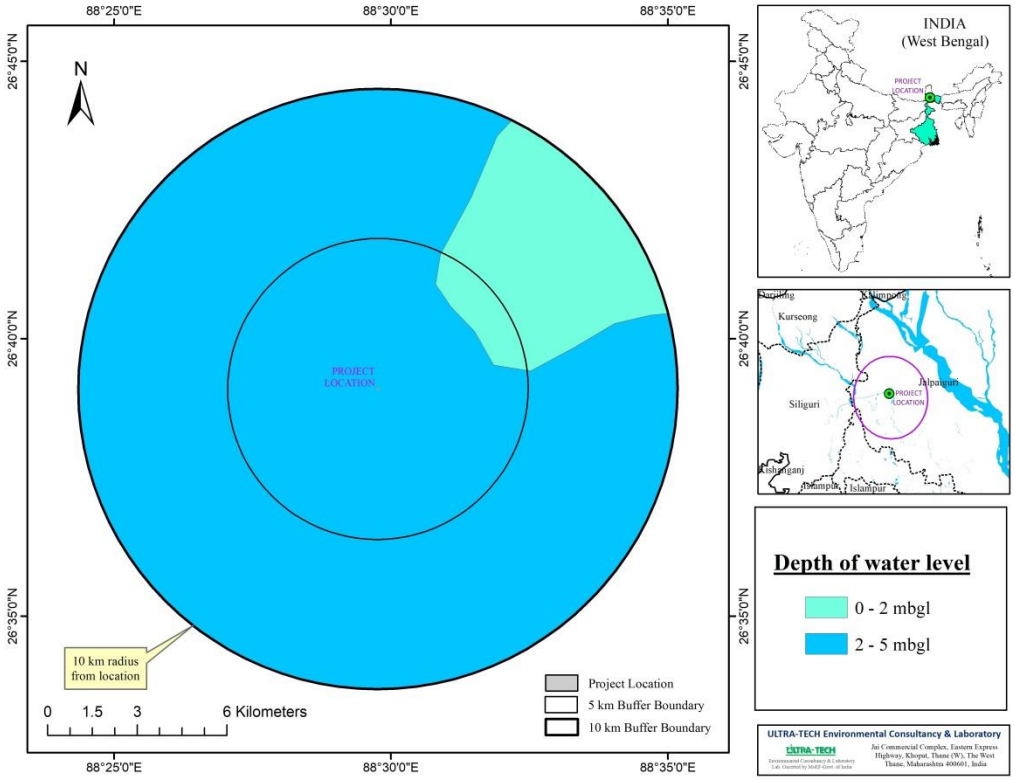


Figure 3.14: Below Ground level of the project location during post-monsoonal months

3.8. BIOLOGICAL ENVIRONMENT

Study of biological environment is one of the most important aspects for Environmental Impact Assessment. In view of the need for conservation of environmental quality and biodiversity study, biological environment is one of the most important aspects for Environmental Impact Assessment. Ecological systems show complex inter-relationships between biotic and abiotic components including dependence, competition and mutualism. Biotic components comprise of both plant and animal communities, which interact not only within and between them but also with the abiotic components viz. physical and chemical components of the environment. Generally, biological communities are the indicators of climatic and edaphic factors. The biological environment includes mainly terrestrial ecosystem and aquatic ecosystem.

3.8.1 Objectives

The present study was undertaken with the following objectives:

- To assess the nature and distribution of vegetation in and around the project site
- To evaluate the distribution of animal life spectra, including avifauna and butterflies, available in this area
- To ascertain whether the proposed project will have any adverse impact on the ecology in and around project areas, and suggest mitigation measures, if needed.

3.8.2 Survey Methodology

Sampling locations were identified for study on biological environment based on topography, vegetation structure, pattern and distribution. The observations were taken from different villages along agricultural field, marshy, land, waste land, riverside vegetation and built up and according to the objectives delineated for environmental impact Assessment studies.

- Primary data have been collected within project site as well as up to 10 Km from project site. Identified vegetation patterns at different locations through GIS map and physically surveyed representative sites.
- Checklist of trees, shrubs, herbs, Palms & grasses from the study area was prepared.
- Different types of animals, including avifauna, available in this area, have been recorded
- To spot the fauna in the study area and also to identify the fauna by secondary indicators such as pugmarks, scats, fecal pellets, calls and other signs;
- For ecological information, the secondary sources such as local officials & villagers were interviewed
- Secondary data, up to 10 Km boundary from the project site have been collected from literature, forest department, and discussions with local people & NGO

3.8.3 Study Area

Project site is located at Village – Gokul Vita, Pargana – Baikunthapur, Dist – Jalpaiguri, West Bengal. As per guidelines of MoEF for Environmental Impact Assessment, the study area was restricted up to 10 km periphery of the project site. All observations were undertaken in January 2022 in the study area (**Figure 3.15**).

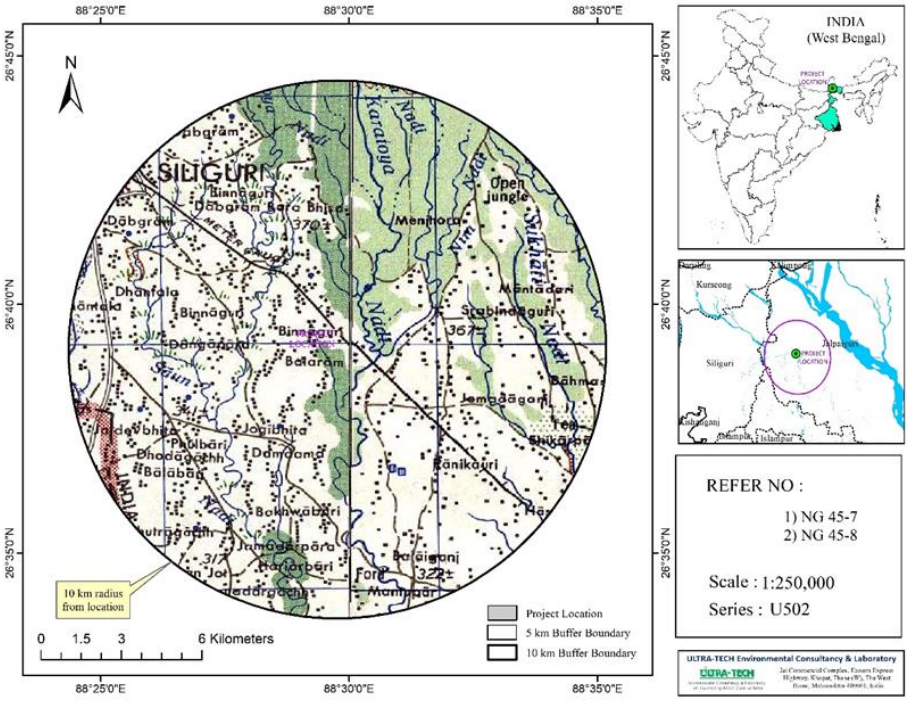


Figure 3.15: Study area for Biological Environment

3.8.4 Biodiversity at Project Site:

a. Terrestrial Ecology:

a) Flora: Dominant tree species in Study area are *Azadirachtaindica, Mangiferaindica, Artocarpusheterophyllus*and, *Ficusbenghalensis.*Dominant families of plants recorded in the study area are CaesalpiniaceaeMimosaceae, Euphorbiaceae, Cucurbitaceae, Papilionaceae. The area showed overall 63 plant species from 60 genera and 41 families. A list of dominant flora observed in study area is given in **Table 3.19**.

Table 3.19: Presence of vegetation up to10 km surroundings of the project site

SN	Botanical name	Common name	Family
Trees			
1.	*Azadirachtaindica*	Neem tree	Meliaceae
2.	*Averrhoacarambola*	Amrakh	Oxalidaceae
3.	*Albizzialebbeck*	Sirish	Fabaceae
4.	*Aeglemarmelous*	Bael	Rutaceae
5.	*Artocarpusheterophyllus*	jackfruit	Moraceae
6.	*Acacia catechu*	Khair	Fabaceae
7.	*Acacia nilotica*	Babul	Fabaceae
8.	*Acacia auriculiformis*	Arteliyn Babul	Mimosaceae
9.	*Adina cordifolia*	Haldu	Rubiaceae
10.	*Bombaxceiba*	Samal	Malvaceae
11.	*Boswelliaserrata*	Indian franki	Burseraceae
12.	*Bauhinia variegata*	Kachanar	Fabaceae
13.	*Citrus medica*	Nimbu	Rutaceae
14.	*Cassia fistula*	Amaltash	Fabaceae
15.	*Carica papaya*	Papaya	Caricaceae
16.	*Cassia siamea*	Kashid	Fabaceae
17.	*Casuarinaequisetifolia*	Australian pine tree	Casuarinaceae
18.	*Caesalpiniapulcherrima*	Krishnachaura	Fabaceae
19.	*Ceibapentandra*	Kapok tree	Bombacaceaeae
20.	*Colocasiaesculenta*	Elephant ear	Araceae
21.	*Dyospyrosmalaberica*	Komoi	Ebenaceae
22.	*Dalbergiasisso*	Sisam	Fabaceae
23.	*Delonixregia*	Gulmohar	Caesalpiniaceae
24.	*Eucalyptus globolus*	Safeda	Myrtaceae
25.	*Ficusbenghalensis*	Wad	Moraceae
26.	*Ficusracemosa*	Umber	Moraceae
27.	*Erythrinavariegata*	Sunshine Tree	Fabaceae
28.	*Ficusreligiosa*	Pimpal	Moraceae
29.	*Gardenia turgida*	Khahar	Rubiaceae

30.	*Leucaenaleucocephala*	Subabul	Fabaceae
31.	*Mitragynaparvifolia*	Karam	Rubiaceae
32.	*Mangiferaindica*	Aam	Anacardiaceae
33.	*Mimusopselengi*	Molshri	Sapotaceae
34.	*Nephelium litchi*	Litchi	Sapindaceae
35.	*Pithecellobiumdulce*	Jungle jalebi	Fabaceae
36.	*Pongamiapinnata*	Karanj	Fabaceae
37.	*Prosopisjuliflora*	BilayatiBabool	Fabaceae
38.	*Syzygiumcumini*	Jamun	Myrtaceae
39.	*Tamarindusindica*	Imli	Fabaceae
40.	*Tectonagrandis*	Sag	
41.	*Terminaliaarjuna*	Arjun	Combretaceae
42.	*Zizphusglaberrima*	Ber	Rhamnaceae
Shrubs			
1.	*Annonasquamosa*	Sarifa	Annonaceae
2.	*Cassia tora*	Tarota	Fabaceae
3.	*Lantana camara*	Raimuniya	Verbenaceae
4.	*Nerium indium*	Kaner (Red)	Apocynaceae
5.	*Psidiumguajava*	Amrud	Myrtaceae
6.	*Ricinuscommunis*	Arandi	Euphorbiaceae
7.	*Solanumnigrum*	Regani	Solanaceae
Herbs			
1	*Achyranthesaspera*	-	Amaranthaceae
2	*Argemonemexicana*	Pivladhotra	Papaveraceae
3	*Partheniumhysterophorus*	Gajar Grass/Congress	Asteraceae
Grasses			
1	*Dendrocalamusstrictus*	Bass	Poaceae
2	*Bambusaarundinacea*	Kat bass	Poaceae
3	*Saccharumspontaneum*	Kans	Poaceae
4	*Cynodondactylon*	Dube	Poaceae
Palms			
1	*Borassusflabellifer*	Sugar palm	Arecaceae
2	*Phoenix sylyestris*	Khajoor	Arecaceae
Aquatic Vegatation			
1	*Typhaelephantina*	Era	Typhaceae
2	*Hydrillaverticillata*	Hydrilla	Hydrocharitaceae
3	*Nymphaea lotus*	White lotus	Nymphaeaceae
4	*Nelumbonucifera*	Indian lotus	Nelumbonaceae
5	*Cyperusrotundus*	Nutgrass	Cyperaceae
6	*Lemnaperpusila*	Small Duckweed	Lemnaceae

Source: Species recorded by Ultratech team

b) Fauna:

Methodology

Field observations of fauna were carried out. The commonly available mammals, reptiles, amphibians birds, butterflies and dragonflies within 10 km surroundings were enumerated. List of dominant fauna recorded in study area are given in **Table 3.20**

Table3.20: List of Dominant Fauna Recorded in Study Area

SN	Scientific Name	Common Name	Status according to IWPA 1972
Mammals			
1	*Bostarus*	Cow	Not enlisted
2	*Bubalusbubalis*	Domestic buffalo	Not enlisted
3	*Capra hircusaegagrus*	Goat	Not enlisted
5	*Canis lupus familiaris*	Common dog	Not enlisted
6	*Canisaureus*	Jackal	Sch. II
7	*Herpestesedwardsii*	Common Mongoose	Sch. II
8	*Presbytis entellus*	Common Langur	Sch. II
9	*Macacamulatta*	Rhesus monkey	Sch. II
10	*Rattusrattus*	House Rat	Sch. V
11	*Funambuluspalmarum*	Four Striped Palm Squirrel	Sch. IV
12	*Suncusmurinus*	Musk Shrew	Sch. V
13	*Pteropusgiganteus*	Indian fly fox	Sch. V
14	*Lepusnigricollis*	Indian hare	Sch. IV
Amphibians and Reptiles			
10	*Calotesversicolor*	Common Garden lizard	-
11	*Najanaja*	Cobra	Sch. II
12	*Ptyas mucosa*	Dhaman/Ret Snake	Sch. II
13	*Eryxjohnii*	Do-muha	Sch. IV
14	*Bungaruscaeruleus*	Common Krait	Sch. IV
15	*Chrysapelea ornate*	Flying Snake	Sch. IV
16	*Hylaranataipehensis*	Frog	-
17	*Euphlyctiscyanophlyctis*	Skipper	-
18	*Bufostomaticus*	Indian Marbled Toad	
19	*Ranahexadactyla*	Indian Pond Frog	Sch. IV
20	*Ranatigerinus*	Indian Bull Frog	Sch. IV
21	*Mabuyacarinata*	Brahminy Skink/ Bahmani	-
22	*Hemidactylusflaviviridis*	House Gecko/Chhipkali	-
Butterflies			
19	*Papiliopolytes*	Common Mormon	Not enlisted
20	*Papiliopolymnesfor*	Blue Mormon	Not enlisted
21	*JunoniaIemonias*	Lemon Pansy	-
22	*Euploea core*	Common Indian Crow	Sch. IV
23	*Danauschrysippus*	Plain Tiger	Not enlisted

b. Aquatic Ecology

Sampling

Water samples within 10km periphery of project site were collected from Korotoya River and Mahananda River Samples from these water bodies were collected during January 2022 for phytoplankton and zooplankton analyses. To enumerate phytoplankton, unfiltered surface waters were collected from the water bodies. Phytoplankton samples were immediately fixed in 2% Lugol's iodine solution so as to prevent adverse effects of light and temperature which might cause rapid decay of organisms (APHA 2005). Phytoplanktons were identified up to genera level using standard taxonomic keys. For zooplankton, about 40 liter water was filtered through plankton net having mesh size of 75µ to represent all the available groups. The samples were fixed immediately with 5 % buffered formalin and subsequently analysed under microscope in the laboratory with the help of Sedgwick rafter cell.

Observations

a. Phytoplankton

Phytoplankton counts, recorded from Korotoya River and Mahananda River varied between140and 760No/ml **(Table 3.21).** Usually Phytoplankton reported from above locations showed dominance of Chlorophyceae followed by Bacillariophyceae, Cyanophyceae & Phaeophyceae members. Altogether 11 genera of Phytoplankton were reported from 2 locations. Density of phytoplankton group was more in Mahananda River. The Shannon Wiener index for phytoplankton varied from 1.4 to 2.2 indicating medium productive water.

Table 3.21: Phytoplankton counts observed in water bodies within study area

SN	Location	Density (No/ml)	Percent Composition of Algal groups				SWI *
			Chloro-phyceae	Cyano-phyceae	Bacillario-phyceae	Pheophy aceae	
1	Mahananda River	760	30	24	26	20	1.4
2	Korotoya River	140	32	22	24	22	2.2

***Ranges of Shannon Wiener Diversity Index**

- <1: Indicate poor productive water
- 1-3 Indicate medium productive water
- >3 Indicate good productive water

Table 3.22: Phytoplankton genera observed in water bodies within study area

SN	Chlorophyceae	Bacillariophyceae	Cyanophyceae	Pheophyaceae
1	*Chlorella sp*	*Cyclotellasp*	*Microcystissp*	*Ceratium sp.*
2	*Cosmarium sp.*	*Diatoma sp.*	*Oscillatoriasp.*	*Scytosiphon sp.*
3	*Closterium sp.*	*Pinullaria*	-	-
4	*Tetraedron*	-	-	-

b. Zooplankton

Zooplankton counts, recorded at Korotoya River and Mahananda River within study area are presented in **Table 3.23.** Density of zooplankton varied between 40 and 130 N/m^3. Only 7 genera of zooplankton, dominated by *Brachionus*sp, *Diaptomus*sp. and *Daphniasp.* were recorded. Rotifera, was most dominant, followed by Copepoda and Cladocera. However, SWI indicates medium productive waters.

Table 3.23: Enumeration of Zooplankton in surface water bodies within study area

SN	Sample Location	Zooplankton (No/m^3)	Percent Composition of Zooplankton Groups			SWI*
			Rotifera	Copepoda	Cladocera	
1	Mahananda River	40	56	34	10	1.2
2	Korotoya River	130	45	45	10	2.2

***Ranges of Shannon Wiener Diversity Index**

- <1: Indicate poor productive water
- 1-3 Indicate medium productive water
- >3 Indicate good productive water

Table 3.24: Zooplankton genera observed in-surface water bodies within study area

SN	Rotifera	Copepoda	Cladocera
1	*Asplanchna* sp.	*Diaptomus*sp	*Alonella* sp.
2	*Brachionus* sp.	*Cyclops sp.*	*Bosmina* sp.
3	-	-	*Daphnia sp*

3.9. SOCIO ECONOMIC STUDY

3.9.1 Introduction

An environmental factor is a socioeconomic concern. The emphasis is mostly on the social and economic consequences of the proposed development's construction and operation. It covers characteristics such as demographic composition, access to basic utilities such as housing, education, health and health services, occupation, water supply, sanitation, connectivity, and power, prevalent local diseases, and characteristics such as tourist sites and ancient monuments. The examination of

these criteria aids in defining and assessing the potential implications of project activity on the surrounding area. Every development effort has an immediate and indirect, positive and negative impact. Every development activity has an immediate and indirect, good and bad impact on the region's socioeconomic environment.

3.9.2 Objective

The following are the socioeconomic study priorities:

- To investigate the demographic and facility structure available in the field of study.
- Identification and evaluation of the effects on the socioeconomic status of the study area.
- Consider any potential negative and positive social consequences of the initiative.
- We are recommending action to minimize the adverse effects of the project.
- To check that environmental and industrial standards have been complied with.
- To advise the adoption of cost-effective steps to mitigate the expected consequences.

The field of socioeconomic evaluation study was formed within a 10-kilometer radius. The Ministry of Environment and Forestry has designated the main radius of 10 km from the project data site radius. The radius of the project location. The EIA Guiding Handbook is used to classify the effect zone. For the socioeconomic study, both primary and secondary data are used.

3.9.3 Data Collection

The word "data collection" refers to a method of processing and obtaining data. Systematic data compilation from various sources for a particular project, which has been frequently monitored, documented, and coordinated. Data are critical inputs to every phase of the project's decision-making process.

Primary Data Collection

The term "primary data" refers to data that was collected specifically for this reason. Data was collected in the field with the investigator's assistance and supervision. This type of Information is often new and collected for the first time. It is beneficial for both present and future research. The following strategies are used to collect primary data in the research sector.

1. Form of observation
2. Focus group discussion (F.G.D.)
3. Questionnaires and Survey

Secondary Data Collection

Secondary data is acquired and registered by someone else before and with a reason other than the present one. Secondary Information is collected from a variety of other offices such as Census offices (2011 Indian Census), Statistical, Health Offices, Department of Land and Revenue, Zilla Parishad, and Non-Governmental Organizations.

3.9.4 Concept & Definitions

- **Study area:** The study area, also known as the impact area, has been established as the whole core region plus a buffer region 10 kilometers from the core perimeter. The study area includes both natural and man-made features.
- **Quality of Life (QoL):** Quality of Life refers to how much a person may appreciate his or her life's favourable resources. The 'possibilities' that each individual has in his or her life, which represent the combination of personal and environmental variables, are derived from opportunities and limits. Leisure consists of two parts: the sensation of pleasure and the possession or attainment of such attributes.
- **Household:** A household is a group of people who usually live together and dine in shared kitchens. People in the household might be related, unconnected, or a combination of the two. However, if a group of similar or unrelated persons reside in the same house but do not share a kitchen, they do not belong to a shared home. Each individual is regarded as if they were a member of a distinct family. Households might include one man, two, or more people.
- **Sex ratio**: The percentage of women and males in a particular population is referred to as the sex ratio. It is stated the term "number of women per 1000 males."
- **Literate:** Anyone above the age of seven who can read and write in any language is called literate. There is no formal schooling or minimum educational credentials required for an individual to be considered literate. Blind persons who can read Braille are now considered academics.
- **Literacy rate:** The literacy rate is defined as the percentage of the Population aged 7 and older who are literate.
- **Labor force:** The number of employees in a geographical unit is equal to the number of jobs and unemployed persons. The workforce is defined as the number of persons who work and those who are jobless. An individual who is not an employee must be characterized as being actively engaged in work. Those between the ages of 14 and 16 make up the majority of the country's labour force, as do those beyond the retirement age (about 65) who are either employers or job searchers. Students, seniors, home visitors, inmates, persons with permanent impairments, and incentives are not counted as part of the labour force.
- **Work:** Work is defined as participation in any economically advantageous action, with or without compensation, wages, or revenue. Such involvement might be emotional or physical in character. Jobs need not only actual work but also close supervision and instruction. Jobs on a farm, in a family business, or in another type of business might be part-time or full-time.
- **Worker:** All personnel are classed as workers. People who produce or prepare milk are typically regarded as employees, even if only for personal consumption.
- **Main workers:** Individuals who worked the majority of the time (6 months or more for a year of the comparative period) are referred to as Main Workers.
- **Marginalized workers:** These are people who have not served for the majority of their time (i.e., for less than 6 months).

- **The rate of participation in work**: The rate of participation is the ratio of workers to the total size of the cohort (national population of the same age range). The labour participation rate is defined in this study as the total (main and marginal) share of the workforce.

3.9.5 Project Location

The project is located in Binnaguri, Jalpaiguri District, and West Bengal. Binnaguri is near to the Bhutan-Nepal border; the Bhutanese town of Samchi.

Figure 3.16: Project site and Study area

In the 10 km radius area, settlements are under study during the discussion of the basic socioeconomic environment scenario. Various tables and graphs give detailed descriptions of these settlements.

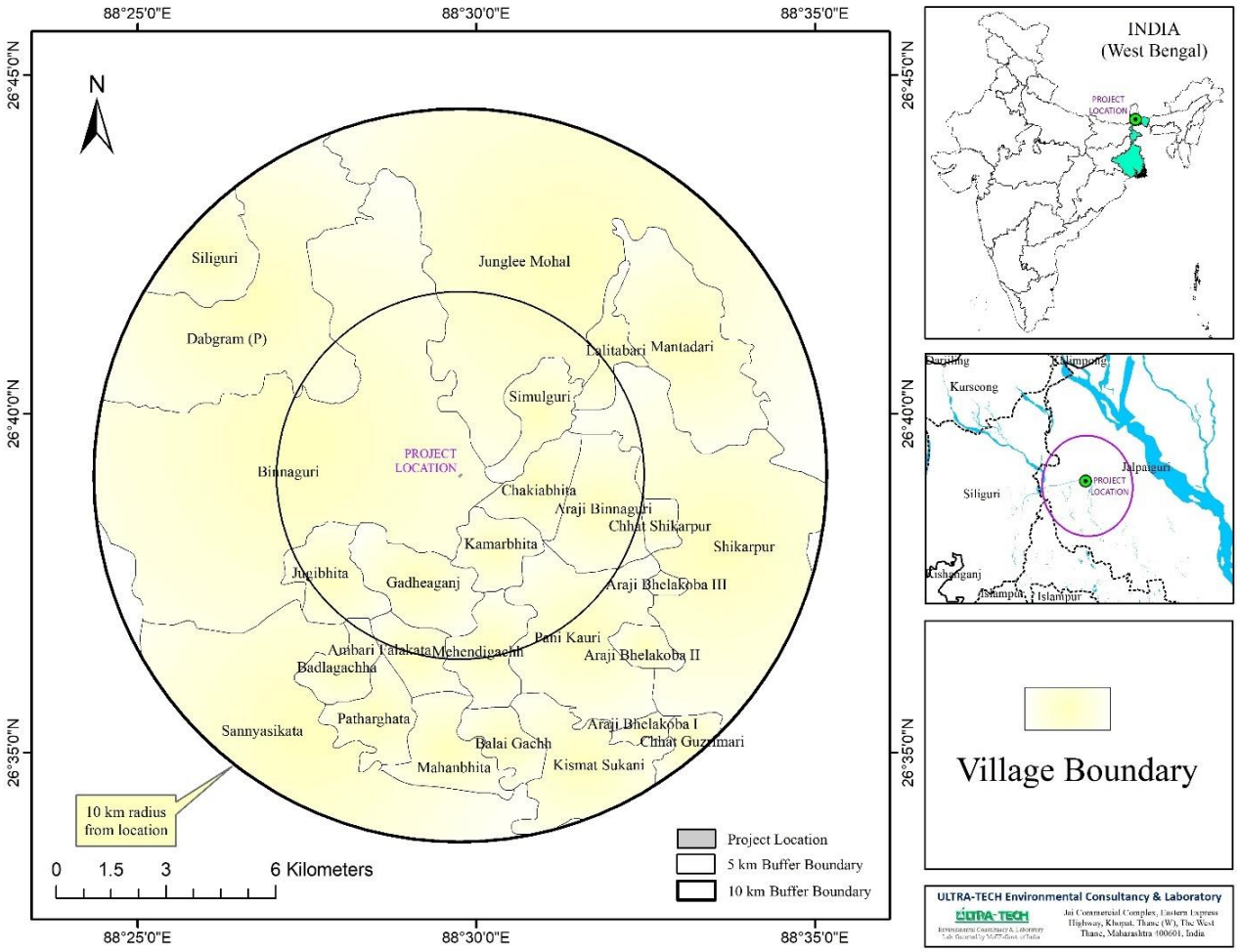


Figure 3.17: Village Boundary Map of the Study area

3.9.6 Demography

The project location has a total population of 345718 people, covering an area of sq. km with 76024 numbers of households.

Table 3.25: Census Data of the Study Area

Name	No of Households	Total Population		Population in the age group 0-6 Person	Scheduled Castes population		Scheduled Tribes population		Literates Population		Illiterate Population		Working Population		Non Working Population	
		Male	Female		Male	Female	Male	Female	Male	Female	Male	Female	Main Worker	Marginal Worker	Male	Female
Ambari Falakata	627	1580	1525	424	208	165	48	49	1167	959	413	566	714	329	784	1278
Araji Bhelakoba I	75	186	167	46	156	140	30	27	122	80	64	87	122	16	78	137
Araji Bhelakoba II	606	1445	1414	314	1389	1365	32	25	945	801	500	613	935	40	621	1263
Araji Bhelakoba III	70	145	151	47	108	108	37	42	89	68	56	83	84	101	45	66
Araji Binnaguri	607	1474	1390	399	1449	1372	1	0	972	701	502	689	831	223	728	1082
Badlagachha	382	960	924	284	111	93	18	23	675	508	285	416	537	37	464	846
Balai Gachh	293	713	670	169	561	530	32	37	528	429	185	241	521	28	303	531
Binnaguri	798	2943	1427	529	642	449	91	33	2574	1015	369	412	2366	176	641	1187
Chakiabhita (CT)	1199	2720	2531	568	1902	1748	13	21	2049	1655	671	876	1552	425	1177	2097
Chhat Guzrimari	1883	4168	3959	897	2791	2628	47	49	3043	2501	1125	1458	2571	374	1887	3295
Chhat Shikarpur	115	286	255	57	258	234	25	20	220	160	66	95	153	110	116	162
Dabgram (P) (CT)	26827	61078	57962	15093	29575	28170	598	609	42200	33892	18878	24070	38349	5264	26311	49116
Gadheaganj	755	1886	1753	489	150	128	50	49	974	783	912	970	860	296	987	1496
Guzrimari	2053	4672	4422	1094	2198	2021	611	564	3191	2447	1481	1975	2446	1178	2132	3338
Jugibhita	767	1864	1785	455	502	445	33	44	1358	1065	506	720	850	382	835	1582
Junglee Mohal	4575	10965	10443	2952	5867	5363	2091	2132	6981	5292	3984	5151	5856	5002	4484	6066
Kamarbhita	1224	2733	2486	546	1893	1713	15	13	2161	1669	572	817	1472	370	1239	2138
Kismat Sukani	1320	3050	2861	717	1704	1607	18	16	2169	1622	881	1239	1794	284	1323	2510
Lalchandpur	134	366	324	91	113	97	178	152	202	138	164	186	266	4	153	267
Lalitabari	325	738	741	204	591	597	47	47	471	365	267	376	428	181	313	557
Mahanbhita	452	1146	1062	275	483	460	28	33	813	637	333	425	614	96	551	947
Mantadari	1136	2728	2634	767	1664	1631	310	293	1751	1343	977	1291	1665	1030	1114	1553
Mehendigachh	581	1451	1440	360	647	642	187	217	1016	851	435	589	877	180	686	1148
Pani Kauri	1497	3386	3227	882	1932	1870	6	4	2028	1568	1358	1659	1984	472	1543	2614
Patharghata	447	1050	985	264	474	452	128	134	647	484	403	501	700	41	461	833
Sannyasikata	5773	13936	13108	3749	5800	5439	341	335	9709	7627	4227	5481	7749	1534	6523	11238
Shikarpur	4336	9969	9468	2295	5148	4824	2055	1982	6587	5173	3382	4295	5395	2563	4412	7067
Simulguri	925	4315	1658	483	999	718	329	133	3813	1150	502	508	3410	297	846	1420
Sukani	7735	18153	17123	4464	7387	6935	146	124	12892	10292	5261	6831	9253	2652	8594	14777
Siliguri Metropolitan	8507	19478	18239	4187	1496	1401	4361	4084	14192	11331	5286	6908	12243	1975	8197	15302

Data Source: http://censusindia.gov.in/pca/SearchDetails.aspx?Id=345721 , http://censusindia.gov.in/pca/SearchDetails.aspx?Id=346603

Population

Although the study area (10 km radius from the project location) is divided based on secondary data (Population Census 2011), the aforementioned total population of the study area is divided between two villages across the study area. The total number of males in the research region is 2943. The population concentration in communities within a 10-kilometer radius of the project area is depicted in Figure 3.18. A map of the research area was developed based on the concentration of individuals within a 10 km radius of the study area—a total population of 4370 people.

Table 3.26: Population Statistics of the Study Area

Population density	1094/sq.km
Total Population	345718
No of Households	76024
Total area	316.03 sq.km
0-6 age group Population	43101
SC/ ST Population	174740
Genaral Population	170978

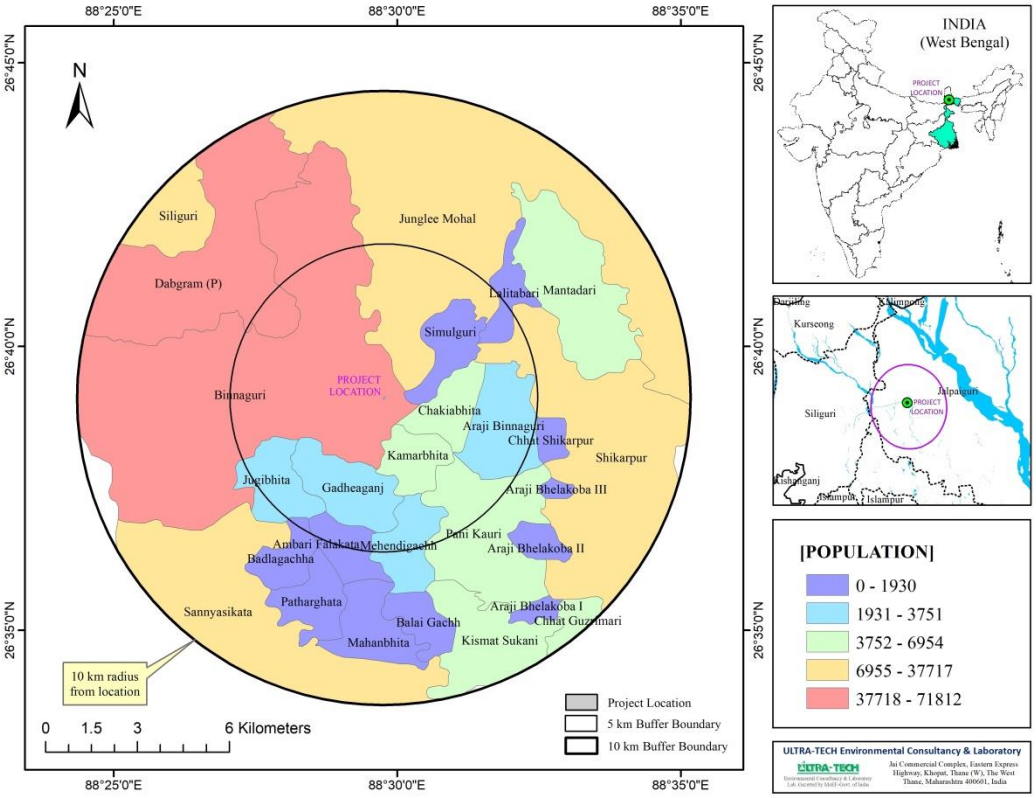


Figure 3.18: Population Concentration Map of the study area

Religion

The major religion in the project area is Hinduism, which accounts for 81.51% of the population. Islam is the second most popular religion in the region, with over 11.51% of the people practising it. Christianity is followed by 4.81%, Jainism by 1.40%, Sikhism by 0.04 %, Buddhism by 1.31 %, and 0.61 % specified 'Other Religion.'

Table 3.27: Religion Statistics of the Study Area

Religion	Percentage
Hindu	81.51
Muslims	11.51
Christian	4.81
Sikh	0.08
Buddhist	1.31
Jain	0.04
Others	0.61
Not Stated	0.13

Sex Ratio

The sex ratio is the male to female population ratio. The population share of males and females is 50% and 49%, respectively, according to the bar diagram in **Figure 3.19**. As a consequence, it is possible to determine it from the diagram in **Figure 3.19**. The sex ratio in the study field is not low; rather, it is balanced and favourable. **Figure 3.19** illustrates a balanced sex ratio pattern.

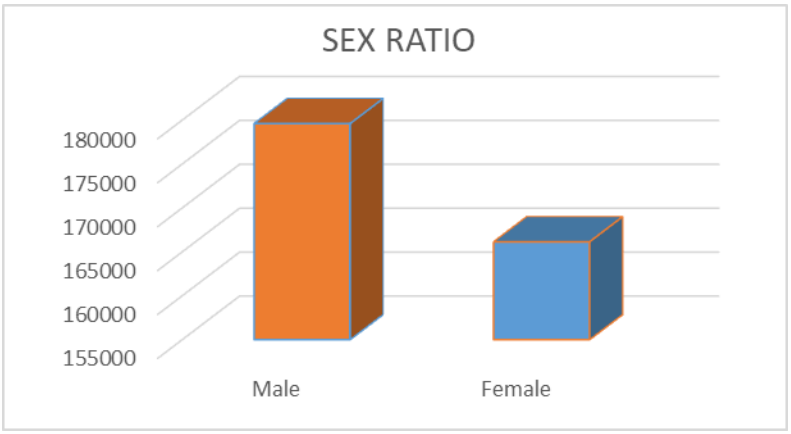


Figure 3.19: Bar-Diagram showing the sex ratio of the study area.

Figure 3.20 shows the male and female population distributions as comparison bar graphs on a map of the study region's villages, indicating the male and female population share. **Figure 3.20** also illustrates the village-level population concentration and distribution, as well as the population proportion of men and women, in the form of unique comparison bar graphs for each village in the study region, determined by a 10-kilometer radius from the project location. While village population distribution varies, **Figure 3.20** shows that the unique percentage of men and females is the same or nearly so demonstrating a positive and equal sex ratio in the project territory.

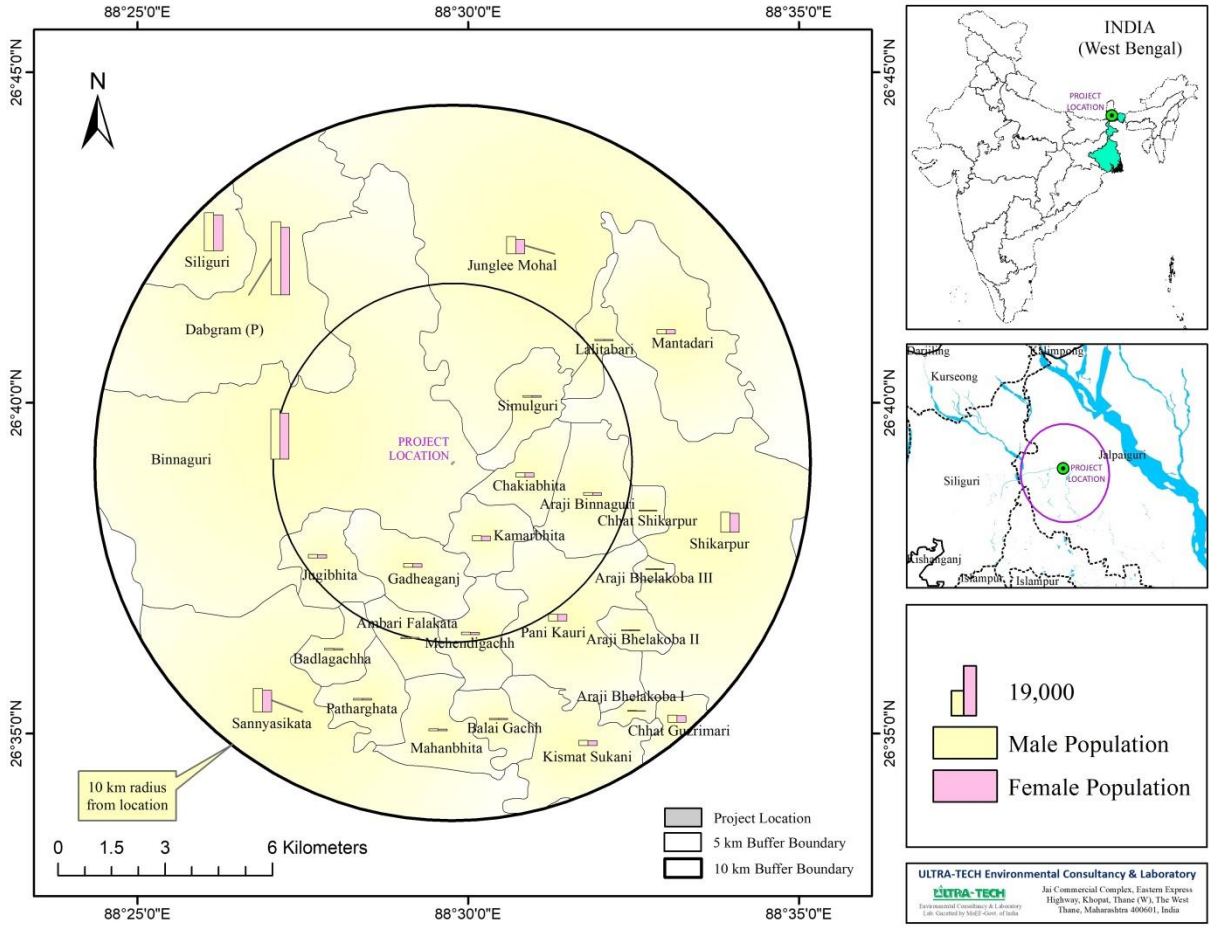


Figure 3.20: Male-Female population share depicting the Sex ratio of the study area.

Child Population [0-6 Age Group]

The infant population is the proportion of the world's total population aged 0-6 years, which is a relevant measure because it ignores a vulnerable part of the population. Children's population In comparison to the Indian Census, which defined children aged 0 to 6 years. Because the population of this age group is included in the general population of the country and states, it is critical to provide reliable statistical figures for the population of this age group on policies and services in the education, health, and other sectors. The overall child population has decreased by 5.030.327 from the 2001 Census, with a loss in rural child population of 8.885 compared to a gain in urban child population of 3.855. **Figure 3.21** depicts a map of the project area's village-wise concentration population aged 0-6 years. **Figure 3.21** shows that the concentration of children aged 0-6 years was divided into five groups, and it also shows that the highest population of children aged 0-6 years is concentrated in the northern, north-western, and north-eastern sections of the project location. The total infant population in the project area (Binnaguri) is 43101.

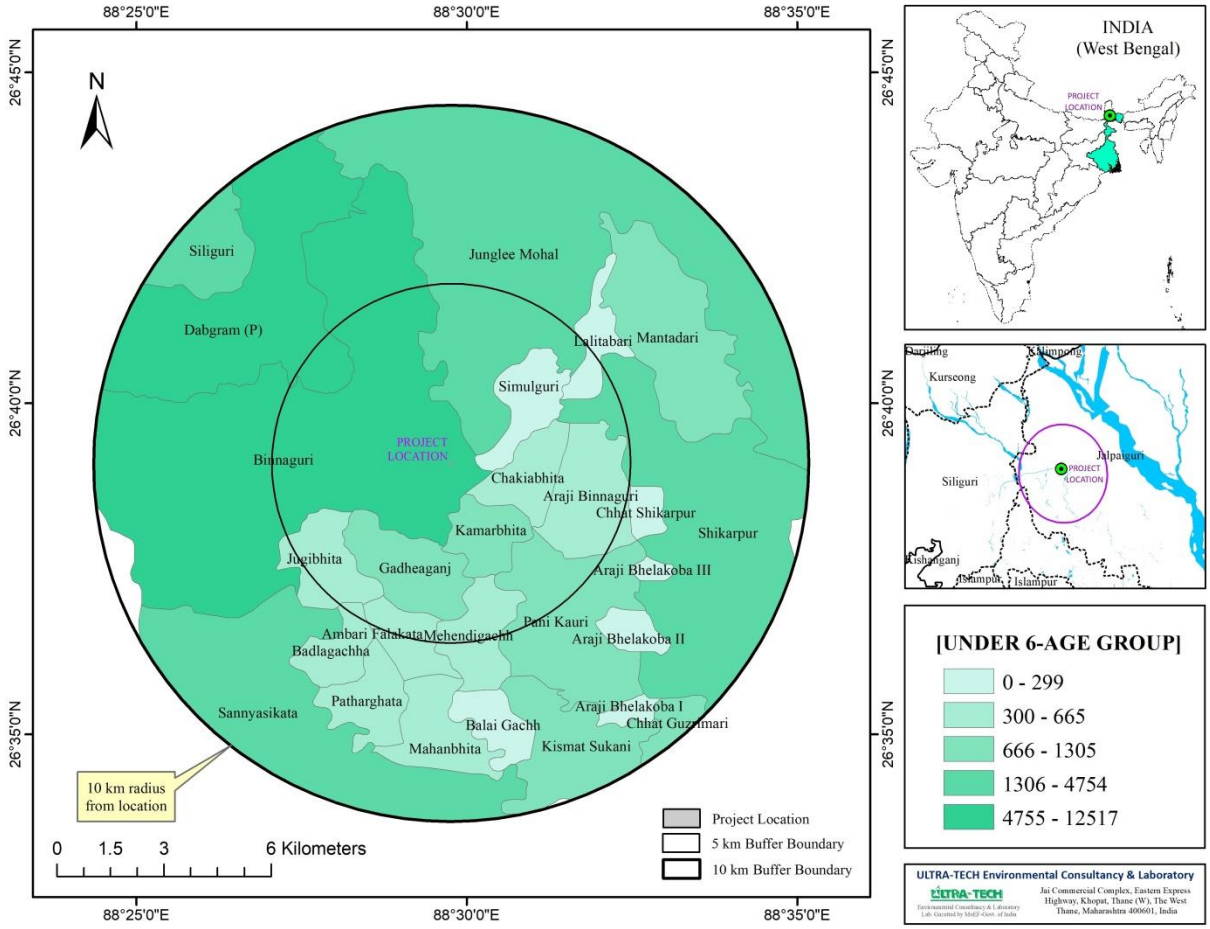


Figure 3.21: Concentration of Child population (0-6 age group) of the study area.

Households

The household consists of one or two people who share meals and live in the same residence. It might be a single family or a distinct group of individuals. Housing is considered to contain several homes if food or living space are not shared. A residence is thought to have many families if food or living space are not shared. Households are the basic unit of study in many social, microeconomic, and political models, and they play an important role in economics and inheritance. **Figure 3.22** depicts the village-wise concentration of households in the sample region chosen by a distance of 10 km from the project location. A map of the study area has been developed (**Figure 3.22**). The concentration of residences within a 10-kilometer radius of the research area was used to construct a map of the study area. **Figure 3.22** shows that the concentration of households was divided into five categories, with the highest household age located in the northern, north-western, and north-eastern portions of the project area. There are 798 households in the project location of Binnaguri, which is higher than other regions.

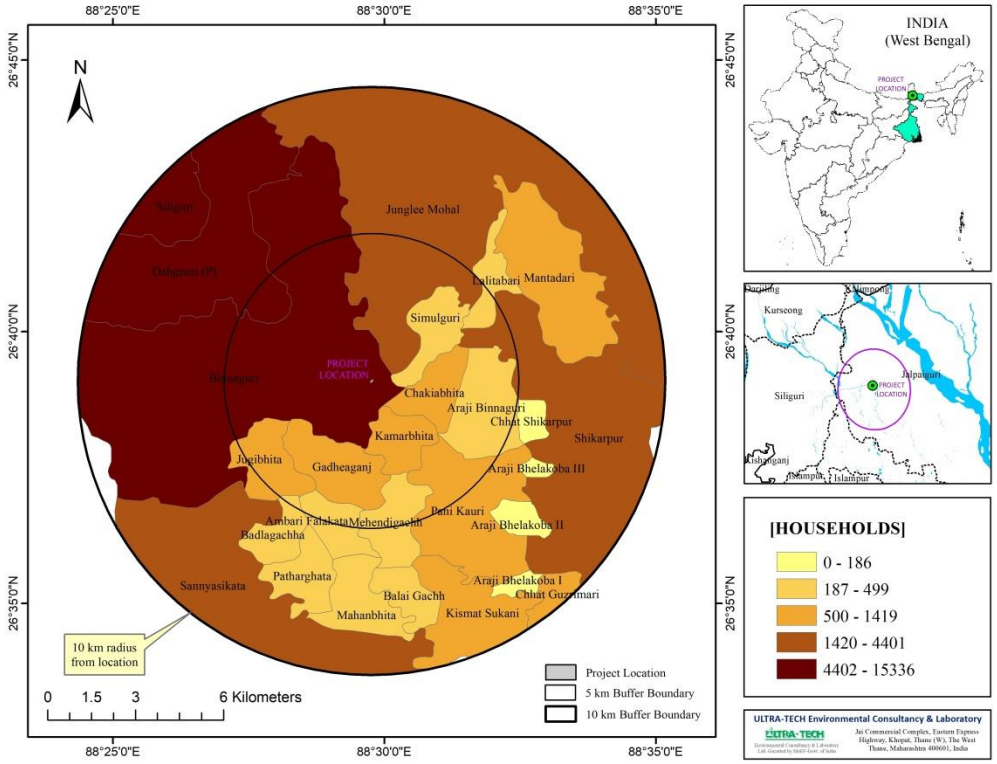


Figure 3.22: Household map of the study area.

Caste Population

The 2011 Socioeconomic and Caste Census (SECC) was carried out in preparation for the 2011 Indian Census. Following a discussion in both Houses of Parliament in 2010, the Manmohan Singh Government approved the 2011 Socioeconomic and Caste Census. According to the pie diagram in **Figure 3.23**, 51% of the overall population is in the Unreserved Group. Aside from that, 49% of the entire population was classified as Schedule Castes/Tribes.

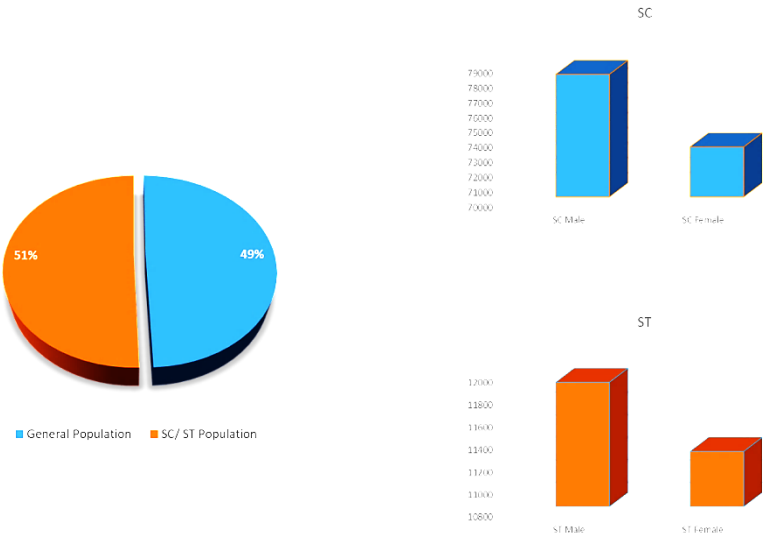


Figure 3.23: Pie diagram and Bar-Diagram showing the percentage share of General and SC/ST caste populations.

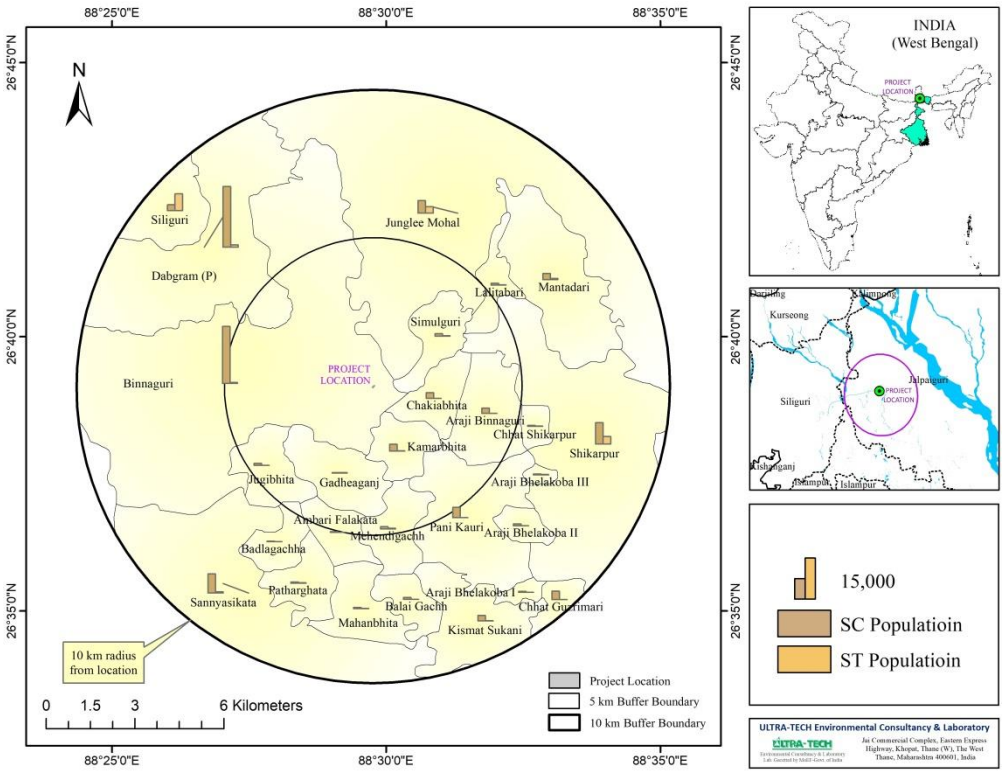


Figure 3.24: Male-Female population share depicting the SC/ST population of the study area.

Occupation Structure

The major working population accounts for 62% of the overall working population, the marginal working population accounts for 20%, and the main working population accounts for 80%. The several pie graphs in **Figure 3.25** represent further categories beneath the major and marginal employees. In the pie graphs in **Figure 3.25**, the major workers are classified as cultivators, labourers, house workers, and other employees. A pie chart depicting marginal growers, agricultural labourers, home industry employees, and other marginal workers is shown in **Figure 3.25.**

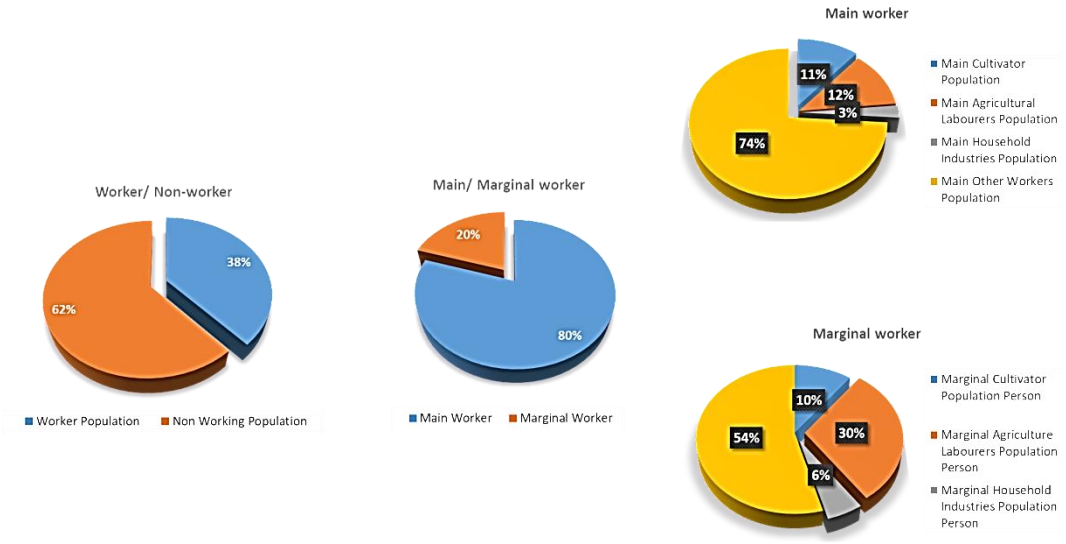


Figure 3.25: Pie diagrams showing Main and Marginal population share and their sub-divisions depicting the occupational structure of the study area.

Figure 3.26 depicts the distribution of employees and non-workers in the population. There are more male workers than female workers within the workforce. In the instance of non-workers, the simple-bar diagrams in **Figure 3.26** reveal that there are more female non-workers in the study region than male non-workers.

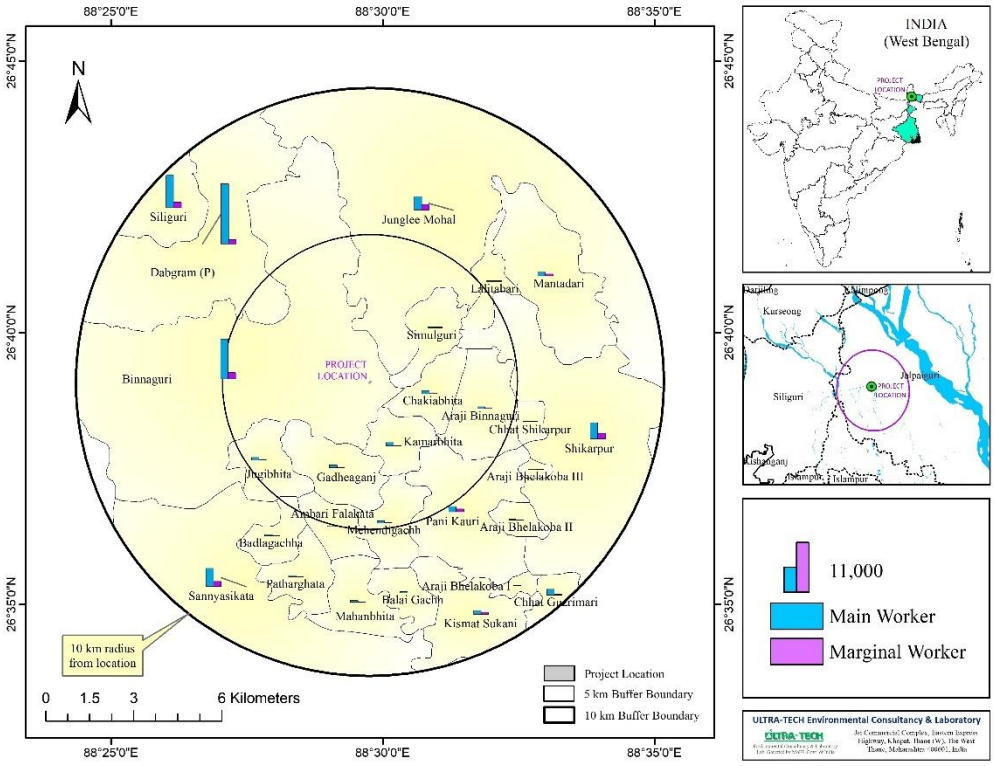


Figure 3.26: Main and Marginal population share depicting the occupational structure of the study area.

Educational Status

The literacy rate is defined as the proportion of a specific age group's population who can read and write. Adult literacy is defined as 15 years and older, adolescent literacy as 15 to 24 years old, and senior literacy as 65 years and older. The ability to comprehend a succinct, basic statement about daily living is sometimes used to assess it. Literacy typically includes numeracy, and a basic assessment of mathematical ability can be included in measuring. Literacy rate and number of literate subjects should be distinguished from functional literacy, a more rigorous literacy indicator assessed on a skill level spectrum. The literacy rate shows the educational quality of the research area. The pie diagram in **Figure 3.27** shows that the proportion of educated and illiterate people within a 10 km radius of the project site is 64% and 36%, respectively, suggesting that the zone around the project is advantageous for educational status and literacy. The basic bar-diagram sets show the percentages of men and women who are literate or illiterate. Females exceed males in terms of illiteracy, according to the bar graphs in **Figure 3.27.**

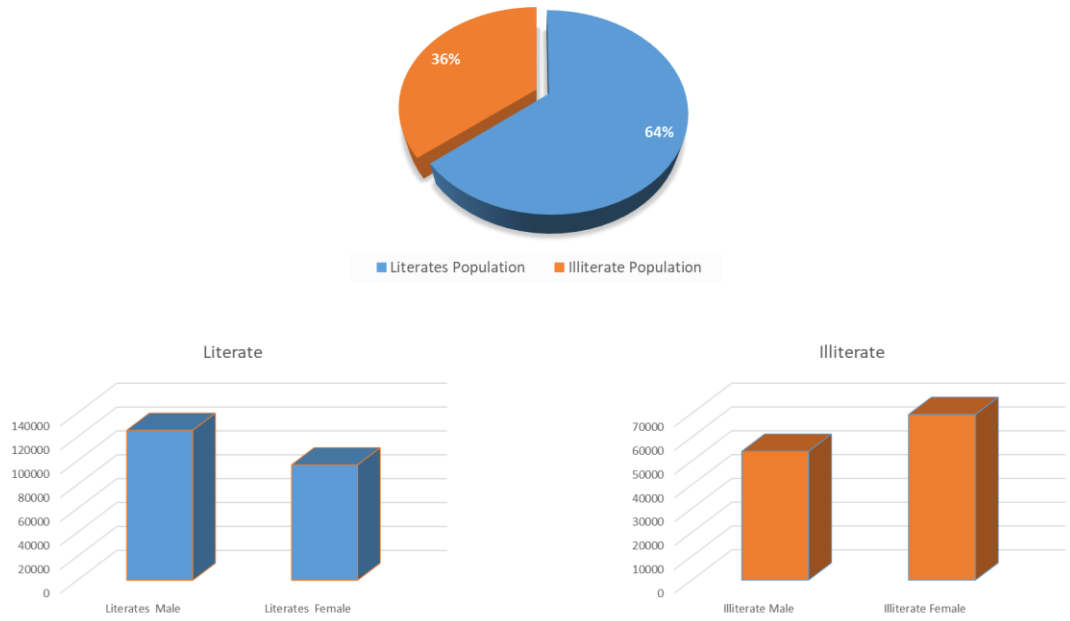


Figure 3.27: Pie diagrams show the Literate and Illiterate population share, and the bar diagrams show the further male-female share of literacy and illiteracy.

The literacy rate reflects the educational quality of the surrounding study region. The pie diagram in **Figure 3.27** reveals that within the 10 km radius research area of the project site.

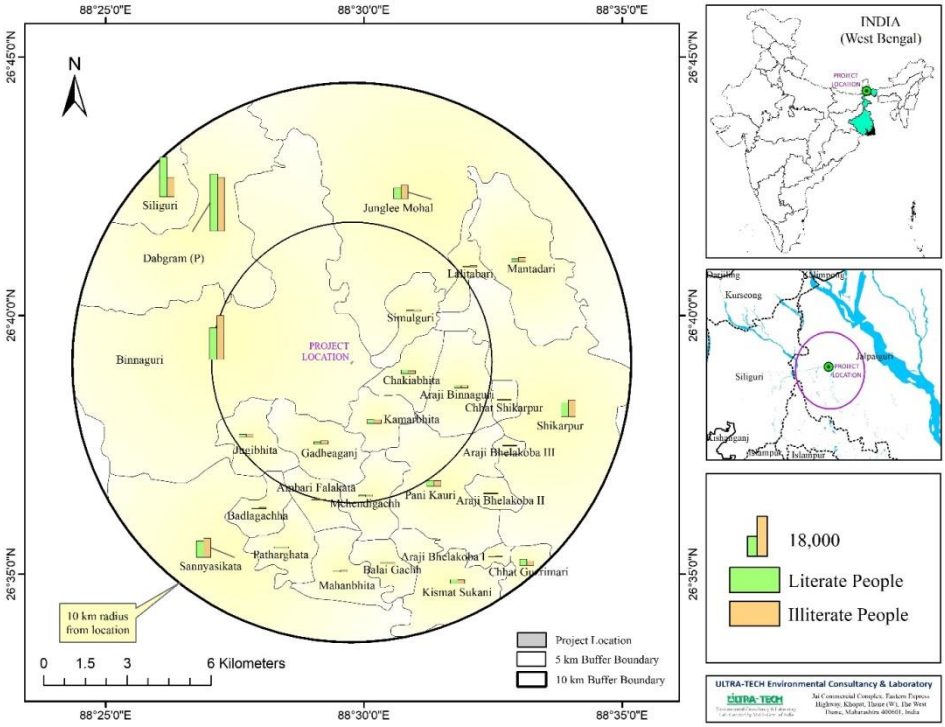


Figure 3.28: Literate and Illiterate population share depicting the Educational status of the study area.

Transport

As previously indicated, the project is accessible via public transportation. In this location, a private bus service is offered. The nearest train station is between 5 and 10 kilometres distant. This village rents out tractors. Man-powered cycle rickshaws are accessible in this village. This nearby villages have animal-drawn carriages. The nearest national highway is around 5 kilometres distant. The State Highway cuts across this neighbourhood. This neighbourhood is traversed by District Road. Kuccha Road and Foot Path are two additional roads and transit choices inside the hamlet, mostly in the study area's eastern half. **Figure 3.29** displays the project area's transportation situation, with a focus on the western part of the project zone.

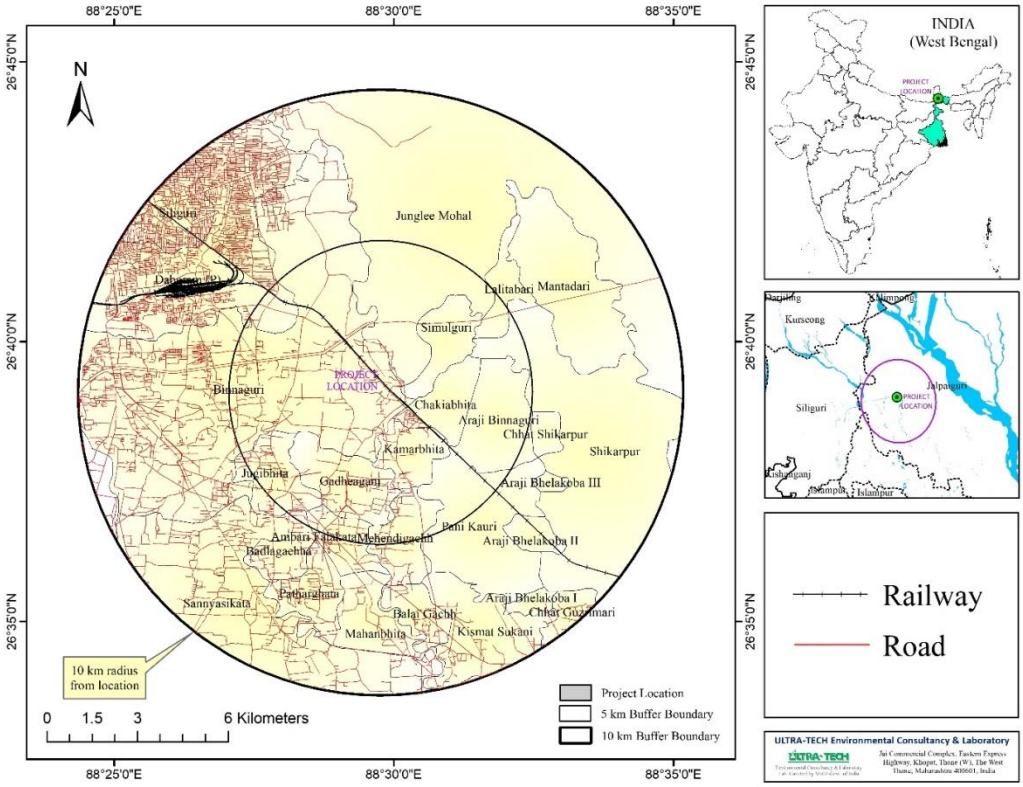


Figure 3.29: Transport and communication scenario of the study area.

- **Amenities:**

SN	Amenities	Name/ Type	Aerial distance from project (km)
1	Airport	Bagdogra International Airport	17.35
2	Railway Station	New Jalpaiguri Junction	6.4
		Siliguri Town	8.87
4	ATM	ICICI Bank ATM	7.88
		Punjab National Bank ATM	8.34
5	Bank	Bank Of Baroda	8.71
		HDFC Bank	7.82
		Union Bank	8.44
6	Post Station	Dabgram Post office	7.15
		Siliguri Head Post Office	9.26
6	Police Station	S.A.P.10Th/12Th Police Housing Complex	7.14
		Siliguri Police Station	9.12
7	Primary School	Sreema Academy	9.46
		Hatia Danga High School	6.65
8	High School	K.E. Carmel School Siliguri	0.42
		Delhi Public School	3.68
		Amar Jyoti International School	7.01
9	College	Surya Sen Mahavidyalaya	7.81
		Siliguri Women's College	7.88
		IGNOU - University	8.15
10	Hospital	New Jalpaiguri Railway Hospital	7.72
		Maharaja Agrasen Hospital	7.92
		Pragati Nursing Home siliguri	9.6
11	Medical Store	Apollo Pharmacy Haiderpara	9.49
		KUMKUM MEDICAL HALL	7.12

- **Administrative offices**

Administrative	Address	Contact
Power House	Binnaguri, West Bengal 735203	
Fulbari 1 Gram Panchyate office	Sahudangi hat-735135	
Uttar Kanya NBDD	Burdwan Rd, Satellite Township, Kamrangaguri Fulbari, West Bengal 734015	
Siliguri Court	43, Ashutosh Mukherjee Road, College Para, Shiva Nagar, Siliguri, West Bengal 734001	
Tea Board, Siliguri Regional Office & Quality Control Laboratory	Gora more, Tea Park, Nayapara Siliguri, West Bengal 734004	

Police Station	Address	Contact
State Armed Police Battalion 10 and 12 Hq	Burdwan Rd, Kamrangaguri Fulbari, West Bengal 734004	0353 256 8055
2nd AIR Battalion	Vill - Ambikanagar, PO- Sahudangihat, PS-New Jalpaiguri Dist, West Bengal 735135	
S.A.P.10Th/12Th Police Housing Complex	10Th Bn Housing Dabgram, Kamrangaguri Siliguri, West Bengal 734004	
Siliguri Police Station	Station Feeder Rd, Ward 27, Babupara Siliguri, West Bengal 734001	0353 266 2101

Post Office	Address	Contact
Dabgram Post office	Post office Road, Ward 36, Shanti Nagar Siliguri, West Bengal 734004	0353 265 6525
Siliguri Head Post Office	Ward 18, Hakim Para Siliguri, West Bengal 734001	
Rabindra sarani post office	Rabindra Nagar Main Rd Ward 21, Tiloksadhu More Siliguri, West Bengal 734006	
SAHUDANGI HAT POST OFFICE	Sahudangi Bazar Binnaguri, West Bengal 735135	
Satellite Township Branch Post Office	Kamrangaguri Fulbari, West Bengal 734004	

- **Banks**

Bank	Address	Contact
Bank Of Baroda	Rabindra Sarani, Ward 19, Subhas Pally Siliguri, West Bengal 734001	1800 258 4455
HDFC Bank	Kadamtala, Shivmandir, NH31 Darjiling, West Bengal 734011	022 6846 1208
Union Bank	College Para Shishu Udyan More Siliguri, West Bengal	
CANARA BANK	M R ROAD, KHALPARA, S F GROUND FLOOR TRIPURA LODGE PO: SILIGURI BAZAR Siliguri, West Bengal 734005	1800 425 0018
Punjab National Bank	Station Feeder Rd, Ward 9, Khalpara Siliguri, West Bengal 734005	
State Bank of India STATION FEEDER ROAD	161,STATION FEEDER ROAD SILIGURI DIST:DARJEELING, West Bengal 734005	0353 256 1525

Bank	Address	Contact
State Bank of India GHUGUMALI	GHUGUMALI MAIN ROAD P.O. RABINDRA SARANI, SILIGURI DIST: JALPAIGURI, West Bengal 734006	
CENTRAL BANK OF INDIA	WARD NO 37 POST RABINDRA SARANI SILIGURI, JALPAIGURI, West Bengal 734006	0353 259 6656
Union Bank of India	Ghogomali Siliguri, West Bengal 734004	

- **School**

School Type	School Name	Address	Contact
Primary School	Chhota Fapri Nepali Primary School	Junglee Mohal, West Bengal 734004	
	Himalayan English School	North Eastern Bypass, Ektiasal, Road Siliguri, West Bengal 734004	
	Siliguri Vibgyor Art School	Ward 39, Shibrampally Siliguri, West Bengal 734004	076790 98067
	Sreema Academy	Shreema Sarani, Ward 39, Haidar Para Siliguri, West Bengal 734001	
	Hatia Danga High School	Hatiadanga, Siliguri, West Bengal 734004	
School	K.E. Carmel School Siliguri	Carmelguri, Ambari, Siliguri, Sahudangi Rd Binnaguri, West Bengal 735135	
	Delhi Public School	Chhobavita, Canal Road, Fulbari, Bhaktinagar Siliguri, West Bengal 734015	097347 25745
	Amar Jyoti International School	Eastern Bypass Thakur Nagar, Shanti Nagar Siliguri, West Bengal 734004	098323 36514
	Xavier's International School	Shanti Nagar Dabgram, West Bengal 734004	098324 84621
High School	Valmiki Vidyapith (H.S)	Ustad Amir Khan Sarani Surya Sen Colony, Babupara Siliguri, West Bengal 734004	094343 28791
	Chanderbari G.K. Roy High School	Shikarpur, West Bengal 735135	072788 87814
	Rabindra nagar Girl's High School	post office Ward 21, Rabindra Sarani Siliguri, West Bengal 734004	
	Tarai Tarapada Adarsha Vidyalaya	Shankar Rd Ward 27, Babupara Siliguri, West Bengal 734004	0353 266 1176
	Ghogomali High School	Ward 37, Ghogomali Siliguri, West Bengal 734006	0353 259 6153
College/ University	Surya Sen Mahavidyalaya	Dist : Jalpaiguri P.O. : Siliguri Town Surya Sen Colony Siliguri, West Bengal 734004	
	Siliguri Women's College	1 No Dabgram Colony Siliguri, West Bengal 734006	089187 22346
	IGNOU - University	Ghogomali Main Road, Siliguri, Darjeeling West Bengal 734004	

School Type	School Name	Address	Contact
	Siliguri College	Siliguri College Campus Rd Ward 17, Hakim Para Siliguri, West Bengal 734001	0353 243 6590
	Government Polytechnic College	Siliguri Unnamed Road Dabgram, West Bengal 734004	
Training Center	Siliguri Institute of Nursing	Dabgram, Fulbari inside the campus of Darjeeling Public School Siliguri, West Bengal 734015	089671 35575
	Siliguri Government Polytechnic (SGP)	Dabgram, Ward 22, Subhas Pally Siliguri, West Bengal 734004	095473 69110
	Star institute of management	Sukumar Roy Sarani Rd North Bharat Nagar, Dabgram Siliguri, West Bengal 734004	

- **Hospital**

Hospital Name	Address	Contact
New Jalpaiguri Railway Hospital	Near D S Colony, Babupara Siliguri, West Bengal 734004	
Maharaja Agrasen Hospital	Fulbari Truck Terminus Dist: Siliguri, West Bengal 734015	
Pragati Nursing Home siliguri	Ward No 41, Iskcon Road Baneswar More near Siliguri Club, Ektiasal Siliguri, West Bengal 734001	095938 00315
ANC Health Care(AAROGYALOY Neurotherapy & Chiropractic) Siliguri (Treatment, Training & Research Centre)	Ward No.38, Post Office Raja Rammohan Roy Road More, East Vivekananda Pally, Hakim Para Siliguri, West Bengal 734001	082505 19707
Apollo Clinic - Hospital	Telipara, Siliguri, West Bengal 734004	
Sai Medicare	19, Baghajatin Main Rd Ward 17, Subhas Pally Siliguri, West Bengal 734003	

- **Medical Store**

Medical Store	Address	Contact
Apollo Pharmacy Haiderpara	101, BBD Sarani, Ward 39, Shibrampally Siliguri, West Bengal 734006	1860 500 0101
KUMKUM MEDICAL HALL	Shanti Nagar Bow Bazar Road,Siliguri Siliguri, West Bengal 734004	
New Shyam Medico	Ward 21, Rabindra Sarani Siliguri, West Bengal 734001	
Siliguri Pharmacy	Baghajatin Rd, near hathi more,Ward 19, Subhas Pally Siliguri, West Bengal 734001	098326 74033

- **Transportation**

Rail Station	Address
Ambari Falakata	Falakata, Railway Flyover Ambari, West Bengal 735135
New Jalpaiguri Junction	Ward 35, Nayapara Siliguri, West Bengal 734007
Siliguri Town	Ward 18, Subhas Pally Siliguri, West Bengal 734001
Bus Stop	Address
Sahudangi Rd	Binnaguri, West Bengal 735135

❖ Socio-Economic Impacts

No doubt setting up a project of some sort will have a significant impact on the socioeconomic and cultural life of the people in the project area. Here an attempt is made to envision and evaluate the tentative results that the project is likely to yield. The possible impacts are described below due to the operation of the project:

Positive outcomes

Mining is the foundation of building the country's economy. As given below the proposed project has the following benefits:

- Industry is the basis of the economy of the country. The following benefits are given as set out below for the proposed project.
- Jobs for local persons.
- Punish the tax on the state government. GST, cessation of wages, levies, etc. in the form of excise duty.
- Stone may be used to build roads, bridges, buildings, etc.
- The generation of the market is coming back.
- Appropriate EMF funds will boost the productivity of the environment.
- CSR funds may be used for the welfare of people in villages.
- The new project would contribute to the enhancement of the facilities that will attract the company's houses.
- Industry will help to establish a local socioeconomic scenario.

Negative outcomes

Due to the planned activity of the project, the population inflow would increase during the construction period. This could lead to a strain on infrastructure resources in the area, as well as an increase in the local population. However, this consequence is of a limited time and a temporary nature only.

- During the construction process, increased levels of dust and other air pollutants can lead to health problems.
- Noise pollution can be caused by vehicle traffic and construction activities.

- Unnaturally high concentrations of chemicals such as arsenic, sulphuric acid, and mercury over a wide area of surface or subsurface water are not taken until sufficient action is taken.
- Runoff containing these chemicals can lead to the destruction of the surrounding vegetation.

Mitigating intervention

To mitigate the adverse impacts likely to occur in the local area due to the proposed and current project activities, an effective mitigation plan must be established. The following recommendations are as follows:

Before and after the initial phase:

- The contact with the local community should be institutionalized and carried out daily. The forum will provide opportunities to address local critical issues and to train programmers for shared benefits.
- Relevant Information on the planned and current development plan, community services, etc should be conveyed to the local community in the form of booklets and audio-visuals.
- According to the expectations of the local citizens, staff, project officials, should carry out CER activities in the local region.

3.10.TRAFFIC SURVEY

The traffic survey, to ascertain the traffic density in the study area was conducted at a junction of Sahudangi Road and adjacent road of project site 0.61km away from the project site. The composition of Traffic includes two wheelers, three wheelers, four wheelers (Passenger Cars) and four wheelers like heavy vehicles like Trucks, Lorries, Bus, etc. The recommended PCU Factors for various types of vehicles on Urban Roads has been adopted from IRC 106-1990 guidelines as shown in **Table 3.28**.

Table 3.28: Recommended PCU Factors on Urban Roads

Types of Vehicles	Passenger Car Equivalency (PCE)
Motor Cycle or Scooter (2-Wheeled)	0.75
Passenger Car, Pick-up van	1
Auto-rickshaw (3-Wheeled)	2.0
Light Commercial Vehicle	2.0
Truck or Bus	3.7
Bicycle	0.5

Thus, volume of vehicles was estimated as: PCU unit = No of vehicles* x PCE of those particular Traffic study was carried out at junction of Sahudangi Road and adjacent road of project site 0.61km away from the project site as shown in **Figure 3.21.**

Figure 3.30: Location of the Node for Traffic Survey

Data was collected by physically counting the number of vehicles plying in both directions. The hourly counts were carried out for the different type/category of vehicles. The variation in the traffic flow at the given road along with the number of vehicles during peak hour & lean hour is presented in the **Table 3.29** and **Figure 3.21.**

Table 3.29: Traffic Survey, Node I

SN	During Lean Hrs.	During Lean Hrs. Vehicles in PCU's	During Peak Hrs.	During Peak Hrs. Vehicles in PCU's
Two Wheelers	30	22.5	44	33
Three Wheelers	10	20	12	24
Car/Jeep	20	20	31	31
Light Commercial Vehicle	7	14	13	26
Trucks/Lorries	14	51.8	22	81.4
Total	**81**	**128.3**	**122**	**195.4**

Lean Hrs: Before 8.00 hrs (morning), 13.00 to 17.00 hrs afternoon & after 21.00 hrs (evening)
Peak Hrs: Between 8.00 to 13.00 hrs& 17.00 to 21.00 hrs in the evening

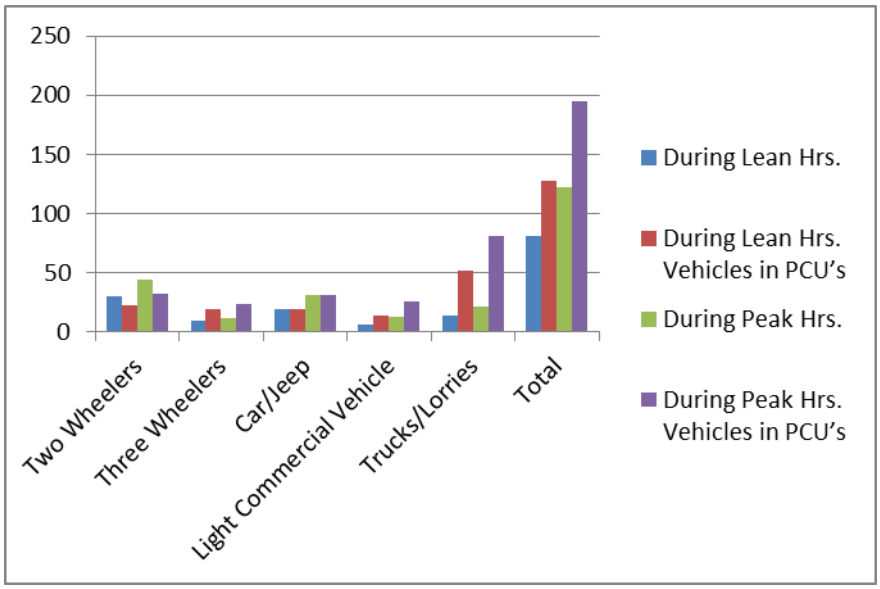


Figure 3.31: No's of vehicles during peak hour & lean hour

3.10.1 Existing Traffic Scenario & Level of Service

Capacity of road as per IRC **= 900PCU's/hr**
Total Volume in PCUs during Peak Hours = **195.4**
Existing Volume/Capacity ratio = **195.4/900 = 0.22**
The level of service is **"B"** that is VERY GOOD**.**

Table 3.30: Level of Service

SN	Existing Volume/Capacity	Level of Services
1	0.0 to 0.2	"A" (Excellent)
2	0.2 to 0.4	"B" (Very Good)
3	0.4 to 0.6	"C" (Good)
4	0.6 to 0.8	"D" (Fair)
5	0.8 to 1.0	"E" (Poor)

During the proposed expansion of project an addition of maximum 20 trips per day (i.e.10 trucks per day to and fro) of trucks is envisaged. To understand that impact due this addition the following modified scenarios on the access roads is discussed. The Node I is shown in the figure.

3.10.2 Modified Traffic Scenario & Level of Service

10 additional trucks *i.e.*20 trips assume to enter and exit during peak hrs for the proposed project (worst case scenario).

Node I: ~10 trucks of 20 additional volume in PCU will be 3.7x20/9 = 8.22 per hour during peak hours.

Traffic Flow **at Node I**

Total volume during peak hours in PCUs after completion of the project (V) = 195.4+ 8.22= 203.62

Capacity of Road as per IRC (C) = 900 PCU's/hr

Modified Existing Volume/Capacity ratio will be (V/C) = 203.62/900 = 0.23. The level of service of the road will be **"B"** after the proposed project that is **"VERY GOOD".**

The above results indicated that the post project scenarios will contribute to addition in existing traffic, the level of service will continue to be VERY GOOD. Traffic will continue to run smoothly without congestion and no widening of road is anticipated.

CHAPTER 4- ANTICIPATED ENVIRONMENTAL IMPACT ASSESSMENT, PREDICTION AND MITIGATION MEASURES

4.1. INTRODUCTION

Environmental Impact can be defined as any change in environmental conditions which may adverse or beneficial occurred due to an action or set of actions under consideration. Prediction of environmental impacts is the most important component in the impact assessment study, as it provides quantitative information on anticipated environmental impacts from a project well in advance. Several mathematical/statistical techniques and methodologies are available for predicting impacts from developmental projects on the surrounding physicochemical, ecological and socio-economic components of environment. Generally, the environmental impacts can be categorized as either primary or secondary. Primary impacts are those, which are attributed directly and secondary impacts are those, which are indirectly induced and typically include the associated investment and changed patterns of social and economic activities by the proposed action. The chapter presents identification and appraisal of various impacts arising from the proposed project, in the study area. The construction and operational phase of the proposed unit comprises of various activities, each of which may have an impact on some or other environmental parameters. Various impacts during the construction and operational phase on the environmental parameters have been studied and are discussed. The proposed project would create impact on the environment in two distinct phases:
During the construction phase which may be regarded as temporary or short term; and during the operation phase which would have long-term effects.

4.1.1. Identification of Impacts

Identification of significant environmental impact is essential in the preparation of EIA report, an attempt has been made here through the use of matrix.

The proposed project divided in to two phases;

1. Construction phase
2. Operation phase

The activities belonging to the industrial project have been grouped and arranged in rows. The environmental parameters, which are potentially impacted, have been arranged in columns. The Matrix, thus, establishes the possible "cause-effect" relationship and identifies the environmental factors being impacted and activities responsible for the same.

4.1.2. Impact during Construction Phase

Total construction activity involves construction of factory sheds, installation of boiler, resin kettle, DG set, APC devices etc. and erection of storage tanks, Office buildings etc. Therefore there will be no significant impact on environment during construction phase.
The construction Phase involves the following activities

- Erection of Plant and Construction
- Installation of equipments
- Transportation

- Material Handling
- Employment of Labour

Air, Noise level, Soil and flora and fauna parameters are likely to be affected by above said activities.

Table 4.1: Impact Prediction during Construction Phase

Parameters/Activities	Air	Soil	Water	Flora	Fauna	Social	Health and safety	Sound
Site Cleaning and leveling	✓	✓	-	-	-	-	✓	✓
Excavation	✓	✓	-	-	-	-	✓	✓
Erection of plant and Construction	✓	✓	-	-	-	-	✓	✓
Installation of equipments	✓	-	-	-	-	-	✓	✓
Transportation	✓	✓	-	-	-	-	✓	✓
Material Handling	✓	-	-	-	-	-	✓	✓
Employment	-	-	-	-	-	✓	✓	-
Plantation	✓	✓	-	✓	✓	-	✓	✓

4.1.3. Impact Assessment

The assessment of impacts involves the determination of nature and potential of impact due to the industrial activities or other related actions. It also determines whether the impacts are positive or negative as well as short term or long term impact. The quantitative and qualitative impacts have been assessed.

Table 4.2: Assessment of Predicted Impact during Construction

Parameters/Activities	Air	Soil	Water	Flora	Fauna	Social	Health & safety	Sound
Site Cleaning and leveling	(-ve) S.T	(-ve) S.T	-	-	-	-	(-ve) S.T	(-ve) S.T
Excavation	(-ve) S.T	(-ve) S.T	-	-	-	-	(-ve) S.T	(-ve) S.T
Erection of plant and Construction	(-ve) S.T	(-ve) S.T	-	-	-	-	(-ve) S.T	(-ve) S.T
Installation of equipments	-	-	-	-	-	-	(-ve) S.T	(-ve) S.T
Transportation	(-ve) S.T	-	-	-	-	-	(-ve) S.T	(-ve) S.T
Material Handling	(-ve) S.T	-	-	-	-	-	(-ve) S.T	
Employment	-	-	-	-	-	(+ve) L.T	(+ve) L.T	
Plantation	(+ve) L.T	(+ve) L.T	(+ve) L.T	(+ve) L.T	(+ve) L.T	-	(+ve) L.T	(+ve) L.T
(-ve): Negative, (+ve): positive, S.T: Short term, L.T: long Term								

4.2. ENVIRONMENT IMPACT AND MITIGATION MEASURES DURING CONSTRUCTION PHASE

4.2.1. Air Environment

The impact due to the construction activities will be short time or for limited period. The main sources for impact of air quality during construction period is due to movement of vehicles and construction equipment at site, dust emitted during levelling, grading, earthmoving, foundation works, transportation of construction material etc. Hence, during the construction phase, particulate matter (PM_{10}& $PM_{2.5}$) would be the main pollutants. Particulate matter in an ambient air will increase since the top soil is loose and local meteorological conditions. The emissions from vehicles and construction equipment could also be of some concern on a local level.

Mitigation Measures

The dust generated will also be fugitive in nature, which can be controlled by frequent sprinkling of water. The impacts will be localized and short time in nature and the areas outside the project are not likely to have major impact with respect to ambient air quality. The construction of proposed units would result in the increase of SPM concentrations due to fugitive dust. Frequent water sprinkling in the vicinity of the construction sites would be under taken and will be continued after the completion of plant construction as there is scope for heavy truck mobility. It will be ensured that diesel powered vehicles will be properly maintained to comply with exhaust emission requirements.

4.2.2. Water Environment

During the construction phase, sewage generation due to construction labours can impact the surrounding areas. For the labours, temporary toilets will be constructed.

Mitigation Measures

The overall impact on water environment during construction phase due to will be temporary and insignificant

4.2.3. Noise Environment

During construction phase, construction equipment, including dozer, scrapers, concrete mixers, generators, vibrators and power tools, and vehicles will be the major source of noise. Most of construction activities are expected to produce noise level within the prescribed limit. The noise generated from various sources will be of short duration and only at day time period. Therefore, no significant impact is envisaged in the construction phase.

Mitigation Measures

The noise control measures during the construction phase include provision of caps on the construction equipment and regular maintenance of the equipment. Equipment will be maintained appropriately to keep the noise level within 75 dB (A). Wherever possible, equipment will be provided with silencers and mufflers. High noise producing construction activities will be restricted to daytime only.

Further, workers deployed in high noise areas will be provided with necessary protective devices such as ear plug, ear-muffs etc. Overall, the impact due to increase in noise on the environment would be insignificant, localized and confined to the day hours.

4.2.4. Land Environment

Impact on Land use

Preparatory activities like construction of access roads, temporary offices, and go-downs, piling, storage of construction materials etc. will be confined within the project area. These will not exercise any significant impact except altering the land use pattern of the project site. No forestland is involved. Therefore, impact will be negligible.

4.2.5. Ecology and Biodiversity

The impact on ecology and biodiversity will be insignificant during the construction phase. No tree will be destroyed.

4.2.6. Socio-economic Environment

The socio-economic impacts during the construction phase of the proposed unit would result due to migrant workers, induced development etc. Increase in floating population. This project will provide temporary employment of skilled and highly skilled manpower. The local people will have employment opportunities in related service activities like petty commercial establishments, small contracts/sub-contracts and supply of construction materials for buildings and ancillary infrastructures etc. consequently, this will contribute to economic up-liftment of the area. Normally, the construction activity will benefit the local population in a number of ways, which include the increase in requirement of construction skilled, semi-skilled and un-skilled workers, tertiary sector employment and provision of goods and services for daily needs including transport.

- Local people will be given preference for employment depending on their suitability;
- All the applicable guidelines under the relevant Acts and Rules related to labour welfare and safety will be implemented during the construction phase;
- The contractors will be advised to provide fire wood/kerosene/LPG to the workers to prevent cutting of nearby trees for firewood; and
- The construction site will be secured with fencing and is having guarded entry points.

4.3. ENVIRONMENT IMPACT & MITIGATION MEASURES DURING OPERATION PHASE

The major project activities and the affected environmental parameters are given below.

Project Activities

- Manufacturing of 2 types of synthetic resin i.e. Urea-Formaldehyde Resin (UF Resin), Melamine Formaldehyde Resin (MF Resin) and Phenol-Formaldehyde Resin (PF Resin).
- Bulk storage of raw materials
- Bulk Storage of finished product (Plywood & Blockboard)
- Transportation of raw materials, products and personnel.

Pollution Sources

- Emission of particulate matter and gaseous pollutant from the boiler
- Emission of flue gas from the DG set
- Fugitive emissions
- Waste water from various uses.
- Solid wastes (Hazardous waste, ETP sludge etc.)
- Noise from machinery, D.G. sets, and vehicular movement.

Affected Environmental Parameters

- Air quality
- Water resources & quality
- Noise level
- Soil quality
- Biological
- Socio-economics

4.4. AIR DISPERSION MODELLING

Air Quality Predictions through Mathematical Modelling

Ground level concentrations (GLCs) have been predicted using ISCST3 model developed by USEPA. The application incorporates popular U.S. EPA air dispersion models ISCST3 into one integrated graphical interface. The model uses rural dispersion and regulatory default option as per guidelines on air quality models (PROBES/70/1997-1998) used as regulatory model for statutory clearances for the project and compliance for environmental conditions. Following are the Existing and Proposed facilities as discussed in **Table 4.3**. Stack and emission of the Boiler fitted with 30 m Chimney and DG set of 2 m Chimney.

Table 4.3: Detail of Existing Facilities

Parameter	**Unit**	**Details of stack and emission data fitted with Boiler**	**Details of stack and emission data fitted with DG sets**
Stack Height	M	30	2
Stack diameter at exit	M	1.2	0.1
Stack gas exit velocity	m/s	8.0	10.0
Stack gas temperature	^{o}C	140 (413 K)	150 (423 K)
Fuel		Coal	HSD
Feed rate		400 kg/day	7.31 litre/hour
Ash	%	6	0.01
Emission Data			
PM_{10}	g/s	0.016	0.00055
$PM_{2.5}$	g/s	0.012	0.00050
SO_2	g/s	0.138	0.022

Input Data for Dispersion Model

Dispersion model uses input data of wind speed, wind direction, ambient temperature, stability classes, mixing height generated at site or obtained from nearest India Meteorological Department along with emission values of pollutants for prediction of impacts on Ambient Air Quality due to existing & proposed projects.

Meteorology

Hourly Meteorological data of wind speed & direction, temperature, cloud amount and rainfall are used for winter season (January to March 21). Mean wind speed is 2.64 m/s. Calm is low and observed value is 0.74%. North-westerly followed by westerly and north-north-westerly are dominant winds as shown in **Figure 4.1** below.

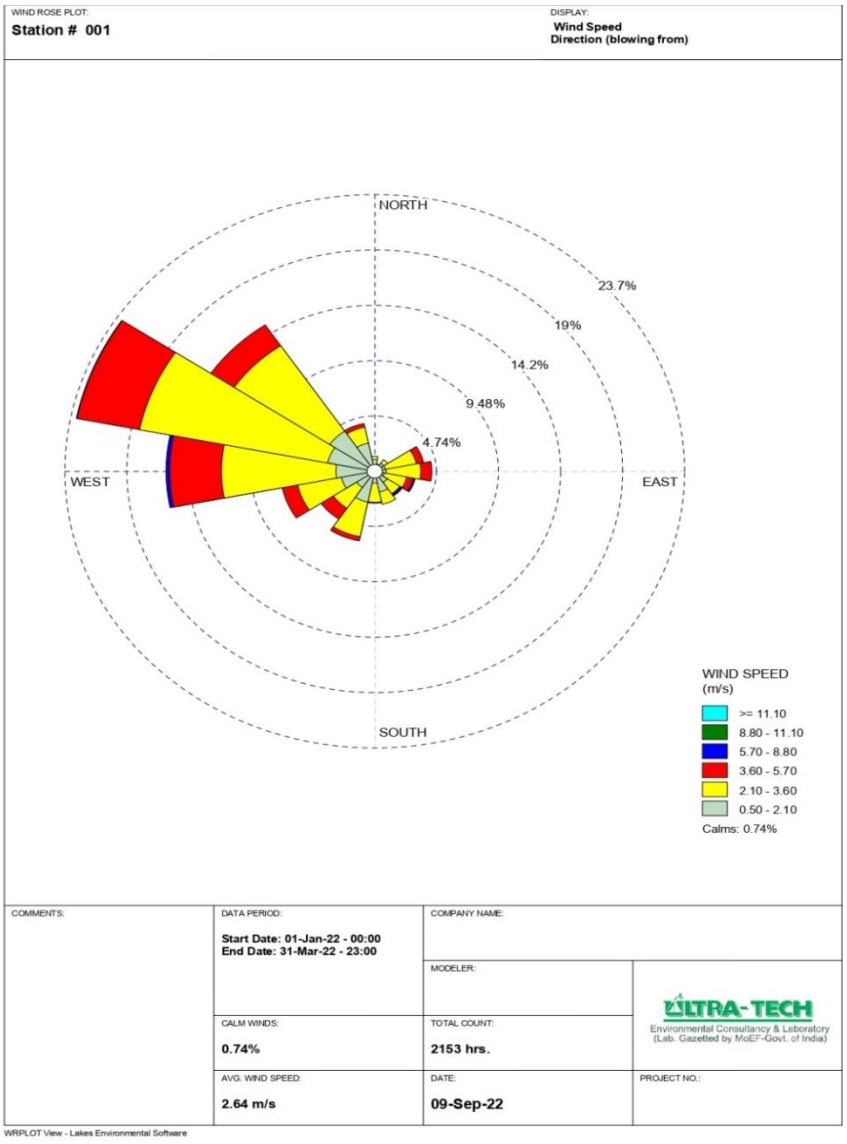


Figure 4.1: Wind-rose (January 2022-March 2022)

Frame work of Calculation

USEPA Dispersion model ISCST3 is used for prediction of impact covering the radial distance of 10 km in the grid interval of 400 m over 51 grids net-work for each pollutant separately. 24-h GLCs are predicted for emission of the pollutants released from stack exist fitted with Boiler of Chimney height 30 m and DG set fitted with Chimney of 2 m height for the pollutants PM_{10}, $PM_{2.5}$ and SO_2. The baseline values monitored at various locations in the study area of the project site are given as follows:

Table 4.4: Base – Line values of pollutants at various monitoring locations

Pollutants	PM10				PM2.5				SO2			
	Min	Max	98P	Avg.	Min	Max	98P	Avg.	Min	Max	98P	Avg.
1.Project Site (0,0) km	80.40	91.20	91.20	86.54	26.50	37.10	35.23	30.60	5.40	6.90	6.80	6.21
2.Kharkharia Junior High School (1.22km,SE)	80.50	98.20	98.15	88.65	26.70	39.80	39.28	32.05	5.90	7.40	7.40	6.46
3.Sitaguri Sishu Siksha Kendra (5.05 km, S)	78.10	91.20	89.95	84.11	28.60	35.30	35.20	31.52	5.40	6.20	6.20	5.82
4.Hari Charan Vita School (1.85 km, SSW)	86.50	94.30	94.30	90.54	27.60	32.40	32.30	30.83	5.50	6.30	6.30	6.02
5. Bhutikar Hat (4.14 km, SW)	73.60	83.40	83.40	79.21	24.60	28.50	28.34	26.77	5.20	6.00	5.95	5.54
6. Bhotpara Primary School (1.92 km, E)	85.40	96.50	96.08	91.25	30.0	37.60	37.60	33.78	5.30	6.30	6.25	5.70
7. Kamarbhita (3.02 km, SSE)	77.30	88.60	88.50	84.70	28.20	35.20	35.10	31.69	5.20	6.00	6.00	5.54
8. Sahudangi Hat P.K.Roy High School (3.16 km, NW)	79.90	90.40	90.04	86.88	27.60	38.40	35.28	29.84	5.20	6.40	6.35	5.79

24-hour incremental values predicted using Dispersion model are superimposed on the 24-hour baseline values monitored at various locations.

Table 4.5: 24-hour Maximum GLCs of PM10 and PM2.5 at various monitoring locations

Locations	Base Line 98 Percentile	Maximum Incremental GLC	Total GLC	Distance(m) Direction
1.Project Site	91.20 (35.23) (6.80)	0.01 (0.007) (0.086)	91.21 (35.237) (6.886)	0 km
2.Kharkharia Junior High School	98.15 (39.28) (7.40)	0.14 (0.105) (1.207)	98.29 (39.385) (7.607)	1.22 km, SE
3.Sitaguri Sishu Siksha Kendra	89.95 (35.20) (6.20)	0.05 (0.037) (0.431)	90.00 (35.237) (6.631)	5.05 km, S
4.Hari Charan Vita School	94.30 (32.30) (6.30)	0.03 (0.022) (0.258)	94.33 (32.322) (6.558)	1.85 km, SSW
5. Bhutikar Hat	83.40 (28.34) (5.95)	0.07 (0.052) (0.603)	83.47 (28.392) (6.553)	4.4 km, SW
6.SW Bhotpara Primary School	96.08 (37.60) (6.25)	0.24 (0.18) (2.07)	96.32 (37.78) (6.32)	1.92 km, E
7. Kamarbhita	88.50 (35.10) (6.00)	0.12 (0.09) (1.035)	88.62 (35.19) (7.035)	3.02 km, SSE
8. Sahudangi Hat P.K.Roy High School	90.04 (35.28) (6.35)	0.06 (0.04) (0.517)	90.10 (35.32) (6.867)	3.16 km, NW
Worst case scenario with max. baseline and max. incremental	**98.15 (39.28) (7.40)**	**0.508 (0.381) (4.381)**	**98.658 (39.661) (11.781)**	**600 m, SE**

Note – First value within ( ) is $PM_{2.5}$ and Second value within ( ) is for SO_2.

In the worst -case scenario, the maximum base-line values of PM_{10} (98.15 µg/m^3) $PM_{2.5}$ (39.28 µg/m^3) and SO_2 (7.40 µg/m^3) are superimposed on the maximum incremental GLCs for PM_{10} (0.508 µg/m^3), $PM_{2.5}$ (0.381 µg/m^3) and SO_2 (4.381 µg/m^3). The total GLCs of pollutants of PM_{10}, $PM_{2.5}$ and SO_2 are 98.658 µg/m^3, 39.661µg/m^3 and 11.781 µg/m^3 which are below the National Ambient Air Quality Standards (Table 1.3). The Isopleth for these pollutants is shown below.

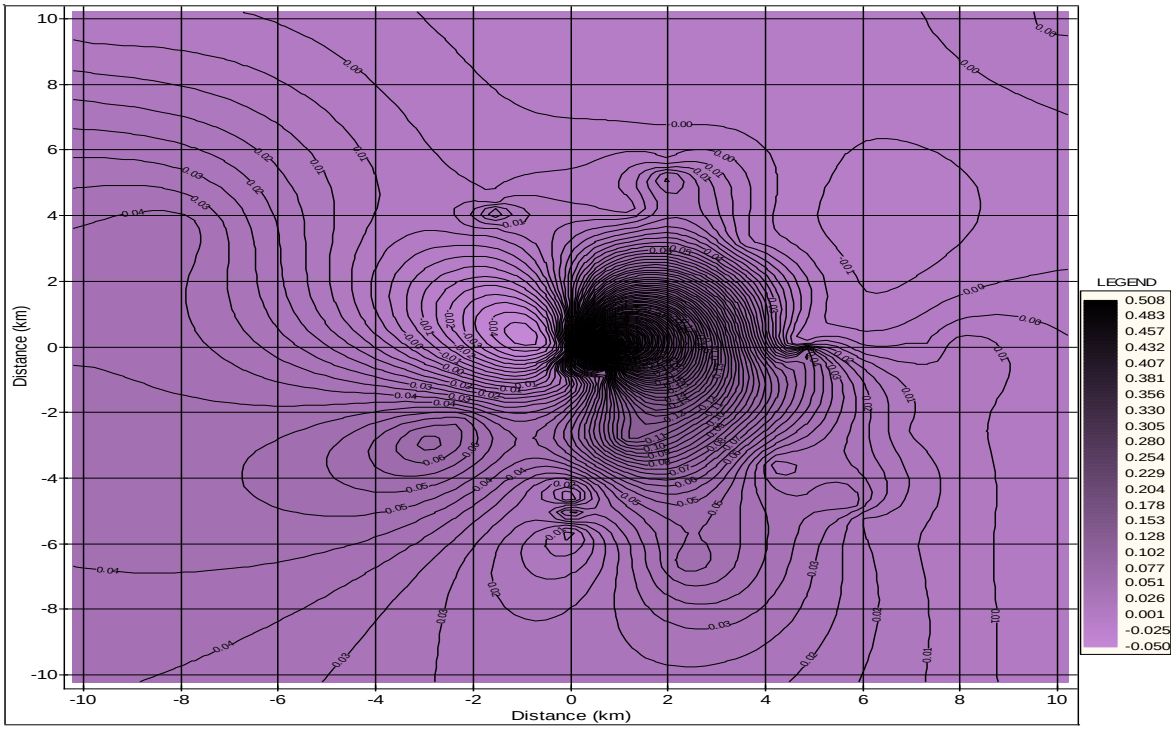


Figure 4.2: 24 -h Incremental Concentration of PM10 is 0.508 µg/m3 at 600 m, East due to combined impact of Boiler (0.3TPH) and DG set (63 kVA).

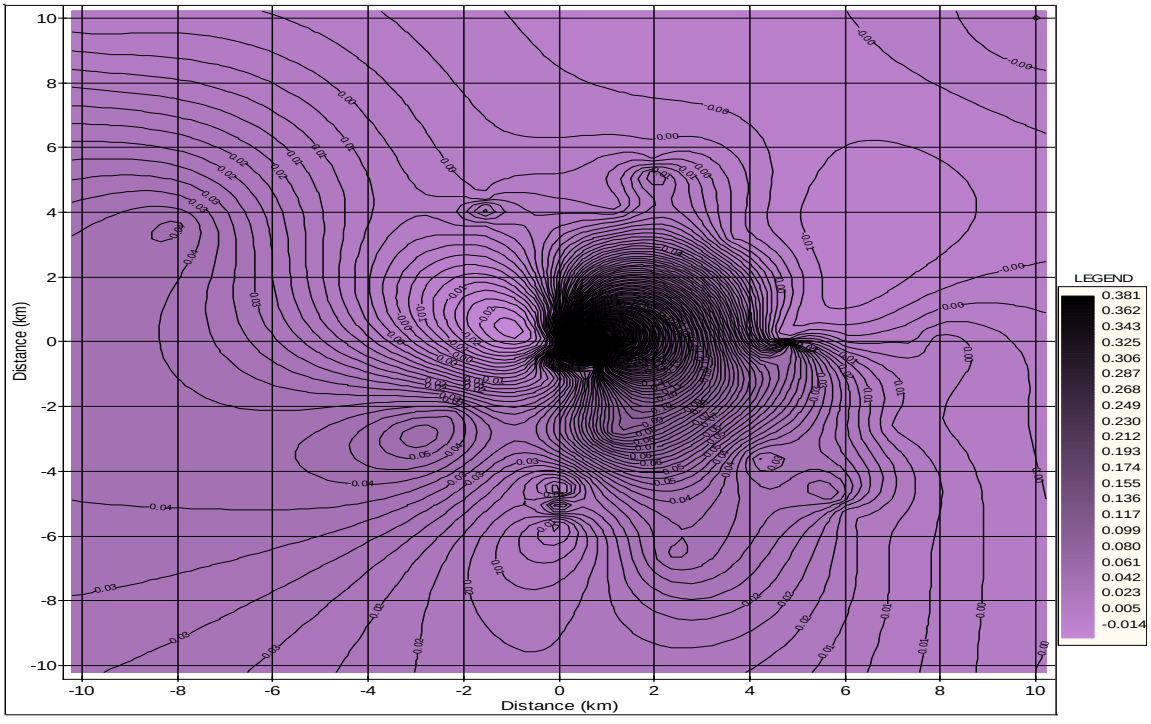


Figure 4.3: 24 -h Incremental Concentration of PM2.5 is 0.381 µg/m3 at 600 m, East due to due to combined impact of Boiler (0.3TPH) and DG set (63 kVA).

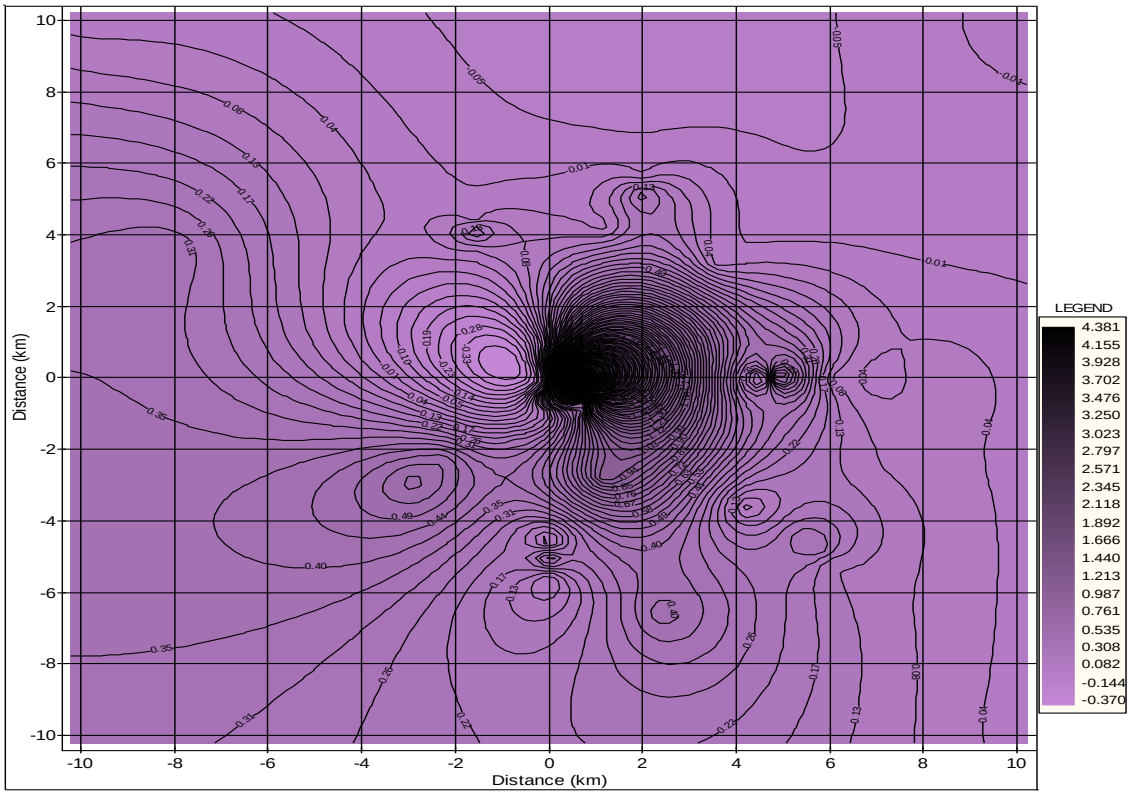


Figure 4.4: 24 -h Incremental Concentration of SO2 is 4.381 µg/m3 at 600 m, East due to due to combined impact of Boiler (0.3TPH) and DG set (63 kVA).

Following measures will be adopted for controlling the fugitive dust emission within the plant premises,

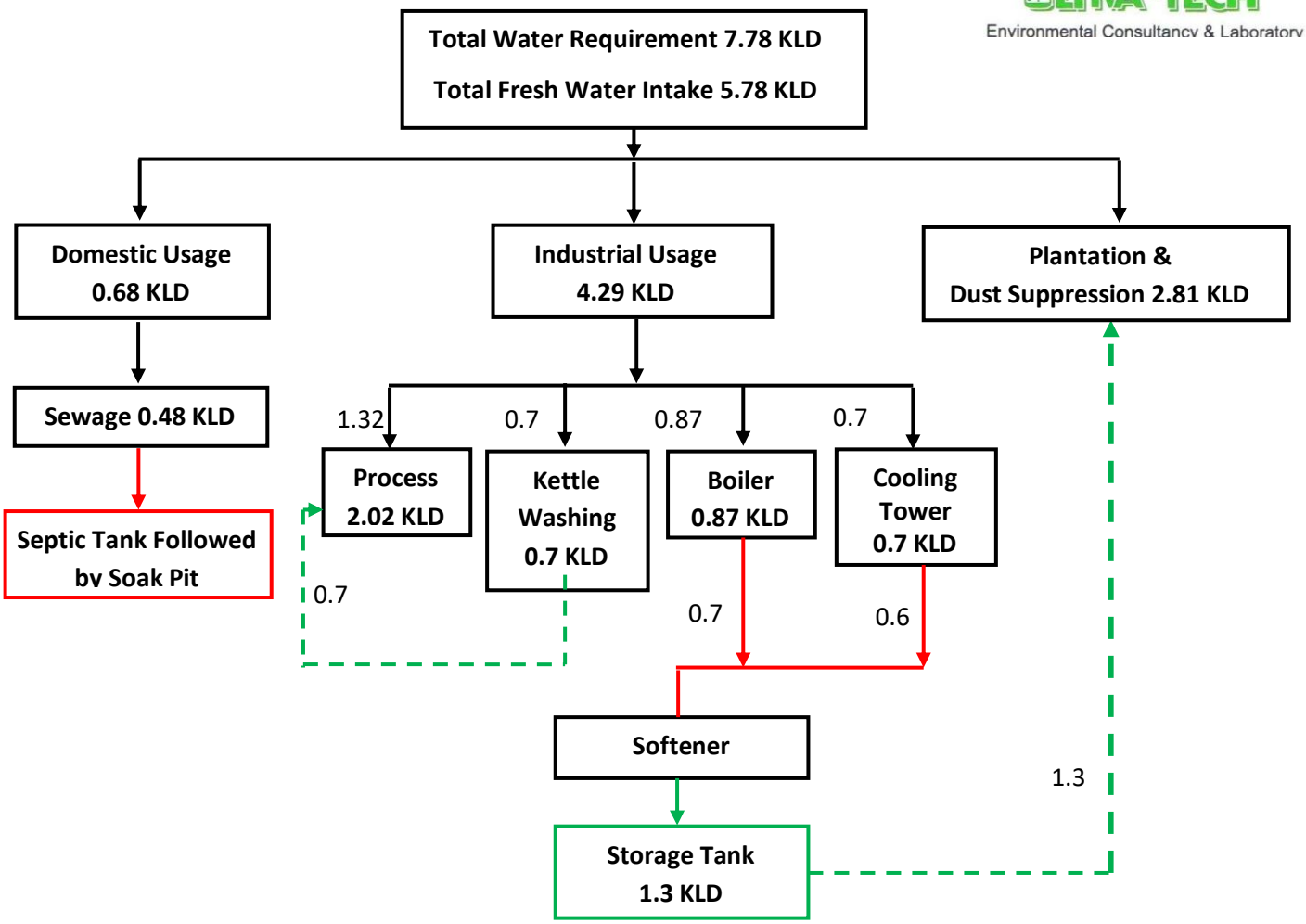
- The roads within the premises shall be sprinkled with water at a regular interval to avoid the dust generation.
- To ensure that all transportation vehicles carry a valid PUC (Pollution under Control) Certificate.
- Proper servicing & maintenance of vehicles is being carried out.
- Adequate green belt covering area greater than 33% of total plot area shall be developed in the project site.
- Ambient air quality shall be regularly monitored to ensure the air pollution devices are working efficiently.
- Electricity backup shall be provided to all APCDs
- In case of APCD failure, operation shall be stopped by consulting plant engineer and safety officials.
- Ash from ESP and Bag filters shall be stored in bags, dedicated closed room for storage of ash in bags is recommended.
- Greenbelt development with higher APTI index plants, shall be done at max incremental locations to reduce impact of pollutants.

4.5. WATER ENVIRONMENT

The quantitative and qualitative information on water utilization, waste water generation and its disposal in the proposed industry is covered in Chapter 2. The total water requirement will be around 7.78 KL per day, out of which 0.68 KL will be used for domestic purpose from where around 0.48 KL sewage water will be generated which will be flowed to septic tank followed by soak pit.

4.5.1. Water environment & Its Source

The total water requirement will be around 7.78 KL per day, out of which 0.68 KL will be used for domestic purpose from where around 0.48 KL sewage water will be generated which will be flowed to septic tank followed by soak pit. For industrial use, around 4.29 KL water will be required out of which 2.02 KL will be used in production process, 0.87 KL will be used in boiler, 0.7 KL will be required for cooling water makeup and around 0.7 KL will be used for kettle washing. Around 1.3 KL waste water is expected to be generated from boiler blow down & cooling tower blow down, which will be stored in a storage tank and will be reused for greenbelt development & dust suppression. Effluent generated from the kettle washing (around 0.7 KLD) will be reused in the process. So there will be no discharge of waste water. Details of water balance diagrams are given in **Figure 4.5.**



*** - Fresh Water**
 # - Recycled Water

Figure 4.5: Water Diagram

4.5.2. Mitigation Measures

The action plan is prepared to ensure that there is no discharge of effluent creating nuisance during rainy season.

- There will be no unattended storage of effluent.
- Pre-monsoon inspection shall be carried out to ensure that there will not be any rain-wash pollution in the eventuality of rain run on or rain run-off.
- The Storage Tank & sludge beds also will be taken care off during pre-monsoon inspection.

Water Resources

- Fresh water need to the industries will be minimized by taking appropriates reuse and recycle measures as discussed in Chapter-2.
- Planned storm water drainage network will be provided and maintained to avoid contamination of rain water with factory waste water and other waste materials.

Waste Water

The quantity and quality of waste water in the plant will be controlled by following measures**.**

- Maximum recycle of process water in gardening purpose.

- Control of water taps, hose pipe washings, leakages from pump glands and flanged joints and overflow of vessels are monitored and controlled.
- Wastewater generated from Boiler & Cooling Tower blow down will be partially utilized for greenbelt development & dust supression. So there will be no discharge of Waste Water.

4.6. NOISE & SOIL

Noise from machinery, D.G. sets, and vehicular movement will be created.

4.6.1. Mitigation Measures

- Accoustic enclosures for the DG sets will be used to reduce the noise.
- Ear-Muffs will be provided to the labours when required.

4.6.2. Impact on Soil & Mitigation

In the proposed unit, during operational phase, there is very less chance of soil contamination as:-

- RCC flooring will be done at manufacturing and materials storage area.
- The preventive maintenance will be planned to avoid the failure of valve, pipe lines and other component of transferring line
- All the chemical handling will be carried out on proper RCC area to prevent from soil contamination.

4.7. SOLID WASTE

The details of hazardous and non-hazardous waste are discussed below.

Following mitigation practice is the policy for future:

A. Non-Hazardous Solid Waste:

The unit will employ 15 persons when fully operational (including laborers and administrative staff). Municipal solid waste will be generated @0.1 kg/day/person. Hence the quantity of MSW generated will be 1.5 Kg/Day which will be disposed off as per MSW Rules.

Table 4.6: Non-Hazardous Solid Waste

S.N	Waste	Quantity	Disposal
1	Dry Garbage	0.9Kg/day	To be disposed off as per MSW Rules
2	Wet Garbage	0.6Kg/day	To be disposed off as per MSW Rules

B. Hazardous/Industrial Solid Waste:

The main source of hazardous waste generation from proposed activity is discarded containers/Barrel/bags from storage and handling of raw materials and spent/used oil generation from plant machinery.

The unit will obtain membership of active Common Environmental Infrastructure TSDF at Haldia for proper disposal of hazardous waste. The unit has provided dedicated storage area for the hazardous waste storage within premises having impervious floor and roof cover system. The details of hazardous waste generation and handling/Management are given in **Table 4.7.**

Table 4.7: Details of Hazardous Waste generation and Disposal

SN	Waste	Category No.	Quantity	Disposal
1.	Used Oil	5.1	20 Lit/Year	Collection, Storage, and reuse as lubricant in plant & machineries or sale to registered recycler
2.	Discarded Containers/ barrels/Plastic	33.1	500 No/Year	Collection, Storage and sent to authorized recycler after decontamination
3.	Resin Residue	23.1	0.2 MT/Year	Collection, Storage and disposal at CHWIF
4.	Plastic Waste	-	4 MT/Year	Collection, storage and sale to register recycler
5.	Fly Ash	37.2	0.15 MT/Day	Collection, Storage and sent to TSDF or brick manufacturers for reprocessing

Mitigation Policy

- Minimization at all levels will be attempted for discarded products, empty containers, packing surpluses, incoming raw material unloading spillages and fugitives.
- The plant will produce very less amount of scrap materials. All these, however, be carefully stored on raised platform with dwarf toe walls all around, and a roof over-head. The contents will not be held in the premises for more than a fortnight.
- This waste along with Storage Tank sludge and evaporation residue will be transported to the Common Hazardous Waste Treatment and Disposal site for proper treatment and disposal at CHWTSDF site
- We will buy raw materials in tankers/drums/bags. The drums /bags will be sent back to raw material supplier or will be sold to registered recycler.

Nuisance Due To Odour

Odour can be of some sensitivity in chemical industries. However, in this case majority input is odourless, and only few are pungent nature but less in quantity and handled in closed fashion. Referring to the MSDS details of their odour properties are as mentioned below:

Table 4.8: Odour Emissions

SN	Raw materials	Chemical Name	Form	Quantity (MT/Month)	Source	Mode of Transport	Max. Storage (MT)	Mode of Storage
1	Formaldehyde	Formaldehyde	Liquid	769.22	Imported / Local	Shipment /Truck	215.38	HDPE Tank
2	Industrial Urea	Carbonyl diamide	Solid	70	Local	Road	19.6	Woven PP Bag
3	Phenol	Carbolic Acid	Liquid	226.34	Imported / Local	Shipment /Truck	63.38	HDPE Drum
4	Melamine	1,3,3-triamino-2,4,6-triazine	Solid	193.85	Local	Road	54.28	HDPE Drum
5	Caustic Soda	Sodium Hydroxide	Solid	27.60	Local	Road	7.73	Woven PP Bag
6	Acetic Acid	Acetic Acid	Liquid	5.63	Local	Road	1.58	HDPE Drum

Mitigation

- Chilled water will be used in condenser & breather to control process emission and solvent losses.
- Reactor's vent lines, wherever required will be connected to condenser system, with chilled water, for condensing the volatiles and controlling VOC emissions.

4.8. BIOLOGICAL ENVIRONMENT

1. There are very less trees, shrubs, herbs and climbers on project site. Due to lack of proper habitat, animal biodiversity, including insects, is meager. During construction, certain trees and shrubs will also be removed, resulting in deterioration of biodiversity.
2. There is no endangered species of flora and fauna within Project site however; other flora and fauna exist in the project site and surroundings of the site. Air pollutants may affect the biota.
3. Generation of noise, causing significant impact physiology of existing flora and fauna
4. Excessive light attracts and disorients photophilic animals, those that follow light. Disrupted navigation in moths can easily be observed around bright lamps on summer nights. Insects gather around these lamps at high densities instead of navigating naturally. Some animals, notably insects, such as the honey bee, are sensitive to the polarization of light.

Mitigation Measures

The proposed project will not involve any cutting of tree. There will be no habitat destruction. Biodiversity will be increased by developing green belt in an area of about 6371.08Sq.mt. by plantation of different varieties of Native trees and shrubs having higher dust settling and air pollution tolerance. It has been predicted up to 10 km towards from the site that maximum levels of PM10, PM2.5, NOX and CO are within the desired limits specified by CPCB.

In order to further reduce the levels of the pollutants; the measures to be adopted are delineated in concerned Air pollution section. Noise level should not exceed the prescribed standards. Provision of caps, silencers and mufflers should be provided to reduce noise at desire level. Noise levels within project site is observed within the allowable CPCB limits Details are mentioned in noise pollution section. Unless essential, excessive light during night hours should be strictly avoided. Use of yellow lights is suggested in open areas.

4.9. SOCIAL IMPACT ASSESSMENT

No doubt setting up a project of some sort will have a significant impact on the socioeconomic and cultural life of the people in the project area. Here an attempt is made to envision and evaluate the tentative results that the project is likely to yield. The possible impacts are described below due to the operation of the project:

Positive Impacts

- Timber is one of the few naturally occurring and renewable construction materials. The cyclical process of harvesting and regenerating forests for wood production assures that timber will always be accessible.
- When a tree is harvested, up to 10 trees are planted in its place, resuming the renewable cycle. Timber, being a natural resource, is non-toxic and safe to handle and touch; it also matures naturally and does not degrade into ecologically harmful materials.
- The following benefits are given as set out below for the proposed project.
- Jobs for local persons.
- It is one of the few construction materials that contribute to long-term carbon emission reductions, so positively addresses climate change.
- The generation of the market is coming back.
- Appropriate E.M.F. funds will boost the productivity of the environment.
- C.S.R. funds may be used for the welfare of people in villages.
- The new project would contribute to the enhancement of the facilities that will attract the company's houses.
- Timber manufacture requires far less fossil fuel energy per unit volume than steel, concrete, or aluminum, reducing the number of pollutants produced throughout the process. This indicates that using one cubic metre of wood instead of other construction materials such as concrete, blocks, or bricks may save 0.75 to 1 tonne of CO2.

Negative Impacts

Due to the planned activity of the project, the population inflow would increase during the construction period. This could lead to a strain on infrastructure resources in the area, as well as an increase in the local population. However, this consequence is of a limited time and a temporary nature only.

- By destroying habitat, clear cutting poses a danger to a variety of animal species, including the pine marten.

- Noise pollution can be caused by vehicle traffic and construction activities.
- Appropriate mining may have detrimental effects on local soil and groundwater.
- Unnaturally high concentrations of chemicals such as arsenic, sulphuric acid, and mercury over a wide area of surface or subsurface water are not taken until sufficient action is taken.
- Runoff containing these chemicals can lead to the destruction of the surrounding vegetation.

Mitigation

To mitigate the adverse impacts likely to occur in the local area due to the proposed and current project activities, an effective mitigation plan must be established. The following recommendations are as follows:

Before and after the initial phase

- The contact with the local community should be institutionalized and carried out daily. The forum will provide opportunities to address local critical issues and to train programmers for shared benefits.
- Relevant Information on the planned and current development plan, community services, etc., should be conveyed to the local community in the form of booklets and audio-visuals.
- According to the expectations of the local citizens, staff, project officials should carry out C.E.R. activities in the local region.

Step of Operation

- Plan supporters should take appropriate precautions to ensure that the environment is secure and healthy during the construction process.
- Appropriate drinking water, toilet, and bathing facilities should be made available on the project site.
- In order to regulate air pollution and thus avoid adverse health effects, water is sprinkled/spread to suppress dust during the construction process.
- Proper living arrangements with sufficient facilities for residential labor should be provided.
- Appropriate preparation and awareness-raising events should be carried out in such a way that workers understand the importance of wearing personal protective equipment.
- The first aid and medical services will be given to all the persons concerned working on the site.
- Collectively, colony management would include transporters, drivers, builders, watchmen, fitters, and machine operators. Preference should be given to local citizens for all of this.

The impacts of operational activities on different parameters of environment are enlisted herein below:

Table 4.9: Impact Prediction during Operational Phase

Parameters/Activities	Air	Soil	Water	Flora	Fauna	Social	Health and safety	Sound
Raw Material Storage & Handling	Õ	-	-	-	-	-	Õ	Õ
Production	Õ	-	Õ	-	-	-	Õ	Õ
Product Storage & Handling	Õ	Õ	-	-	-	-	Õ	Õ
Transportation	Õ	Õ	-	Õ	Õ	-	Õ	Õ
Gaseous Emission	Õ	Õ	-	Õ	Õ	-	Õ	Õ
Wastewater Discharge		Õ	Õ	Õ	Õ	-	Õ	-
Solid & Hazardous Waste Generation	-	Õ	Õ	Õ	Õ	-	Õ	Õ
Employment	-	-	-	-	-	-	Õ	-
Infrastructure Development	Õ	Õ	Õ	Õ	Õ	-	Õ	Õ
Greenbelt Development	Õ	Õ	Õ	Õ	Õ	Õ	Õ	

Impact Assessment

Table 4.10: Assessment of Predicted during Operational Phase

Parameters/Activities	Air	Soil	Water	Flora	Fauna	Social	Health and Safety	Sound
Raw Material Storage & Handling	(-ve) L.T	-	-	-	-	-	(-ve) L.T	
Production	(-ve) S.T	-	(-ve) L.T	-	-	-	(-ve) L.T	(-ve) L.T
Product Storage & Handling	-	-	-	-	-	-	(-ve) L.T	- -
Transportation	(-ve) S.T	(-ve) S.T	-	(-ve) S.T	(-ve) S.T	-	(-ve) S.T	(-ve) S.T
Gaseous Emission	(-ve) L.T	(-ve) L.T	-	(-ve) L.T	(-ve) L.T	-	(-ve) L.T	-
Wastewater Discharge		(-ve) S.T	(-ve) L.T	(-ve) S.T	(-ve) S.T	-	(-ve) L.T	-
Solid & Hazardous Waste Generation	-	(-ve) L.T	(-ve) L.T	(-ve) L.T	(-ve) L.T	-	(-ve) S.T	-
Employment	-	-	-	-	-	-	(-ve) L.T	-
Infrastructure Development						(+ve) L.T	(+ve) L.T	-
Greenbelt Development	(+ve) L.T	(+ve) L.T	(+ve) L.T	(+ve) L.T	(+ve) L.T	-	(+ve) L.T	(+ve) L.T
(-ve): Negative, (+ve): positive, S.T: Short term, L.T: long Term								

Conclusion:

On the background of known Environmental Status of the area, and having known the pollution potential of the manufacturing process, efforts are now made to minimize the pollution to such an extent that the impact on environment will be very low. This is done methodically with accredited methods and found a satisfactory situation in this particular case.

CHAPTER 5 - ANALYSIS OF ALTERNATIVES (TECHNOLOGY & SITE)

5.1. PROJECT SCHEDULE

The commercial operation date (COD) is envisaged in six (6) months reckoned from the effective zero date.

5.2. PROJECT COST ESTIMATES

Total cost of the project will be around **82 lakhs**. Budgetary break up is as follows:

Table 5.1: Break-up Cost of the Project

Sl. No	Particular	Cost (Rs Lakhs)
1	Land & Land Development	30.0
2	2 nos. Resin Kettle	35.0
3	Boiler	5.0
4	Tanks	6.0
5	Electrical Installations	2.5
6	Miscellaneous	3.5
	Total	**82.0**

5.3. ANALYSIS OF ALTERNATIVE SITE ANALYSIS

The technical feasibility and financial viability of the project has been reviewed with reference to the proposed project with reference to overall company as a whole. Our review has been done on the basis of the present scenario and documents made available to us by the company. We have made the assessment afresh and made the changes in assumptions wherever felt required.
Based on our analysis it may be inferred that

- ✓ The project is technically feasible and financially viable.
- ✓ The overall financial liquidity and profitability parameters of the project appeared to be reasonable and satisfactory.
- ✓ We conclude the capital expenditure of the company as a viable option subject to the weakness and threats associated with a business venture.
- ✓ The operation of plant has significant positive impact on the socio-economic environment of the area. It helps to sustain the development of this area including further development of physical infrastructure facilities.

In the interest of development and improve the social conditions of the local habitants this project should be allowed after considering all the environment aspects.

CHAPTER 6 - ENVIRONMENTAL MONITORING PROGRAM

6.1. INTRODUCTION

The proposed project, though, has minimal environmental impact, nonetheless, to control and limit the pollution level to desired level; an effective EMP is a must. In view of above, it is proposed to establish a monitoring protocol for air, water, noise and solid waste soil. The stations will be the same as where the samples are taken while preparing this EIA. It is proposed to outsource the EMP to an accredited Consultant. **M/s Sawariya Chemical** will adopt comprehensive environmental monitoring plan which is essential to take into account the changes in the environment.

The objective of monitoring is:

- To verify the result of the impact assessment study in particular with regards to new developments.
- To follow the trend of parameters which have been identified as critical
- To check or assess the efficiency of controlling measures
- To ensure that new parameters, other than those identified in the impact assessment study, do not become critical through the commissioning of new project.

To monitor effectiveness of Control Measures:

- Monitor daily, Assess effectiveness of the Control Measures being implemented, Explore the need to modify or add new Control Measures particularly if a violation is observed & Report weekly.
- Regular monitoring of environmental parameters will be made to find out any deterioration in environmental quality.
- Monitoring of the proposed project area will be regularly conducted. The attributes, which merit regular monitoring, are specified underneath

Table6.1: Summary of Sampling for Environmental Monitoring Program

Aspects	Parameters to be Monitored	Frequency of Monitoring	Compliance
Air Quality	PM_{10}, $PM_{2.5}$, SO_2, NO_2, CO, NH_3	Twice in a week for one season	NAAQ Standards, 2009
Noise Levels	Day and night noise Levels	Quarterly	CPCB Standards
Water Quality	pH, Temp, Salinity, TDS, TSS, DO, BOD, Hardness, Alkalinity, Chlorides, Turbidity, Conductivity, Oil and Grease, Heavy Metals	Quarterly	IS10500: 2012
ETP Inlet	pH, SS, TDS, BOD, COD, Chlorides, Sulphates, Total Ammonical Nitrogen	Monthly	WBPCB Standards
ETP Outlet	pH, SS, TDS, BOD, COD, Chlorides, Sulphates, Total Ammonical Nitrogen	Monthly	WBPCB Standards
Stack	PM_{10}, SO_2	Monthly	WBPCB Standards

M/s Sawariya Chemical will outsource the sampling and monitoring work for post project environment monitoring. The environmental department in respect of operation of pollution control facility will maintain following records.

- Instruction manual for operation and maintenance of pollution control equipments.
- Log sheet for self-monitoring of pollution control equipments.
- Instruction manual for monitoring of water, solid and gaseous parameter discharged from the factory and also for various parameters of pollution control facilities.
- Statutory records as per the Environmental Acts.
- Monthly and annual progress reports.

6.2. BUDGET ALLOCATION FOR MONITORING

The EMC will be responsible to carry on the monitoring. Budget allotment has also been proposed for the same:

Table 6.2: Budget Allotment for Monitoring

S. No.	Description	Cost to be incurred (in lakhs/annum)
1	Air Quality	1.25
2	Water Quality (Surface & Groundwater)	1.25
3	Soil Quality	1.00
4	Noise Level	0.50
TOTAL		**4.00**

6.3. REPORTING SCHEDULES OF THE MONITORING DATA

It is proposed that voluntary reporting of environmental performance with reference to the EMP should be undertaken. The environmental monitoring cell shall co-ordinate all monitoring programmes at site to furnish the data to the State regulatory agencies regularly in respect of the stipulated prior environmental clearance terms and conditions. The proponent shall prominently advertise in the newspapers indicating that the project has been accorded environmental clearance and also the details of website where it is displayed.

CHAPTER 7 - ADDITIONAL STUDIES

7.1. RISK ASSESSMENT STUDY

7.1.1 For Set up of Synthetic Resin with 1250 MT/Month Capacity of the Project

M/s Sawariya Chemical is willing to install a plant for production of Synthetic Resin with a capacity of 1250 MT/Month, in the land area of 0.43 Acre at R.S. Plot No 407; L.R. Plot No 550; Mouza – Binnaguri, Village – Gokul Vita, Pargana – Baikunthapur, Dist – Jalpaiguri, West Bengal. Due to high market demand, the project proponent is willing to produce three types of synthetic resin i.e. Urea-Formaldehyde Resin (U-F Resin), Phenol-Formaldehyde Resin (P-F Resin) and Melamine-Formaldehyde Resin (M-F Resin). The production capacity of U-F Resin will be 10 Ton/day and P-F & M-F Resin production capacity will be 20 Ton/day each.This synthetic resin manufacturing project has envisaged the raw materials to be used in the production unit. Out of total raw material Formaldehyde, Industrial Urea, Phenol, Melamine Caustic Soda and Acetic Acid have been identified as hazardous materials to be handled, besides fuel HSD has also been considered for consequence analysis. Therefore, ALOHA (Areal Locations of Hazardous Atmospheres) software has been used for the study of consequence analysis. ALOHA is a modeling program that estimates threat zones associated with hazardous chemical releases, including toxic gas clouds, fires, and explosions. A threat zone is an area where a hazard (such as toxicity) has exceeded a user-specified Level of Concern (LOC). ALOHA is part of the CAMEO® software suite of products for emergency responders and planners. This software has been used for the current study. The Google Earth Image of the project site is shown in the following **Figure – 7.1**.

Figure- 7.1: Google Earth Image of Project Site

Area statement and location of the industrial units are shown in the layout map of the project. Layout map of the project is shown in the following **Figure -7.2**.

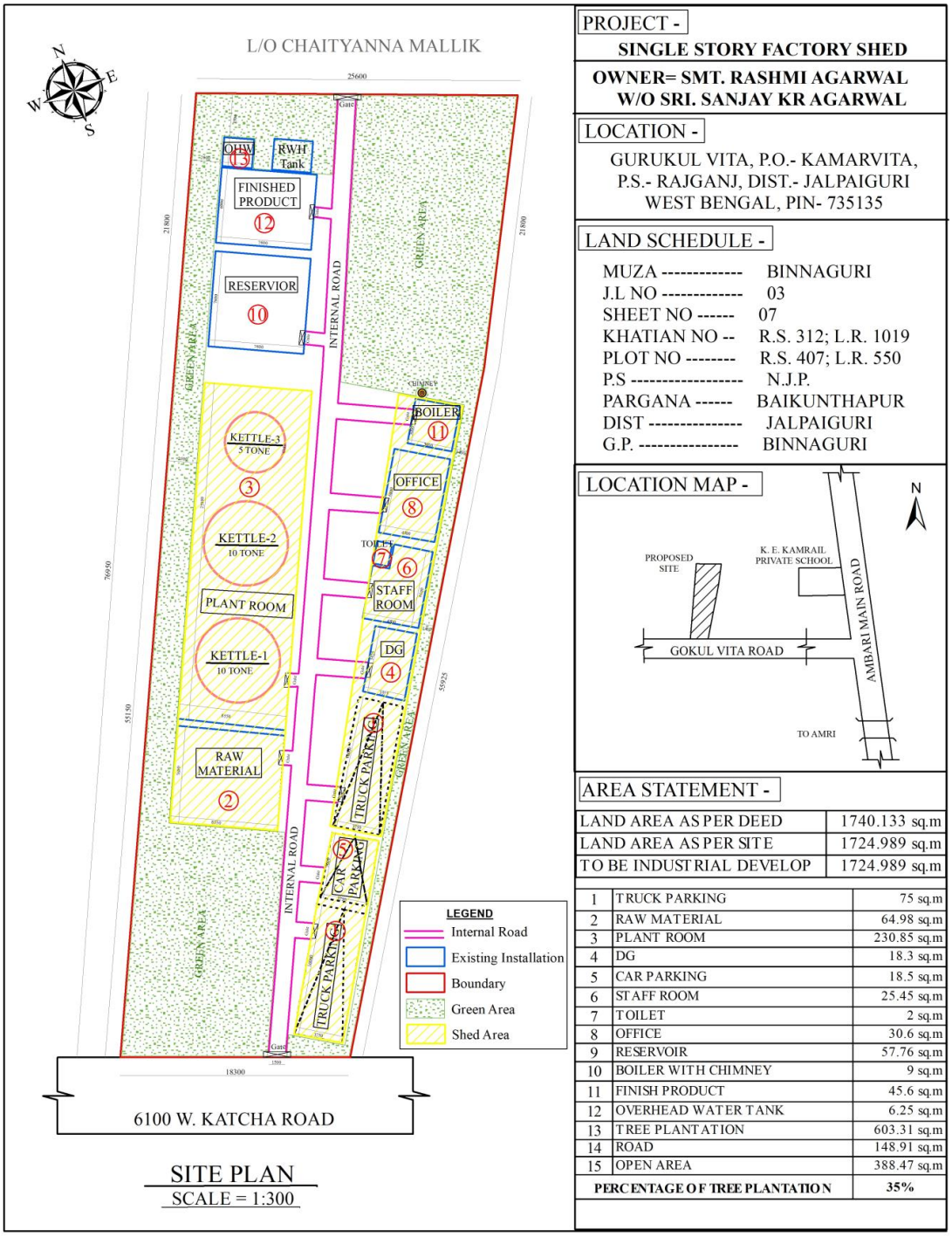


Figure – 7.2: Layout map of the Project Site

7.1.2. Plant Machineries

List of major machineries to be used in the plant is mentioned in **Table -7.1.**

Table- 7.1: List of Plant Machinery

SN	Plant Machinery Details		
	Machinery	**Specification**	**Quantity**
1	Vertical Boiler	Capacity 300 kg/hr	1
2	Resin Kettle	Capacity 5 Ton	1
3	Resin Kettle	Capacity 10 Ton	2
4	DG Set	Capacity 63 KVA	1

7.1.3. Fuel Requirement

Fuel is required for boiler and DG Set (Stand by). Requirement and source of fuels are mentioned in **Table – 7.2.**

Table- 2: Requirement and Source of Fuel

S.N	Fuel Type	Fuel used for	Qty.	Source	Mode of Transport
1	Coal	Boiler	400 kg/day	Local	Road
2	Diesel	DG Set (63KVA)	7.3 lit/hr	Local	Road

7.1.4. Size and Magnitude of Operation

The plant is planned to design for the production of three types of synthetic resin namely Urea-Formaldehyde resin (UF Resin), Phenol-Formaldehyde Resin and Melamine-Formaldehyde resin (MF Resin). The details of production capacity are mentioned in **Table – 7.3**.

Table-7.3: Proposed Production Capacity

S.N.	Name of the product	Production Capacity (MT/Month)	Production Capacity (MT/Annum)	Storage Capacity (MT)	Mode of Storage
1	Urea-Formaldehyde Resin	250	3000	70	PVC Tank
2	Phenol-Formaldehyde Resin	500	6000	140	PVC Tank
3	Melamine-Formaldehyde Resin	500	6000	140	PVC Tank
Total		**1250**	**15000**	**350**	

7.1.5. Details of Raw materials

Following raw materials are required for proposed products as mentioned in **Table-7.4**. The properties of the Raw materials, quantity required and mode of storage are mentioned in **Table- 7.4**.

Table- 7.4: Chemical Name, Physical Form and Required Quantity & Mode of Storage of Raw Materials

SN	Raw materials	Chemical Name	Form	Quantity (MT/Month)	Source	Mode of Transport	Max. Storage (MT)	Mode of Storage
1	Formaldehyde	Formaldehyde	Liquid	769.22	Imported / Local	Shipment /Truck	215.38	HDPE Tank
2	Industrial Urea	Carbonyl diamide	Solid	70	Local	Road	19.6	Woven PP Bag
3	Phenol	Carbolic Acid	Liquid	226.34	Imported / Local	Shipment /Truck	63.38	HDPE Drum
4	Melamine	1,3,3-triamino-2,4,6-triazine	Solid	193.85	Local	Road	54.28	HDPE Drum
5	Caustic Soda	Sodium Hydroxide	Solid	27.60	Local	Road	7.73	Woven PP Bag
6	Acetic Acid	Acetic Acid	Liquid	5.63	Local	Road	1.58	HDPE Drum

The physical and chemical properties of the products are described in following **Table – 7.5.**

Table-7.5: Physical and Chemical Properties of the Products

S.N.	Products	State	Main Properties (refer MSDS)						
			B.P °C	F.P °C	LEL/ UEL	TLV	LD50 / LC50	Sp. Gravity	Vapour Density
1	Phenol Formaldehyde	Semi Solid	Approx. 102	Less than 0	1%	NA	2900mg/kg & 2501ppm/1hr	1.2	>1
2	Melamine Formaldehyde	Semi Solid	NA	105-115	NA	NA	NA	NA	>1
3	Urea Formaldehyde	Semi Solid	102	-10	NA	0.3ppm	5,628 mg/kg & 800 mg/kg	` NA	NA

The details & MSDS of hazardous raw materials required for the production of resins are provided in following **Table – 7.6.**

Table- 7.6: Details & MSDS Raw Materials Required

Full name of the raw materials	Physical Phase	Main properties (refer MSDS)						Flammability
		B.P °C	F.P °C	LD_{50} Mg/kg	Specific Gravity (water=1)	IDLH (ppm)	Vapor density (air=1)	
Formaldehyde	Clear Liquid	101	0	500	NA	20	>1.0	Flammable
Industrial Urea	White Solid	131-135	NA	8471	NA	1	NA	Non Flammable
Phenol	Colourless Liquid	182	42.8	317	NA	NA	3.2	Flammable
Melamine	White Crystalline Solid	<250	Sublimes	3161	1.573	NA	4.34	Flammable
Caustic Soda	Colourless Liquid	110 - 144	-32 to 15	1350	1.11 – 1.53	NA	NA	Non Flammable
Acetic Acid	Liquid	117-118	16.2	3310	NA	NA	NA	Flammable

ALOHA (Areal Locations of Hazardous Atmospheres) is a modelling program that estimates threat zones associated with hazardous chemical releases, including toxic gas clouds, fires, and explosions, if any. A threat zone is an area where a hazard (such as toxicity) has exceeded a user-specified Level of Concern (LOC). Since, ALOHA is limited to chemicals that become airborne, it includes models to assess the rate at which a chemical is released from containment and vaporizes. These "source strength" models can be critical components in the process of assessing hazards. ALOHA links source strength models to a dispersion model to estimate the spatial extent of toxic clouds, flammable vapours, and explosive vapour clouds. However, ALOHA does not model all combinations of source strength, scenario, and hazard category for combustion scenarios. The user must choose a specific combination from a limited selection.

ALOHA uses a graphical interface for data entry and display of results. The area where there is a possibility of exposure to toxic vapours, a flammable atmosphere, overpressure from a vapor cloud explosion, or thermal radiation from a fire are represented graphically as threat zones. Threat zones represent the area within which the ground-level exposure exceeds the user-specified level of concern at some time after the beginning of a release. All points within the threat zone experience a transient exposure exceeding the level of concern at some time following the release; it is a record of the predicted peak exposure over time. In some scenarios, the user can also view the time dependence of the exposure at specified points.

7.1.6. Methodology:

Available MSDS and chemical data sheets were used to fill the properties of chemicals as input for running the software for the results of consequences of toxic, flammable and explosives materials. Some of the properties are not available for Formaldehyde and Melamine, which is flammable and toxic chemical used as raw material.

In some of the cases either flammability or toxicological properties, whichever is important has been considered for running the program. The raw materials mentioned in **Table – 7.4**, has been identified for running ALOHA modelling program that estimates threat zones associated with hazardous chemical releases, if happens. Model run has been attempted for Urea Formaldehyde, Melamine Formaldehyde, Formaldehyde, Industrial Urea, Phenol, Melamine, Caustic Soda, Acetic Acid and HSD. However, precautionary measures for other solid and liquid chemicals will be taken as included in the attached respective MSDS sheets. The results of model run for Formaldehyde (Case-1), Melamine (Case-2), Acetic acid (Case-3) and diesel (Case-4) are described as:

Case- 1 Formaldehyde-Liquid: Impacted distances/ Threat zone of ALOHA run needs to be considered for risk and safety distances. Hazards and precautionary measures mentioned in MSDS should be considered for handling the emergencies.

Case- 2 Melamine-White Crystalline Solid: Impacted distances/ Threat zone of ALOHA run needs to be considered for risk and safety distances. Hazards and precautionary measures mentioned in MSDS should be considered for handling the emergencies.

Case- 3 Acetic Acid-Liquid: Hazards and precautionary measures mentioned in MSDS should be considered for handling the emergencies.

Case- 4 Storage of HSD (N-Octane): Impacted distances/ Threat zone of ALOHA run needs to be considered for risk and safety distances. Hazards and precautionary measures mentioned in MSDS should be considered for handling the emergencies.

CASE-1: FORMALDEHYDE

The composition /information on the ingredients of formalin are given in the following Table.

Mixtures

Component		Classification	Concentration
formaldehyde			
CAS-No. EC-No. Index-No. Registration number	50-00-0 200-001-8 605-001-00-5 01-2119488953-20-XXXX	Acute Tox. 3; Acute Tox. 2; Acute Tox. 3; Skin Corr. 1B; Eye Dam. 1; Skin Sens. 1; Muta. 2; Carc. 1B; STOT SE 3; H301, H330, H311, H314, H318, H317, H341, H350, H335 Concentration limits: >= 25 %: Skin Corr. 1B, H314; 5 - < 25 %: Skin Irrit. 2, H315; 5 - < 25 %: Eye Irrit. 2, H319; >= 5 %: STOT SE 3, H335; >= 0,2 %: Skin Sens. 1, H317;	>= 30 - < 50 %
Methanol			
CAS-No. EC-No. Index-No. Registration number	67-56-1 200-659-6 603-001-00-X 01-2119433307-44-XXXX	Flam. Liq. 2; Acute Tox. 3; STOT SE 1; H225, H301, H331, H311, H370 Concentration limits: >= 10 %: STOT SE 1, H370; 3 - < 10 %: STOT SE 2, H371;	>= 10 - < 20 %

SITE DATA:

Location: Jalpaiguri, WB, INDIA

Building Air Exchanges Per Hour: 0.48 (user specified)

Time: July 20, 2022 ; 1512 hours ST (using computer's clock)

CHEMICAL DATA:

Chemical Name: Formaldehyde Molecular Weight: 30.00 g/mol
IDLH: 20 ppm LEL: 70000 ppm UEL: 700000 ppm
Normal Boiling Point: -unavail-

Note: Not enough chemical data to use Heavy Gas option

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 3 meters/second from NE at 3 meters
Ground Roughness: urban or forest Cloud Cover: 3 tenths
Air Temperature: 35° C Stability Class: D
No Inversion Height Relative Humidity: 5%

SOURCE STRENGTH:

Direct Source: 0.5 kilograms/min Source Height: 2 meter
Release Duration: 60 minutes
Release Rate: 500 grams/min
Total Amount Released: 30.0 kilograms

THREAT ZONE:

Model Run: Gaussian
Red : 58 meters --- (20 ppm = IDLH)
Orange: 82 meters --- (10 ppm)
Yellow: 186 meters --- (2 ppm)

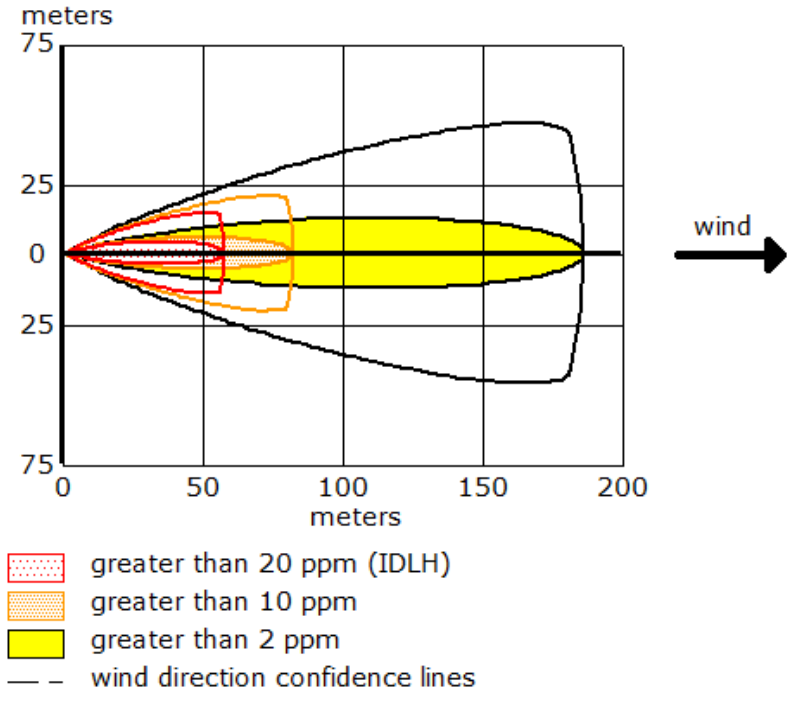


Figure-7.3: Impacted Distances due to Toxicity of Formaldehyde

If any unlikely accident happens with the storage of formalin, all safety measures should be adopted. All safety precaution should be taken within the distance of 58 m from the storage and handling location of formalin. Hazard and Precautionary Statements mentioned in MSDS must be followed during the handling of formalin, which is toxic and flammable in nature.

CASE –2: MELAMINE

SITE DATA:

Location: Jalpaiguri, WB, INDIA
Building Air Exchanges Per Hour: 0.48 (unsheltered single storied)
Time: July 20, 2022 1309 hours ST (using computer's clock)

CHEMICAL DATA:

Chemical Name: MELAMINE Molecular Weight: 126.12 g/mol
Normal Boiling Point: -unavail-
Freezing Point: 344.9° C

Note: Not enough chemical data to use Heavy Gas option

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 3 miles/hour from NE at 3 meters
Ground Roughness: urban or forest Cloud Cover: 3 tenths
Air Temperature: 35° C Stability Class: B
No Inversion Height Relative Humidity: 5%

SOURCE STRENGTH:

Direct Source: 0.5 kilograms/min Source Height: 2 meters
Release Duration: 60 minutes
Release Rate: 500 grams/min
Total Amount Released: 30.0 kilograms

THREAT ZONE:

Model Run: Gaussian
Red : LOC is not exceeded --- (2000 ppm)

Note: Threat zone was not drawn because the ground level concentrations never exceed the LOC.

Orange: LOC is not exceeded --- (100 ppm)

Note: Threat zone was not drawn because the ground level concentrations never exceed the LOC.

Yellow: 32 meters --- (10 ppm)

Note: Threat zone was not drawn because effects of near-field patchiness make dispersion predictions less reliable for short distances.

PRECAUTION AND SAFETY MEASURES

Following precaution should be taken as per mentioned Hazards:

Products of Combustion:

These products are carbon oxides (CO, CO2), nitrogen oxides (NO, NO2...), cyanide fumes, irritating and toxic fumes and gases.

Fire Hazards in Presence of Various Substances:

Slightly flammable to flammable in presence of heat.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

CASE –3: ACETIC ACID

SITE DATA:

LOCATION: Jalpaiguri, WB, INDIA
Building Air Exchanges Per Hour: 0.48 (unsheltered single storied)
Time: July 20, 2022 ; 1051 hours ST (using computer's clock)

CHEMICAL DATA:
Chemical Name: ACETIC ACID, GLACIAL
CAS Number: 64-19-7 Molecular Weight: 60.05 g/mol
ERPG-1: 5 ppm ERPG-2: 35 ppm ERPG-3: 250 ppm
IDLH: 50 ppm LEL: 40000 ppm UEL: 199000 ppm
Ambient Boiling Point: 117.8° C
Vapor Pressure at Ambient Temperature: 0.035 atm
Ambient Saturation Concentration: 35,563 ppm or 3.56%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
Wind: 3 miles/hour from NE at 3 meters
Ground Roughness: urban or forest Cloud Cover: 3 tenths
Air Temperature: 35° C Stability Class: B
No Inversion Height Relative Humidity: 5%

SOURCE STRENGTH:
Direct Source: 0.001 kilograms/sec Source Height: 2 meters
Release Duration: 60 minutes
Release Rate: 60 grams/min
Total Amount Released: 3.60 kilograms

THREAT ZONE:

Model Run: Heavy Gas

Red : 11 meters --- (250 ppm = ERPG-3)

Note: Threat zone was not drawn because effects of near-field patchiness make dispersion predictions less reliable for short distances.

Orange: 20 meters --- (35 ppm = ERPG-2)

Note: Threat zone was not drawn because effects of near-field patchiness make dispersion predictions less reliable for short distances.

Yellow: 54 meters --- (5 ppm = ERPG-1)

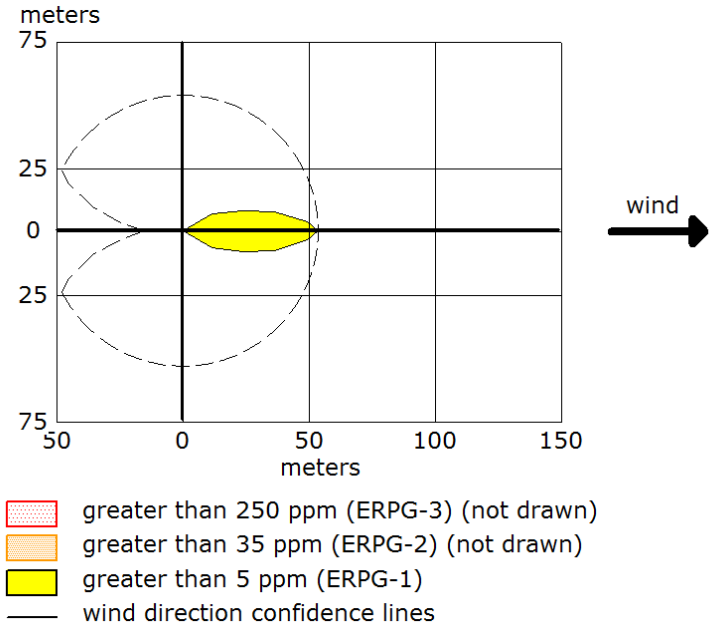


Figure-7.4: Impacted Distances due to Toxicity of Acetic Acid

Products of Combustion:

These products are carbon oxides (CO, CO2), nitrogen oxides (NO, NO2...), cyanide fumes, irritating and toxic fumes and gases.

Fire Hazards in Presence of Various Substances: Slightly flammable to flammable in presence of heat.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Precautions and corrective action should be taken considering the above hazards as included in the attached MSDS for Acetic Acid.

CASE 4- HSD (Combustion Mixture mainly N-OCTANE)

SITE DATA:

Location: Jalpaiguri, WB, INDIA
Building Air Exchanges Per Hour: 0.61 (sheltered single storied)
Time: July 16, 2022 ;1519 hours ST (using computer's clock)

CHEMICAL DATA:

Chemical Name: N-OCTANE has been considered as a hydrocarbon as worst case for Diesel
CAS Number: 111-65-9 Molecular Weight: 114.23 g/mol
PAC-1: 230 ppm PAC-2: 385 ppm PAC-3: 5000 ppm
IDLH: 1000 ppm LEL: 9600 ppm UEL: 65000 ppm
Ambient Boiling Point: 124.8° C
Vapor Pressure at Ambient Temperature: 0.027 atm
Ambient Saturation Concentration: 27,778 ppm or 2.78%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 3 meters/second from NE at 3 meters
Ground Roughness: urban or forest Cloud Cover: 5 tenths
Air Temperature: 32° C
Stability Class: A (user override)
No Inversion Height Relative Humidity: 5%

SOURCE STRENGTH:

Leak from hole in horizontal cylindrical tank
Flammable chemical is burning as it escapes from tank
Tank Diameter: 2.33 meters Tank Length: 1.17 meters
Tank Volume: 5000 liters
Tank contains liquid Internal Temperature: 35° C
Chemical Mass in Tank: 2,788 kilograms
Tank is 80% full
Circular Opening Diameter: 1 inches
Opening is 0.5 meters from tank bottom
Max Flame Length: 7 meters
Burn Duration: ALOHA limited the duration to 1 hour
Max Burn Rate: 22 kilograms/min
Total Amount Burned: 1,309 kilograms
Note: The chemical escaped as a liquid and formed a burning puddle.
The puddle spread to a diameter of 2.3 meters.

THREAT ZONE:

Threat Modeled: Thermal radiation from pool fire
Red : less than 10 meters (10.9 yards) --- (10.0 kW/(sq m) = potentially lethal within 60sec)
Orange: **11 meters** --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)
Yellow: **16 meters** --- (2.0 kW/(sq m) = pain within 60 sec)

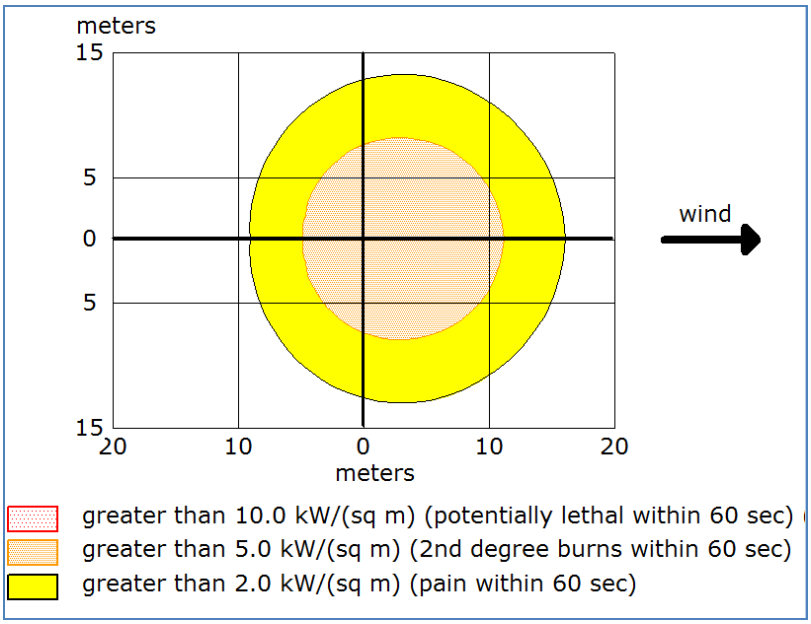


Figure7. 5: Thermal Radiation Threat Zone (5.0 KL of HSD)

Therefore, consider 16.0 m as threat zone from the location of tank and activities should be planned accordingly beyond 16 m distance from 5 KL diesel storage tank.

7.2. RECOMMENDATION OF MEASURES FOR HANDLING OF HAZARDOUS CHEMICAL

The following specific measures are considered in order to enhance the safe handling of chemicals:

- The attached MSDS sheet for Formaldehyde & Methanol, Melamine, Caustic Soda, Acetic Acid, Carbonyl di-amide and HSD should be followed and referred for handling during the emergency of specific chemicals handled in the factory premises.
- Water shower and curtain to wash out any chemical entering to eye and face.
- Use of PPE kits as specified in MSDS for specific chemicals must be used during the handling operation.
- In case of rupture of pipelines due to malfunctioning of Valve, the provision of automatically shut off the valve (ESD) and system should be provided.
- Leak detectors should be provided to detect leaks of toxic materials for taking any corrective/preventive action.
- Man power round the clock to take corrective actions in case of any emergency.
- Fire fighting facilities to be installed to take care of any fire and toxic hazards, if occur.
- The pipeline, tanks and valves should be inspected periodically.
- HSD/Diesel storage tank up to 5 KL capacity should be provided at suitable place for the project.
- Critical switches and alarm should be provided, which should always kept in line.
- Updating of existing Disaster Management Plan along with Emergency Preparedness Plan;

7.3. RISK REDUCTION MEASUREMENTS & RECOMMENDATIONS

- ✓ Storage tank of phenol and Formaldehyde should be installed away from the plant area.
- ✓ Wind indicator should be provided at the highest level of the plant to know the wind direction.
- ✓ Automatic sprinkler system for the flammable material tanks (over ground tanks only) may be provided as knock on effect in case of fire is possible.
- ✓ Containment dykes with proper sloping and collection sumps should be provided so that any spillages in the bulk storage and other handling areas shall not stagnate and shall be quickly lead away to a safe distance from the source of leakage. This reduces the risk of any major fire on the bulk storages and the risk to the environment shall be minimized/ eliminated.
- ✓ Inspection of the storage tanks as per prefixed inspection schedule for thickness measurement, joint and weld efficiency etc.
- ✓ Provision of flameproof electrical fittings / equipment's.
- ✓ Proper maintenance of earth pits.
- ✓ Strict compliance of security procedures like issue of identity badges for outsiders, gate passes system for vehicles, checking of spark arrestors fitted to the tank lorries etc.
- ✓ Strict enforcement of no smoking.
- ✓ Periodic training and refresher courses to train the staff in safety fire fighting.
- ✓ Employee training and education will be carried out.
- ✓ Emergency drills should be carried out periodically to ensure preparedness must continue.
- ✓ Many operations involve use of highly toxic/flammable materials and these needs to be documented as SOPs. These must be made and kept updated on priority.
- ✓ Many of the raw materials used for resin are either toxic or flammable. It is therefore important to ensure that these materials are stored in closed, well ventilated totally safe areas. A fire alarm system (heat and smoke detection) should be provided for the storage area where the material is stored as toxic fumes arise on combustion.
- ✓ Loose drums of waste materials, often solvent laden, must be removed from the working areas and close watch kept.
- ✓ Ventilation should be provided for any enclosed are where hydrocarbon or toxic vapours may accumulate. Several such areas were noticed- these may be surveyed and tackled accordingly.
- ✓ All personnel should be trained in handling emergency situations and should be apprised of their role in handling emergency situation and to ensure adequacy of the emergency procedures simulated exercise should be carried out. Flame arrestor should be provided.
- ✓ Monitoring of occupational hazards like noise, ventilation, chemical exposure etc. will be carried out regularly and its record will be maintained.
- ✓ Good housekeeping, use of PPE, Engineering controls, Enclosure processes, scrubber system, display of safety boards, SOP of loading / unloading, local exhaust ventilation, safety shower etc are maintained.
- ✓ Appropriate personal protective equipment will be provided & ensure the usage of them. Workers will be trained on safe material handling of hazardous chemicals.
- ✓ Prepare & display the safe operating procedure for hazardous chemicals storage, handling & transporting or using.
- ✓ Local Exhaust ventilation and scrubber should be installed where it is required to reduce fumes, vapours, temperature and heat stress

- ✓ Following fire safety devices will be provided to protect from any malfunctioning of plant equipment's. Following fire protection systems will be provided:
  - Water storage of adequate capacity to meet the requirements of water for fire fighting purposes
  - Fire hydrants and automatic sprinkler system. Diesel driven pumps and headers to supply water to fire hydrant network.
  - Adequate Portable fire extinguishers, sand bucket, wheeled fire & safety equipment should be provided at the required places.
  - Equipment required for personal safety like blankets, gloves, apron, gum boots, face mask helmets, safety belts, first aid boxes etc. are provided. Proximity suits and self-contained breathing apparatus to be provided.

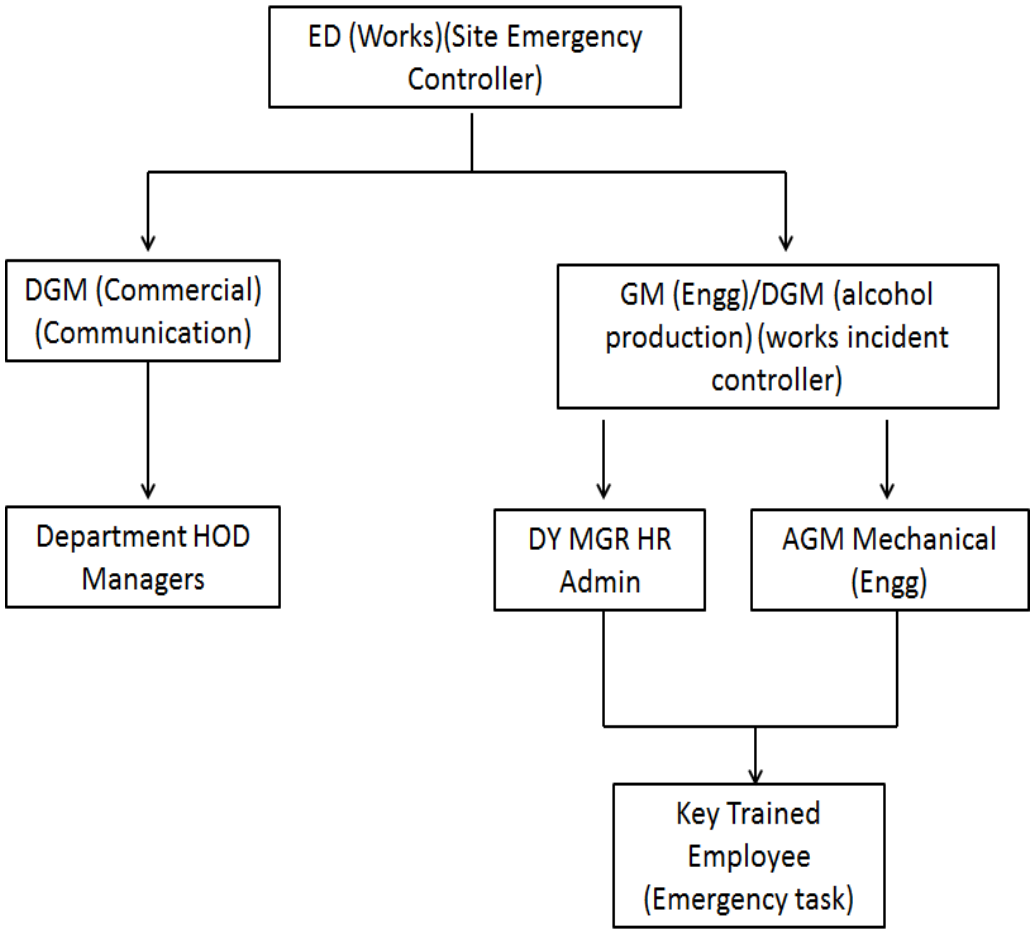


Figure 7.6: HSE Organization Chart

7.4. EMERGENCY PLANNING & PROCEDURE

Emergency Control Centre

Emergency Control Centre (ECC) is cell from which emergency operations are directed and coordinated. This centre activates as soon as on–site emergency is declared.

General Description of ECC

The ECC is located in an area that offers minimal risk being directly exposed to possible accidents. During an emergency, the Emergency Management Staff, including the site controller shall gather in the ECC. Therefore, the ECC shall be equipped with adequate communication systems in the form of telephones and other equipment to allow unhampered

organisations and other nearby facility personnel. The ECC provides shelter to its occupants against the most common accidents; in addition, the ECC's communication systems are protected from possible shutdown. The DGM (Commercial) (Communication Department HOD Managers DY MGR HR Admn. AGM Mechanical (Engg ED (Works) (Site Emergency Controller) GM (Engg)/DGM (alcohol Production) (works Incident Controller) Key Trained Employee (Emergency Task ECC has its own emergency lighting arrangement and electric communication systems operation. **Figure 7.7** shows Team involved in Emergency planning & Table shows names, details and contact no's of Emergency Task Force

Only a limited and prearranged number of people are admitted to the ECC, when in use. This eliminates unnecessary interference and reduces confusion. The ECC is always ready for operation and provided with the equipment and supplies necessary during the emergency such as:

- Updated copies of the On–site Disaster Management Plan.
- Emergency telephone numbers.
- The names, phone number, and address of external agencies, response organizations and neighbouring facilities.
- The adequate number of telephone (more than two).
- Emergency lights, Clocks, Personal protective equipment.
- List of fire extinguishers with their type no. and location, capacity, etc.
- Safety helmets – List of quantity & location.
- Status boards/message board.
- Material safety data sheets for chemicals handled at the facility

Several maps of the facility including drainage system for surrounding area showing:

- Areas where hazardous materials are stored.
- Plot plans of storage tanks, routes of pipelines, all water permanent lines etc.
- The locations where personal protective equipment are stored.
- The position of pumping stations and other water sources.
- Roads and plant entrances.
- Assembly areas & layout of Hydrant lines.

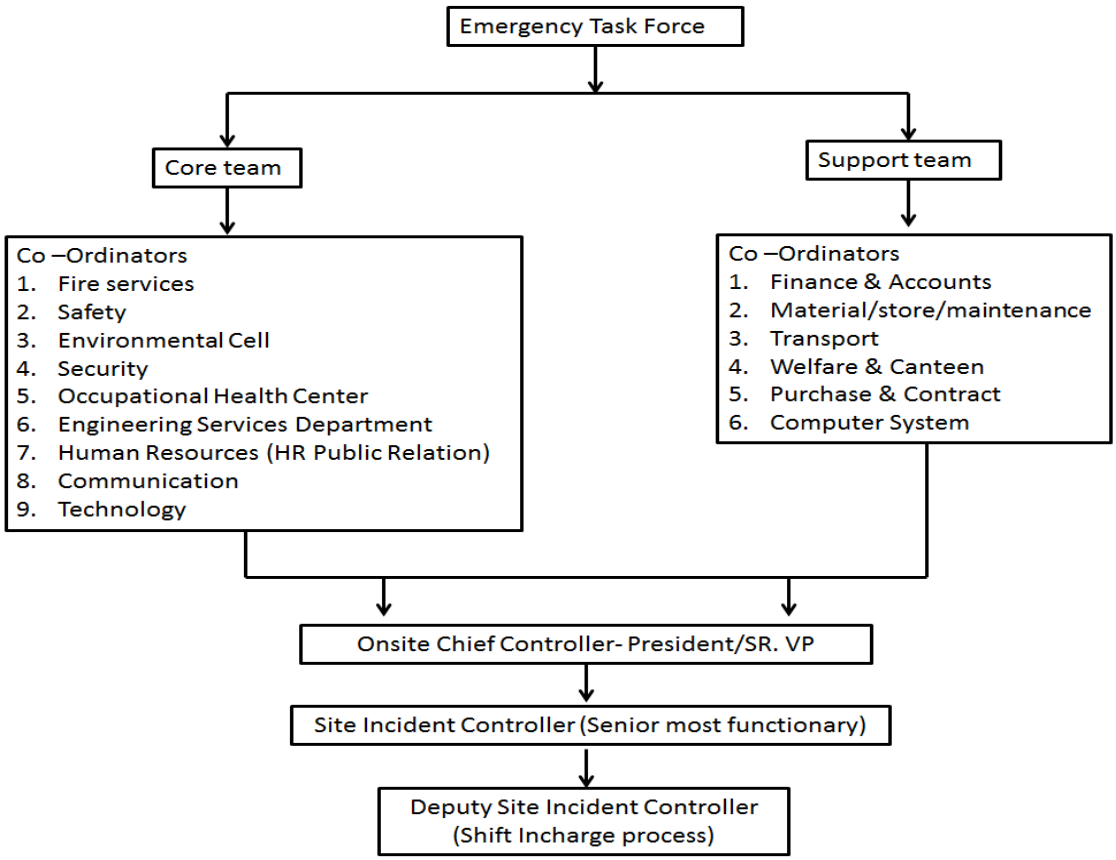


Figure 7.7: Emergency Planning for Disaster due to Fire

Cable rooms, transformer, unit, auxiliary transformers, oil tanks, etc. within the plant are the likely areas for which disaster management plan is to be made to deal with any eventuality of fire. Stores, workshop, canteen and administrative building will be included.

7.5. DO'S & DON'TS OF PREVENTIVE MAINTENANCE, STRENGTHENING OF HSE, MFG UTILITY STAFF FOR SAFETY RELATED MEASURES

Table 7.7: Fire Prevention

SN	Do's	Don'ts
1	Follow "No Smoking" Sign	Do not leave any flammable material at the work area
2	Deposit oily rags and waste combustible material in the identified containers and dispose them suitably.	Do not allow wild grass growth around storage of flammable chemicals and gas cylinders
3	Keep minimum inventory of flammable and combustible substances	Do not obstruct accessibility to the fire fighting equipments
4	Take permission before breaking or removal of fire barrier and ensure subsequent relocation of fire barrier	Do not destroy the inspection tag provided with the fire equipment
5	Check periodically the operability of fire fighting systems	Do not misuse the fire fighting equipment other than intended purpose
6	Use instruments that are intrinsically safe in explosive atmosphere	Do not use instruments that are not intrinsically safe in the explosive atmosphere

Table 7.8: In Case of Fire		
SN	**Do's**	**Don'ts**
1	On seeing fire please inform Factory Manager / EHS In charge and warn people nearby by shouting," Fire".	Do not runaway in case of fire but act on it.
2	Tell exact location and place of the occurrence clearly	Do not become the hindrance to the fire crew
	Try to extinguish the fire if you are aware about the fire fighting operation	Do not spread rumour in case of fire.
3	Guide the fire crew to the correct location	Do not leave place unattended if possible, till the fire crew arrive.
4	Keep the emergency escape route clear of materials	Do not stay there if you feel unsafe
5	Try to remove the combustible material from the vicinity of the fire if possible	Do not touch any electrical equipment under the influence of fire.
6	Cover the electrical equipment that is situated near or below the area of fire before applying water	Do not use the extinguisher if not in a good condition

Table 7.9: Handling of Chemicals		
SN	**Do's**	**Don'ts**
1	Use proper lifting tool and tackle having adequate capacity	Do not use the equipment for the purpose other than its design intention
2	Only authorized persons should operate material handling equipment	Do not allow personnel to move underneath lifted load
3	Each tool, tackle or equipment should have identification number and safe working load marked on it.	Do not load the equipment above its safe working load.
4	Assess weight of the material, distance to be carried, and hazards etc before lifting the load.	Do not use makeshift arrangement for lifting the material
5	Wear safety boots with metal toe while handling of materials	Do not drag chains, ropes or cables etc on the floor.
6	When placing a sling of a load, ensure all Sharp corners are covered with pad or soft material	Keep the tools & tackles free from adverse effect of atmosphere by applying suitable protective coating

Table 7.10: House Keeping		
SN	**Do's**	**Don'ts**
1	Assign places for everything and maintain things at its assigned place	Do not leave combustible materials in the work area.
2	Clean the area after completion of work	Do not smoke in the area of work
3	Use aisle space free for personnel and material movement	Do not allow dustbin to overflow
4	Ensure adequate illumination and ventilation for the job.	Do not generate extra waste
5	Drop paper, plastic, glass, metal and biomedical waste in a separate bin kept for this purpose.	Do not disturb the safety equipments from assigned location
6	Know the emergency equipments where Emergency equipments like first aid box, SCBA, fire fighting equipment, are kept.	Do not block emergency switches and on / Off switches of the equipment by storing of materials in front of work
7	Arrest all type of spills such as water, oil, gas, etc. and clean up the area immediately	Do not leave cleaning agent like acetone, Isopropyl alcohol, kerosene etc. at the work area after completion of work
8	Material and equipment needed for future usage are to be tagged and arranged in order.	Do not block fire exit point by storing materials or by means
9	Assign a periodicity for the documents to be weeded out and follow it scrupulously	Do not leave a spillage unattended

7.6. DISASTER MANAGEMENT PLAN

7.6.1. Definition

A major emergency in an activity/project is one which has the potential to cause serious injury or loss of life. It may cause extensive damage to property and serious disruption both inside and outside the activity/project. It would normally require the assistance of emergency services to handle it effectively. A disaster is catastrophic situation in which suddenly, people are plunged into helplessness and suffering and as a result, need protection, clothing, shelter, medical and social care and other necessities of life. Disasters can be divided into two main groups. In the first, are Disasters resulting from natural phenomena like earthquakes, volcanic eruptions, cyclones, tropical storms, floods, avalanches, landslides etc. The second group includes disastrous events occasioned by man, or by man's impact upon the environment. Examples are industrial accidents, radiation accidents, factory fires, explosions and escape of toxic gases or chemical substances, river pollution, mining or other structural collapses, air, sea, rail and road transport accidents and can reach catastrophic dimensions in terms of human loss. There can be no set criteria for assessing the gravity of a disaster in the abstract since depends to a large extent on the physical, economic and social environment in which it occurs. What would be considered a major disaster in developing country, will be equipped to cope with the problems involved, and may not mean more than temporary emergency elsewhere. However all disasters bring in their wake similar consequences that call for immediate action, whether at the local, national or international level, for the rescue and relief of the victims. This includes the search for the dead and injured, medical and social care, removal of the debris, the provision of temporary shelter for the homeless food, clothing and medical supplies, and the rapid reestablishment of essential services.

7.6.2. Objectives

The overall objectives of the emergency plan will be:

- To localize the emergency and, eliminate it
- To minimize the effects of the accident on people and property.

Elimination will require prompt action by operations and works emergency staff using, for example, fire–fighting equipment, water sprays etc. Minimizing the effects may include rescue, first aid, evacuation, rehabilitation and giving information promptly to people living nearby.

7.6.3. Phases of Disaster

There are various phases of Disaster including pre and Post Management of Hazardous Event that may or has occurred.

- **Warning Phase**

Emergencies /disasters are generally preceded by warnings during which preventive measures may be initiated. For example uncontrollable build-up of pressure in process equipment, weather forecast give warning about formation of vapour cloud, equipment failure etc.

- **Period of Impact Phase**

This is the phase when emergency /disaster actually strike and preventive measures may hardly be taken. However, control measures to minimise the effects may be taken through a well-planned and ready-to-act disaster management plan already prepared by organization. The duration may be from seconds to days.

- **Rescue Phase**

This is the phase when impact is almost over and efforts are concentrated on rescue and relief measures.

- **Relief Phase**

In this phase, apart from organization and relief measures internally, depending on severity of the disaster, external help are also to be summoned to provide relief measures (like evacuations to a safe place and providing medical help, food clothing etc.). This phase will continue till normalcy is restored.

- **Rehabilitation Phase**

This is the final and longest phase. During which measures required to put the situation back to normal as far as possible are taken. Checking the systems, estimating the damages, repair of equipment and putting them again into service are taken up. Help from revenue/insurance authorities need to be obtained to assess the damage, quantum of compensation to be paid etc.

7.6.4 Proposed On–Site Emergency Plan

Onsite Emergency Plan

The onsite emergency is an unpleasant situation that causes extensive damage to plant personnel and surrounding area and its environment due to in operation, maintenance, design and human error. Onsite plan will be applied in case of proposed project.

Following points are to be taken into consideration:

- To identify, assess, foresee and work out various kinds of possible hazards, their places, potential and damaging capacity and area in case of above happenings.
- Review, revise, redesign, replace or reconstruct the process, plant, vessels and control measures if so assessed.
- Measures to protect persons and property of processing equipment in case of all kinds of accidents, emergencies and disasters
- To inform people and surroundings about emergency if it is likely to adversely affect them

7.6.5 Disaster control Management system

Disaster Management group plays an important role in combating emergency in a systematic manner. Schematic representation Emergency Control Management system for proposed project is shown in **Figure 7.8.**

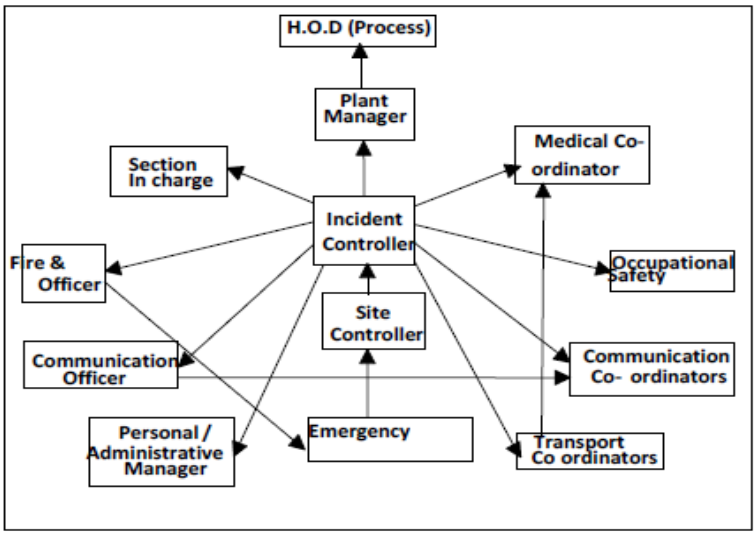


Figure 7.8: Onsite DMP - Disaster Control / Management System

7.6.6. General Industrial Emergencies

The emergencies that could be envisaged in the plant are as follows:

- Fire scenario due to storage of Bagasse/Ethanol.
- Contamination of food / water.
- Sabotage / social disorder.
- Structural failures.
- Slow isolated fires
- Earthquakes.

7.6.7 Emergency Organization's

It is recommended to setup an Emergency Organization. A senior executive who has control over the affairs of the plant would be heading the Emergency Organization. He would be designated as Site Controller. In case of stores, utilities, open areas which are not under the control of production heads, executive responsible for maintenance of utilities would be designated as Incident Controller. All records and actions would be reported to the site controller. Shift in-charge would be the reporting Officer, who would bring the incidence to the notice of the Incidence Controller and Site Controller. Emergency Coordinators would be appointed who would be undertake the responsibilities like fire fighting, rescue, rehabilitation, transport and support services. In each shift, electrical supervisor, electricians, pump house in-charge and other maintenance staff would be drafted for emergency operations. In the event of power communication system failure, some of staff members in the office/ plant offices would be drafted and their services would be utilized as messengers for quick passing of communications. All these personnel would be declared as essential personnel.

7.6.8. Emergency Communication

Whoever notices an emergency situation such as fire, growth of fire, leakage etc. should communicate with (ECC) Emergency Control Centre. The person on duty in the Emergency

Control Centre would appraise the site controller. Site controller verifies the situation from the Incident Controller of that area or the shift in-charge and takes a decision about an implementing on Site Emergency. This would be communicated to all the Incident Controllers, Emergency Coordinators. Simultaneously, the emergency warning system would be activated on the instructions of the Site Controller.

7.6.9 Site Controller

On receiving information about emergency he would rush to ECC and take charge of ECC and the situation and assesses the magnitude of the situation on the advice of incident controller and decides.

- Whether affected area needs to be evacuated.
- Whether personnel who are at assembly points need to be evacuated.
- Declares Emergency and orders for operation of emergency siren.
- Organizes announcement by public address system about location of emergency.
- Assesses which areas are likely to be affected, or need to be evacuated or are to be altered
- Maintains a continuous review of possible development and assesses the situation in consultation with Incident Controller and other key personnel whether shutting down the plant or any section of the plant required and if evacuation of persons is required.
- Directs personnel of rescue, rehabilitation, transport, fire brigade, medical and other designated mutual support systems locally available, for meeting emergencies.
- Controls evacuation of affected areas, if the situation is likely to go out of control or effects are likely to go beyond the premises of the factory, informs to District Emergency Authority, Police, and Hospital and seeks their intervention and help.
- Informs Inspector of factories, Deputy Chief Inspector of factories, APPCB and other statutory authorities.
- Gives public statement if necessary.
- Keeps record of chronological events and prepares an investigation report and preserves evidence.

7.6.10. Incident Controller

- Assembles the incident control team.
- Directs operations within the affected areas with the priorities for safety to personnel minimize damage to the plant, property and environment and minimize the loss of materials.
- Directs the shutting down and evacuation of plant and areas likely to be adversely affected by the emergency.
- Ensures that all-key personnel help is sought.
- Provides advice and information to the Fire and Security officer and the local Fire Services as and when they arrive.
- Ensures that all non-essential workers / staff of the affected areas evacuated to the appropriate assembly points and the areas are searched for causalities.

- Has regard to the need for preservation of evidence so as to facilitate any enquiry into the cause and circumstances, which caused or escalated the emergency.
- Coordination on with emergency services at the site.
- Provides tools and safety equipment's to the team members.
- Keeps in touch with the team and advice them regarding the method of control to be used.
- Keep the site Controller of Emergency informed of the progress being made

7.6.11. Emergency Coordinator - Rescue, Fire Fighting

- On knowing about emergency, rushes to Emergency Control Centre.
- Helps the incident controller in containment of the emergency.
- Ensure fire pumps in operating conditions and instructions pump house operator to be ready for any emergency, which stand arrangement.
- Guides the fire-fighting crew i.e. Firemen trained plant personnel and security staff.
- Organizes shifting the fire-fighting facilities to the emergency site, if required.
- Takes guidance of the Incident Controller for fire-fighting as well as assesses the requirements of outside help.
- Arranges to control the traffic at the gate and the incident area / directs the security staff to the incident site to take part in the emergency operations under his guidance and supervision.
- Evacuates the people in the plant or in the nearby areas as advised by site controller
- Searches for casualties and arranges proper aid for them.
- Assembles search and evacuation team.
- Arranges for safety equipment's for the members of this team.
- Decides which paths the evacuated workers should follow.
- Maintains law and order in the area, and if necessary seeks the help of police.

7.6.12. Emergency Coordinator

In the event of failure of electric supply and there by internal telephone, sets up communication point and establishes contact with the Emergency Control Centre (ECC). Organizes medical treatment to the injured and if necessary will shift the injured to nearby hospitals.

7.6.13. Emergency Control Centre

For the time being office block is identified as Emergency control centre. It would have external Telephone and Fax facility. All the Incident controller officers, senior personnel would be located here. The following information and equipment are to be provided at the Emergency control centre (ECC).

- Intercom, telephone
- P&T telephone
- Fire suit / gas tight goggles / gloves / helmets
- Factory layout, site plan

- Emergency lamp / torchlight
- Plan indicating locations of hazard inventories, plant control room, locations of safety equipment, road plan, assembly points, rescue location vulnerable zones, escape routes Hazard chart
- Breathing apparatus
- Wind direction, wind velocity indications
- Public Address Megaphone, Hand bell, Telephone directories (Internal, P&T).
- Address with telephone numbers and key personnel, Emergency coordinator.
- Important addresses, telephone numbers such as experts from outside,
- Government agencies neighbouring industries etc.
- Emergency shutdown procedures.
- Nominal roll of employees

7.6.14 Emergency Medical Facilities

Gas masks and general first aid materials for dealing with chemical burns, fire burns etc. would be maintained in the medical centre as well as in the emergency control room. Private medical practitioners help would be sought. Government hospital would be approached for emergency help. Apart from plant first aid facilities, external facilities would be augmented. Names of Medical Personnel, Medical facilities in the nearby village would be prepared and updated. Necessary specific medicines for emergency treatment of Burns patients and for those affected by toxicity would be maintained. Breathing apparatus and other emergency medical equipment would be provided and maintained. The help of nearby industrial managements in this regard would be taken on mutual support basis.

7.6.15 Emergency Shutdown

There are number of facilities which can be provided to the help deal with hazard conditions. The suggested arrangements are

- Stop feed
- Deluge contents
- Remove heat

7.6.16 Evacuation of Personnel

The area would have adequate number of exits pathways/staircase. In the event of an emergency unconnected personnel have to escape to assembly point. Operators have to take emergency shutdown procedure and escape. Time office maintains a copy of deployment of employees in each shift at ECC. If necessary, persons can be evacuated by rescue teams.

7.6.17. All Clear Signal

At the end of emergency, after discussing with Incident Controllers and Emergency Coordinators, the site controller orders an all clear signal.

7.7. OCCUPATIONAL HEALTH

In large scale industries where multifarious activities are involved during construction, erection, testing, commissioning, operation and maintenance, the men, materials and machines are the basic inputs. Along with the booms, the industrialization generally brings several problems like occupational health and safety. Occupational health needs attention both during construction and operation phases. However the problem varies both in magnitude and variety in the above phases.

7.8. SAFETY TRAINING

Safety training is being provided by the safety officers to all the employees with the assistance of faculty members called from professional safety institutions and universities. In addition to regular employees, limited contractor labours are also provided with safety training. To create safety awareness safety films will be shown to workers and leaflets etc. will be distributed.

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

7.9. OFF-SITE EMERGENCY PLANNING

The off-site emergency plan is an integral part of any hazard control system. It is based on those accidents identified by the works management, which could affect people and the environment outside the works. Thus, the off-site plan follows logically from the analysis that took place to provide the basis for the on-site plan and the two plans therefore complement each other. The roles of the various parties that may be involved in the implementation of an off-site plan are described below. The responsibility for the off-site plan will be likely to rest either with the works management or with the local authority. **Table 7.10 shows** details with Communication No. during Offsite Emergency

Table 7.10: Local Statutory Government bodies

S.NO	NAME OF GOVT AGENCY	PHONE NOS
1	District Magistrate	03561-230127
2	Additional District Magistrate (General)	03561230701
3	Sub-Divisional Officer Sadar	7797860400
4	West Bengal Pollution Control Board	1800-345-3390
5	District Planning Officer	3561231263
6	The Block Development Officer, Rajganj	7797863500

Source: Official Website of Jalpaigurir Distric, WBPCB & WB Police

7.10. PROPOSED ECOLOGICAL DAMAGE, REMEDIATION PLAN (RP) AND NATURAL AND COMMUNITY RESOURCE AUGMENTATION PLAN (NCRAP):

- **Identification of Ecological or Environmental Damage:**

The term natural resources includes living and non-living natural resources like land, habitats, flora, fauna, air, water, ground water and ecosystems. Ecological or environmental damage is the damage to natural resources. It is considered as the alteration, modification, injury to, deterioration, destruction or loss of such natural resources. The loss or impairment of public uses or services as a consequence of the harm to these natural resources is also to be considered as damage. It should be noted that not every change in the quantity and quality of natural resources or the services provided by such resources, is to be considered as damage. Certain threshold criteria have to be taken into account.

While doing an assessment of Ecological Damage caused due to construction projects it is necessary to study the peculiar nature of and more localized impacts that can be caused due to these projects. Taking into account damage to the various regimes of natural resources as mentioned earlier, it is necessary to first understand really whether the standard precautions or mitigation measures were taken into consideration while actual construction for this project was taken up without obtaining environmental clearance from the respective authorities. We have also referred the actual general and specific conditions for both phases which are generally put while granting the Environmental clearances by various SEACs/ EACs. Then we have compared it with the project under reference in which Buildings are under purview of EIA Notification and already constructed without obtaining EC. This exercise has helped us actually to assess the exact damage to the environment caused due this project.

For the present study, Google Earth Historic Images of the project area in different phases viz. before starting construction, during construction and after construction have been analysed to assess environmental damage:

	
01/03/2018 Before Construction	**01/10/2019 During Construction**
	
01/01/2020 During Construction	**01/03/2022 After Construction**

The following table explains the specific damage caused due to this project.

Table 0.11: Identification of Ecological or Environmental Damage in context to

Notification F. No. 22-21/2020-IA.III dated 7th July, 2021

SN.	Component	Environmental facet	On site scenario	Damage Identification
1	Topography and Natural Drainage	Whether natural drain system is maintained for ensuring unrestricted flow of water?	No natural drainage system has been altered for the project.	No
		Whether construction activity obstructs the natural drainage?	No obstruction of natural drainage has been done while constructing the site.	No
		Whether construction is carried out on wetland and water bodies?	There is no Wetland or Water Bodies on site	No
		Whether any measures are taken for maintaining the drainage pattern and to harvest rain water?	Internal storm water drains has been constructed strictly in accordance to the governing authority regulations and these storm drains of the complex will collect and convey the rain water through pipeline to the nearby canal.	No
2	Water Conservation, Rain Water Harvesting, and Ground Water Recharge	Whether use of water efficient appliances has been promoted?	Water saving measures were implemented : Total generated wastewater 2.48 KLD. Total waste water recycled 2KLD. It will maintain zero effluent discharge.	No
		Whether local bye-law provisions on rain water harvesting were followed?	NA	NA
		Whether Storage and reuse of the rain water promoted?	We are proposing 15kl Rain Water Harvesting Tank	No
		Whether ground water was withdrawn without approval from the Competent Authority?	Source of water will be from Ground water. Approval has been taken from competent authority. Approval has been attached as **Annexure IV**	No

SN.	Component	Environmental facet	On site scenario	Damage Identification
		Whether activity has resulted in ground water / surface water pollution?	Required water will be sourced from Ground water with proper approval. There are no chances of surface water pollution from this activity.	No
		Whether the activity has resulted in surface water pollution?		
		Whether adequate open spaces as per local bye laws have been provided?	Adequate open spaces are provided as per Rules.	No.
3	Waste Management	Whether Separate wet and dry bins were provided for each unit and at the ground level for facilitating segregation of waste?	NA	No
		Whether onsite sewage treatment system was installed where there is no municipal sewage network?	Only 0.48KL Domestic waste water will be generated for which installation of STP will not be feasible. We are proposing septic tank followed by Soak pit	No
		Whether treated effluent is reused?	Effluent is being reused .Around 1.3 KL waste water is expected to be generated from boiler blowdown & cooling tower blow-down, which will be stored in a storage tank and will be reused for greenbelt development & dust suppression. Effluent generated from the kettle washing (around 0.7 KLD) will be reused in the process. So there will be no discharge of waste water.	No
		Whether excess treated effluent is discharged following the CPCB norms?	Treated industrial waste water will be reused for plantation purpose. The factory will follow Zero Liquid Discharge concept.	No
		Whether sludge is disposed as per the Ministry of Urban Development, Central Public Health and Environmental Engineering Organization (CPHEEO) Manual on Sewerage and Sewage Treatment Systems, 2013	Yes	No

SN.	Component	Environmental facet	On site scenario	Damage Identification
		Whether provisions of the Solid Waste (Management) Rules 2016 and the e-waste (Management) Rules 2016, and the Plastics Waste (Management) Rules 2016 are followed?	The Solid Waste (Management) Rules 2016 is being followed. And the e-waste (Management) Rules 2016 and the Plastics Waste (Management) Rules 2016 are also being followed as per the guidelines.	No
4	Energy	Whether buildings are compliant with the Energy Conservation Building Code (ECBC)?	NA	No
		Whether outdoor and common area lighting is on Light Emitting Diode (LED)?	Most of the common area lightings are proposed to work on high energy efficient lamps (LED).	No
		Whether renewable Energy is installed to meet electricity generation equivalent to 1% of the demand load?	No renewable energy is installed to meet electricity demand.	No
		Whether building orientation, landscaping, efficient building Envelope, appropriate fenestration, increased day lighting design and thermal mass etc. is incorporated in the building design?	Not Applicable	No
		Whether wall, window, and roof u-values are as per ECBC specifications?	Not Applicable	No
5	Air Quality and Noise	Whether Dust, smoke & other air pollution prevention measures are provided for the factory as well as the site?	During Construction Phase: • Water sprinkling on site for dust suppression • Use of CPCB approved DG sets. Proper maintenance of DG sets. During Operation Phase:	No

SN.	Component	Environmental facet	On site scenario	Damage Identification
			➢ Water sprinkling will be done regularly for dust suppression ➢ DG room is being treated acoustically as per norms to control the noise from DG sets. ➢ Pumps, DG sets etc. are properly maintained for fuel efficiency and noise control. ➢ PPE is provided to the maintenance staff working in high noise areas	
		Whether Plastic/tarpaulin sheet covers are/were provided for vehicles bringing in sand, cement, murram and other construction materials prone to causing dust pollution at the site as well as taking out debris from the site?	No, Plastic/tarpaulin covering sheets were used while transporting the material.	No
		Whether sand, murram, loose soil, cement, stored on site are/were covered adequately so as to prevent dust pollution?	No, Separate storage is being provided for Sand, murram, loose soil, cement and covered adequately so as to prevent dust pollution.	No
		Whether wet jet are/were provided for grinding and stone cutting?	No stone cutting involved. Pre-cut stones of required sizes are procured.	No
		Whether unpaved surfaces and loose soil area/were adequately sprinkled with water to suppress dust?	Provision of mobile water sprinkler for dust suppression is being used.	No
		Whether construction and demolition debris is/was stored on site?	Not applicable	No
		Whether construction and demolition debris is disposed at authorized sites outside the project boundary?	Not applicable	No

SN.	Component	Environmental facet	On site scenario	Damage Identification
		Whether all workers working at the construction site and involved in loading, unloading, carriage of construction material and construction debris or Yes working in any area with dust pollution are/were provided with dust mask and other necessary PPEs?	Yes, all workers were provided PPE during the construct ion period.	No
		Whether location of the DG set and exhaust pipe height shall be as per the provisions of the CPCB norms?	DG sets are proposed with acoustic enclosure and appropriate stack height. The emission from DG sets will be discharged through stack of height 2 meter.	No
		Whether the activity has resulted into air pollution?	No	
6	Green Cover	Whether tree plantation is carried out on site?	The proposed project will have extensive plantation of 87 numbers of trees. Total area measuring around 584.31 sqm (around 33.87% of the total plot area) will be used as exclusive tree plantation area.	No
		Whether native trees are planted?	Yes	No
		Whether tree cutting as carried out with permission and compensatory plantation was observed?	No	No
7	Top soil preservation	Whether top soil is preserved for the landscape development?	Top soil had been preserved at the time of construction	No
		Whether the activity has resulted in soil pollution?	No	No
8	Transport	Whether traffic calming measures are/were taken?	Yes	No

SN.	Component	Environmental facet	On site scenario	Damage Identification
		Whether Roads are designed with due consideration for environment, and safety of users?	Yes	No
		Whether parking is provided as per local norms?	No	No
9	Socio-economic	Whether any direct impact (positive and/or negative) on community occurred due to violation activity?	No	No
		Whether any in-direct impact (positive and/or negative) on community occurred due to violation activity?	No	No
10	Natural resource utilization	Whether any direct impact (positive and/or negative) on natural resources like surface water, underground water, forest area, air, noise, land and biodiversity occurred due to violation activity?	Violation activity does not have any impact on surface water, underground water, forest area and biodiversity etc. However proper measures are being taken to reduce the impact on air and noise which are as follows: • Regular noise monitoring to maintain the noise level within the levels prescribed by CPCB during day and night time • Provision of ear plugs to workers • Use of high efficiency mufflers • No noise polluting work in night shifts • Provision of barricades along the periphery of the site • Tree Plantation • Proper measures to control dust as described above	No

Table 0.12: Identification of Ecological or Environmental Damage in context to actual general and specific conditions for both phases which are generally put while granting the Environmental clearances

SN	Description	Whether Compliance done	Proof for compliance	Identification of Damage (if any)
• **Statutory permissions**				
Compliance with the conditions of NOC /Clearance obtained from :				
•	Environmental Clearance	Not obtained	--	Yes
•	CRZ clearance	Not applicable	Not applicable	No
•	Forest Conservation Act, 1980	Not applicable	Not applicable	No
•	Wildlife (Protection) Act, 1972	Not applicable	Not applicable	No
•	Competent Authority for Land use change	Yes	The site has been converted into industrial land	No
•	Local planning authority	No	Approved land of **0.43 Acre** at R.S. Plot No 407; L.R. Plot No 550; Mouza – Binnaguri, Village – Gokul Vita, Pargana – Baikunthapur, Dist – Jalpaiguri, West Bengal, PIN: 735135.	No
•	Consent to Establish from SPCB / DIC	Yes	--	No
•	Consent to Operate (CTO)from SPCB	No	--	Yes
•	Civil Aviation Department	Not Applicable	--	No
•	High-rise Clearance	Not Applicable	--	No
•	Fire Department	No	NOC will obtained	Yes
•	Competent Authority for Shifting/ realignment of Transmission lines	Not applicable	Not applicable	No
•	Nalla remarks	Not applicable	Not applicable	No

SN	Description	Whether Compliance done	Proof for compliance	Identification of Damage (if any)
•	Competent Authority for structural stability	Yes	Factory licence obtained	No
•	Assured water supply connections	Yes	Water withdrawal permission has been obtained	No
• **Construction precautions and Labor Safety**				
•	Site barricades	Yes	Sheet fence which acts as a dust and noise barrier was provided all around the construction site.	No
•	First Aid Room	Yes	--	No
•	Facilities such as fuel for cooking, mobile toilets, safe drinking water, medical health care, crèche, etc. for residential labor	Yes	--	No
•	Provision of PPE to construction workers	Yes	--	No
•	Safety educational and awareness programme for construction workers	Yes	--	No
•	Proper arrangements for firefighting	Yes	--	No
•	Disaster Management Plan	Yes	--	No
• **Land Environment : Solid/ Hazardous waste Management**				
1.	Ensuring minimum cutting filling and retention of natural site levels	No		No
2.	No development on hill top hill slope	Not Applicable	Not Applicable	No
3.	Preservation of top soil for its use in horticulture/ landscape development within the project site.	Not Applicable	Not Applicable	No
4.	Proper collection & disposal/ recycling and management of	Not Applicable	Not Applicable	No

SN	Description	Whether Compliance done	Proof for compliance	Identification of Damage (if any)
	debris/ muck/ excavation material/ construction waste			
5.	Proper collection & disposal/ recycling and management of E waste/ hazardous waste generated during construction & operation phase	Yes	**During Construction Phase** : **E-waste**: Not Applicable **Hazardous waste**: Designated storage for Hazardous wastes and its disposal to authorized common hazardous waste disposal site for further treatment and disposal in TSDF Haldia.	No
6.	Proper collection & disposal/ recycling and management for biodegradable and non-biodegradable garbage during operation phase	Not Applicable	Not Applicable	No
7.	Prevention of oil leaks by regular repair/ maintenance of machineries	Yes	--	No
• **Water Environment : Water conservation, reuse and waste water treatment recycling**				
•	Permission of CGWB / SWID for ground water withdrawal during construction/ operation phase of the project	Yes	--	No
•	Reduction of Water demand during construction	No	--	No
•	Prohibiting the contamination of water courses or ground water by silt, sediments or Construction spoils including bituminous material and other hazardous materials	No	--	No

SN	Description	Whether Compliance done	Proof for compliance	Identification of Damage (if any)
•	Adequate capacity of Storm water drains and its management through proper channelization and timely maintenance	Not Applied	--	No
•	Provision of Low flow fixtures for showers, toilet flushing and drinking	No	---	No
•	Dual plumbing system for reuse of treated water from STP	Yes	--	No
•	Soil and ground water samples have been tested to ascertain that there is no threat to ground water quality by leaching of heavy metals and other toxic contaminants	Yes	Lab analysis report is attached as Annexure II	No
•	Rainwater harvesting plan	Yes	---	No
•	Pre-treatment to remove suspended mater, oil and grease before recharging the surface run off.	Not applied	---	No
•	Use of collected roof top rain water and its re-use as per CGWB and BIS standards for various applications.	Not applied	--	No
•	Treatment of Sewage in STP upto tertiary level with disinfection.	Not applied	---	No

SN	Description	Whether Compliance done	Proof for compliance	Identification of Damage (if any)
	Regular Operation and Maintenance of STP			
•	Proper arrangement for sludge handling and disposal	Not applied	--	No
•	Necessary measures should be made to mitigate the odour problem from STP.	Not applied	--	No
•	Maintaining disposal standards of sewage as per EP Act.	Not applied	---	No
•	Use of Treated sewage for cooling tower make-up water/ flushing/ horticulture within building premises	Not applied	---	No
	• **Air Environment**			
A.	Use of Ready mixed concrete in building construction.	Not applied	--	No
B.	Hiring Vehicles with valid PUC and conforming to applicable air and noise emission standards their plying only during non-peak hours.	Yes	--	No
C.	Ensuring smooth flow of traffic within premises to avoid traffic congestion and pollution	Yes	Traffic movement plan is given in section 3.10 of chapter 3of the EIA report.	No
D.	Water sprinkling for dust suppression on site	Yes	--	No
E.	Use of low Sulphur diesel type which conforms to Environmental (Protection) prescribed for air and noise emission standards	Yes	--	No

SN	Description	Whether Compliance done	Proof for compliance	Identification of Damage (if any)
F.	Gaseous emissions from DG to be dispersed through adequate stack height as per CPCB standards.	Yes	The emission from DG sets will be discharged through stack of height 2 meter of 63KVA.	No
G.	Acoustic enclosure to the DG sets to mitigate the noise pollution.	Yes	Inbuilt Acoustic enclosure	No
H.	Monitoring of incremental pollution loads on the ambient air and noise level Adequate measures to reduce ambient air and noise level during construction phase, so as to conform to the stipulated standards by CPCB.	Yes	Lab report is attached as **Annexure II**	No
	• **Biological Environment**			
1.	Site away from any national park or biosphere reserve or any forest	yes	No such areas are on/ adjacent/ nearby to site	No
2.	Site not housing any areas which are important or sensitive for ecological reasons, Wetlands, watercourses or other water bodies, mountains etc. are not located adjacent or nearby site	Yes	No such areas are on/ adjacent/ nearby to site	No
3.	Retention of existing trees	There was no tree in the site	--	No
4.	Transplantation of existing trees	Not applied	--	No
5.	Plantation of new trees of local variety is done as per norms	Yes	Around 87 Nos. of trees of various varieties on ground has been planted.	No
6.	Provision of green belt of the adequate width and density preferably with local species along	Yes		No

SN	Description	Whether Compliance done	Proof for compliance	Identification of Damage (if any)
	the periphery of the plot so as to provide protection against particulates and noise			
7.	Rare, threated or endangered species of flora or fauna are not found on site	No	No such species are found on/ adjacent/ nearby to site	No
	• **Energy Saving**			
1.	Reduction in Use of glass up-to 40% to reduce the electricity consumption and load on air-conditioning.	Not Applicable	Not Applicable	No
2.	Use high quality double glass with special reflective coating in windows.	Not Applicable	--	--
3.	Insulation of Roof to meet perspective requirement as per Energy Conservation of Building Code	Not Applicable	--	No
4.	Conventional Energy conservation measures like installation of LEDs, Energy efficient chillers & pumps, motors, VFD, etc	Not Applicable	--	No
5.	Use of renewable energy like solar energy	Not Applicable	--	No
6.	Use of natural lighting in the building	Not Applicable	--	No
7.	Monitoring of Compliance of energy conservation measures	Not Applicable	--	--

➢ **Assessment of Damage and Damage Control Plan:**

Now as damage due to this project is identified next step is to assess these damage and suggestion of damage control plan. This is explained in the following table.

Table 0.13: Assessment of Damage and Damage Control Plan

SN	Identification of damage w.r.t. Table No. 4 & 5	Identified Damage	Assessment of Damage	Damage Control Plan
A	**Statutory permissions:**			
i	Environmental Clearance from SEIAA, Consent to Establish Consent to Operate from SPCB	Compliance of EPA Act, Air & Water Act	Not obtained Environmental Clearance, Consent to Establish and Consent to Operate for expansion.	Application for Environmental Clearance as per provisions stipulated under the Notification vides F.No. 22-21/2020-IA.III dated 7th July 2021 by MoEF & CC is being done.
B	**Energy**			
i.	Whether renewable Energy is installed to meet electricity generation equivalent to 1% of the demand load?	Not Applied	Not applied	Not applied
ii.	Whether Solar water heating is provided to meet 20% of the hot water demand?			
D	**Air Environment**			
iii.	Monitoring of incremental pollution loads on the ambient air and noise level Adequate measures to reduce ambient air and noise level during construction phase, so as to conform to the stipulated standards by CPCB.	The PM_{10}, $PM_{2.5}$ and Noise Level Monitoring results shows that the project site is as per standard of NAAQ, 2009	Assessment of Ecological damage, remediation plan and Natural Community Resource Augmentation Plan	• Water sprinkling • Internal roads were paved for dust suppression • Development of green belt around the project

After deciding the damage control plan it is easier to decide the cost towards its Remediation or Natural and Community Resource Augmentation. This is explained in the following section:

Natural and Community Resource Augmentation Plan (NCRAP)

As per the Govt of WB guideline vide Letter No. 1312/EN/T-II-1/052/2016 dated 30/05/2018, as the project proponent has not applied to SEIAA for Environmental Clearance prior to taking up construction, the NCRAP budget will be 2% of total project cost. Total project cost of this project is Rs.82 Lakhs. Accordingly the NCRAP budget will be 2% of Rs.82 Lakhs i.e **Rs. 164,000/-** is to be earmarked for Remediation plan, Natural Community Resource Augmentation Plan. It may include some of the following activities:

Resource Augmentation Plan

The specific resource augmentation plan with budget would be prepared in accordance with the directive of May 30, 2018 of the Department of Environment, Govt. of WB. It may include some of the following activities:

- Improvement of local solid waste management facilities e.g. installation of composters for municipal/panchayet market areas with specific consent letters from the respective municipalities/panchayet body.
- Improvement and maintenance of water bodies.
- Plantation in surrounding areas/ development of parks/playground
- Drinking water, sanitation or solid waste management facilities for the local community
- Any other project for improving environment.

Final heads or way of implementation will be decided as per valuable instruction of the SEAC committee members.

7.11. PENALTY PROVISION

As per the Office Memorandum of MOEFCC vide F. No. 22.21/2020-IA.III dated 7th July, 2021 for Standard Operation Procedure (SOP) for Identification and handling of violation cases under EIA Notification 2006 in compliance to order of Honble National green Tribunal, the violation category will be ***'New Projects where Operations has not commenced'***. So the penalty amount will be 1% of the project cost.

As declared by HSCC total project cost of this project is Rs.82 Lakhs. Accordingly the NCRAP budget will be i.e. (**1.0% of Rs. 82 Lakhs). = Rs. 82,000 (Eighty two thousand only).**

CHAPTER 8 - PROJECT BENEFITS

It is seen that the Project is aimed to fulfil the objective of Sustainable Development. It will improve economic status of the nearby area in the district.

8.1. IMPROVEMENTS IN THE PHYSICAL INFRASTRUCTURE

This Project will improve the physical infrastructure of this area:

- The industry is dependent on raw materials and helping chemicals, which arrives by road. The finished goods will be dispatched by road. All the labour force will come by road. The proponents will assist the administration to maintain the roads in good conditions. This improved physical infrastructure will be an added facility to the community for surface transport.
- It will absorb some portion of the CO_2 produced by fuel burning created by process. It is proposed to use treated domestic wastewater for green area development. Canopy of trees will arrest dust fugitive SPM as well as the noise.

8.2. IMPROVEMENTS IN THE SOCIAL INFRASTRUCTURE

The Project will aid in the improvement of the social infrastructure of this area:

- PP will employ local labour without discrimination, wherever feasible. The Proponent's management keeps the transparent account.
- Education level goes along with flow of funds and avenue of livelihood. Dependence on Government subsidy also goes along with political stability of the area. The level of education and literacy (especially rural women) is very poor, needing improvement. This activity by this Proponent will certainly play a catalytic role in this.
- Likewise the health level goes along with flow of funds and avenue of livelihood. Dependence on Government institutes like PHC (Primary Health Centre) also goes along with political stability of the area. The level of health and medication (especially children and women) is very poor, needing improvement. This activity by this Proponent will certainly play a catalytic role in this.
- Health awareness and economic independence may also help in Family Planning decision-making.
- Living in harmony is an important aspect of the society. This can happen only if all the components are comfortably placed. Persons engaged in their respective vocation and accruing job satisfaction leads to this. This will become possible by this venture.

8.3. EMPLOYMENT POTENTIAL – SKILLED, SEMI-SKILLED AND UNSKILLED

The industry and its supporting activity need many types of people right from manual to managerial strength, in a pyramid. The raw material growing may need unskilled workers with people on tractors and tractor repairers as skilled ones. So in manufacturing activity all three types i.e. skilled, semi-skilled and unskilled people are required. The overall potential including the garages, loading-unloading actions, eateries, small repair shops, etc is essential.

The local people can get a good share out of this. If the second generation local people acquire that skill, they too will be able to fill the gap and accrue benefit of higher jobs.

8.4. SOCIAL ENVIRONMENT DEVELOPMENT ACTIVITY

The company has a defined Social Environment Development Policy which guides all the related activities. Company personnel will visit the nearby area and interact with various strata to understand the requirements and shortcomings. Based on the information collected from the visits, and discussion during Public Hearing Social Environment Development programme will been made, containing a list of activities.

8.5. OTHER TANGIBLE BENEFITS

Both tangible and non-tangible benefits will result from this activity and many of those are described above. Apart from direct employment, many other benefits will accrue like

- Water scarcity control by rain-water arresting and harvesting
- Groundwater level enhancing by recharging
- Time saving by quicker transport
- Aesthetics improvement by general greening with emphasis on biodiversity
- Strengthened democratic set-up will bring weight age to secure better school-subsidy and health-institutes
- Improved safety-security in surrounding with better Law and Order.

CHAPTER 9 – ENVIRONMENT COST BENEFIT ANALYSIS

9.1. FINANCIAL AND SOCIAL BENEFITS WITH SPECIAL EMPHASIS ON THE BENEFITS TO THE LOCAL PEOPLE INCLUDING TRIBAL POPULATION, IF ANY, IN THE AREA.

The technical feasibility and financial viability of the project has been reviewed with reference to the proposed project with reference to overall company as a whole. Our review has been done on the basis of the present scenario and documents made available to us by the company. We have made the assessment a fresh and made the change sin assumptions wherever felt required.

Based on our analysis it may be inferred that

- ✓ The project is technically feasible and financially viable.
- ✓ The overall financial liquidity and profitability parameters of the project appeared to be reasonable and satisfactory.
- ✓ We conclude the capital expenditure of the company as available option subject to the weakness and threats associated with a business venture.
- ✓ The operation of plant has significant positive impact on the socio-economic environment of the area. It helps to sustain the development of this area including further development of physical infrastructure facilities.

In the interest of development and improve the social conditions of the local habitants this project should be allowed after consider in gall the environment aspects.

CHAPTER 10 - ENVIRONMENT MANAGEMENT PLAN (EMP)

10.1. INTRODUCTION:

The management of **M/s Sawariya Chemical** will take all the necessary steps to control and mitigate the environmental pollution in the planning stage of the project. While implementing the project **M/s Sawariya Chemical** will follow guidelines specified by CPCB under the Corporate Responsibility for Environmental Protection (CREP) for proposed unit. The EMP task will likely be administered by the "Health, Safety and Environment (HSE) Department", who will have the authority where necessary to "stop the job" if an environmentally detrimental activity is being conducted. The EMP operation/implementation will be the responsibility of the "HSE Officer", who will be coordinating, arranging the collection and reporting of the results of all emissions, ambient air quality, noise and water quality monitoring etc.

10.2. OBJECTIVES:

- To define the components of environmental management.
- To prepare an environmental hierarchy.
- To prepare a checklist for statutory compliance.
- To prepare environmental organization.
- To prepare a schedule for monitoring and compliance.

10.3. CHECKLIST OF STATUTORY OBLIGATIONS

There are a number of environmental statutes required to be attained by the industries. **M/s. Sawariya Chemicals** shall obey the provisions of all relevant Acts, Rules, Notifications and Orders. The checklist of these obligations, which facilitates the obedience of the laws of land are given below:

- Water (Prevention and Control of Pollution) Act, 1974;
- Water (Prevention and Control of Pollution) Cess Act, 1977;
- Air (Prevention and Control of Pollution) Act, 1981;
- Environment (Protection) Act, 1986;
- Environment (Protection) Rules, 1986;
- Hazardous Waste (Management and Handling) Rules 2003;
- EIA Notification'2006 and subsequent amendments
- Consent from SPCB

10.4. ENVIRONMENT MANAGEMENT CELL

Environmental Management Cell will be supervised and controlled by an independent Plant Manager supported by a team of technically qualified personnel apart from other operating staff. Organization structure of the Environment Management Cell is presented in below **Figure 10.1.**

It will be the responsibility of this Cell to supervise the monitoring of environmental attributes viz. ambient air quality, water and effluent quality, noise level etc either departmentally or by appointing external agencies wherever necessary. In case the monitored results of environmental contaminants are found to exceed the standard limits, the Environmental Management Cell will suggest remedial measures and get them implemented.

The functions of Environmental Management Cell will be as follows:

- Obtaining Consent Order from the State Pollution Control Board.
- Environmental monitoring.
- Analysis of environmental data, preparation and submission of reports to statutory authorities, Corporate Centre etc.
- Co-ordination with statutory bodies, functional groups of the station, head office etc.
- Interactions for evolving and implementation of modification programs to improve the availability/ efficiency of pollution control devices / systems.
- Conducting Environmental Appraisal (Internal) and Environmental Audit

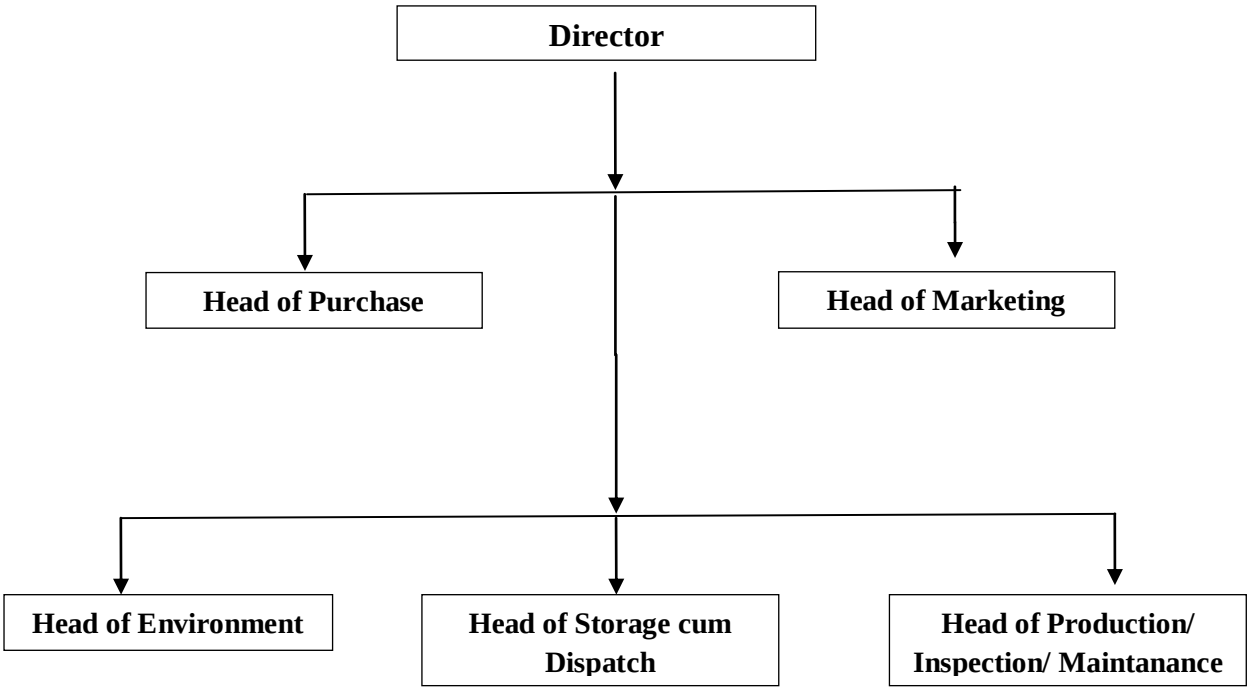


Figure 10.1: Environment Management Cell Structure

10.5. ENVIRONMENT MANAGEMENT PLAN DURING CONSTRUCTION PHASE

M/s Sawariya Chemical is willing to produce three types of synthetic resin i.e. Urea-Formaldehyde Resin (U-F Resin), Phenol-Formaldehyde Resin (P-F Resin) and Melamine-Formaldehyde Resin (M-F Resin). The production capacity of U-F Resin will be 10 Ton/day and P-F & M-F Resin will be 20 Ton/day each.The total plot area of the unit is of **0.43 Acre** at R.S. Plot No 407; L.R. Plot No 550; Mouza – Binnaguri, Village – Gokul Vita, Pargana – Baikunthapur, Dist – Jalpaiguri, West Bengal.

10.6. OBJECTIVES:

- To define the components of environmental management.
- To prepare an environmental hierarchy.
- To prepare a checklist for statutory compliance.
- To prepare environmental organization.
- To prepare a schedule for monitoring and compliance.

Sanitation:

Adequate and suitable sanitation facility will be provided during the construction phase to maintain proper hygiene for construction workers during working hours. These facilities shall include water supply, bath toilets, etc.

Noise:

Though the noise effect on the nearest inhabitants due to construction activity will be negligible (being away) it is advisable that on site workers using high noise equipment adopt noise protection devices like earmuffs.

Construction Equipment and Waste:

It shall be ensured that both gasoline and diesel powered construction vehicles are properly maintained to minimize smoke in the exhaust emissions. The vehicle maintenance area shall be located in such a manner to avoid sources by accidental spillage of oil. Unauthorized dumping of waste oil should be prohibited. Wastes shall be disposed of at an approved site.

Site Security:

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

10.7. ENVIRONMENT MANAGEMENT PLAN DURING OPERATION PHASE

10.7.1 AIR ENVIRONMENT

The main source of air pollution will be the flue gas from Vertical Boiler (300 kg/kr) that contains PM, SO_2 and NO_x as air pollutants. The fugitive emissions are likely to arise during various stages of operations. Probable pollutant from the unit will be PM, SO_2 and NO_x. Following air pollution control measures will be followed to control air pollution-

- For the control of emissions, adequate air pollution control systems and for proper dispersion of pollutants, adequate stack height of 30m will be provided
- Main source of flue gas generation will be Vertical boiler, and DG Set(63 KVA).Adequate stack height will be provided for the control of emissions
- There will also be provision of adequate ventilation system in process plant and hazardous chemical storage area.
- A regular preventive maintenance will be planned to replace or rectify all gaskets, joints etc.

- The unit will also develop green belt within the factory premises to control the fugitive emission from spreading into surrounding environment.

Fugitive Emission Management

The following measures will be adopted to control the fugitive emissions:

- All vehicles and their exhausts will be well maintained and will be regularly monitored for emission generated from the vehicle exhaust;
- The green belt development on periphery

Stack Gas Monitoring

The emissions from the stack will be monitored continuously for exit concentration of the suspended particulate matter, SO_2 µg/m^3 and NOx µg/m^3. Sampling ports will be provided in the stacks as per CPCB guidelines. If the concentration of these pollutants exceeds the limits, necessary control measures will be taken.

10.7.2 NOISE ENVIRONMENT

The design features provided to ensure low noise levels are as given below:

- All rotating items will be well lubricated and provided with enclosures as far as possible to reduce noise transmission. Vibration isolators will be provided to reduce vibration and noise wherever possible
- Manufacturers and suppliers of machine/equipment will be manufactured as per OSHA/ MoEF guidelines.
- The insulation will be provided to reduce noise.
- The personnel safety such as ear muffs, ear plugs and industrial helmets will also act as a noise reducers will be provided workers.
- Layouts of equipment foundations and structures will be designed keeping in view the requirement of noise abatement;
- Central control room(s) provided for operation and supervision of plant and equipment will be air-conditioned, glass fiber insulated frames which will help in reducing noise levels. Necessary enclosures will also be provided on the working platforms/areas to reduce the noise levels ;
- Acoustic laggings and silencers will be provided in equipment wherever necessary. The compressed air station will be provided with suction side silencers. Ventilation fans will be installed in enclosed premises
- The silencers and mufflers of the individual machines will be regularly checked
- The noise level will not exceed the permissible limit 75 dB (A) during the day time 70 dB (A) night time within the plant premises. Green belt around the plant area will reduce the noise level further.

The adoption of the above measures, it is anticipated that noise levels will be maintained in 45-50 dB (A) range at the boundary of the plant premises. Plantations on the periphery of the plant would further attenuate noise level.

10.7.3 WATER ENVIRONMENT

The total water requirement will be around 7.78 KL per day, out of which 0.68 KL will be used for domestic purpose from where around 0.48 KL sewage water will be generated which will be flowed to septic tank followed by soak pit. For industrial use, around 4.29 KL water will be required out of which 2.02 KL will be used in production process, 0.87 KL will be used in boiler, 0.7 KL will be required for cooling water makeup and around 0.7 KL will be used for kettle washing.

Around 1.3 KL waste water is expected to be generated from boiler blow down & cooling tower blow down, which will be stored in a storage tank and will be reused for greenbelt development & dust suppression. Effluent generated from the kettle washing (around 0.7 KLD) will be reused in the process. So there will be no discharge of waste water.

10.7.4 GREEN BELT DEVELOPMENT PLAN

10.7.4.1. Objective

The potential value of vegetation in controlling air pollution has been well recognized. Trees can filter particulates and are effective pollutant sink. Vegetation also reduces noise level and regulates the oxygen balance in the area by consuming released carbon di-oxide. Development of green belt will include plantation of trees along boundary wall of the factory, roads, raw material yards and other available spaces.

The main purpose of green belt development is to contribute to the following factors:

- To attenuate noise levels generated from the plant;
- To improve the aesthetics of the plant area;
- To trap the vehicular emissions and fugitive dust emissions.
- To maintain ecological homeostasis.
- To prevent soil erosion and to protect the natural vegetation; and
- To utilize the treated effluents.

10.7.4.2. DESIGN OF GREEN BELT

The unit proposes to have a green belt programme for the proposed plant. The green belt will be developed on an area of 584.31sq m of land which is about 33.87% of the entire project area. As far as possible the following guidelines will be considered in green belt development. Shrubs and trees will be planted in encircling rows around the project site.

- The short trees will be planted in the first two rows of the greenbelt. The tall trees will be planted in the outer three rows.
- Planting of trees in each row, will be in staggered orientation.
- Since the trunks of the tall trees are generally devoid of foliage, it will be useful to have shrubs in front of the trees so as to give coverage to this portion.

- The spacing between the trees will be maintained slightly less than the normal spaces, so that the trees may grow vertically and slightly increase the effective height of the green belt.

10.7.4.3. PLANT SPECIES FOR GREEN BELT

While selecting the plant species for the proposed green belt, the following points are taken into consideration:

- Should be a fast growing type;
- Should have a thick canopy cover;
- Should be perennially green;
- Should be preferably of native origin; and
- Should have a large leaf area index.

Criteria for selection of species

Species to be selected should fulfil the following specific requirements of the area:

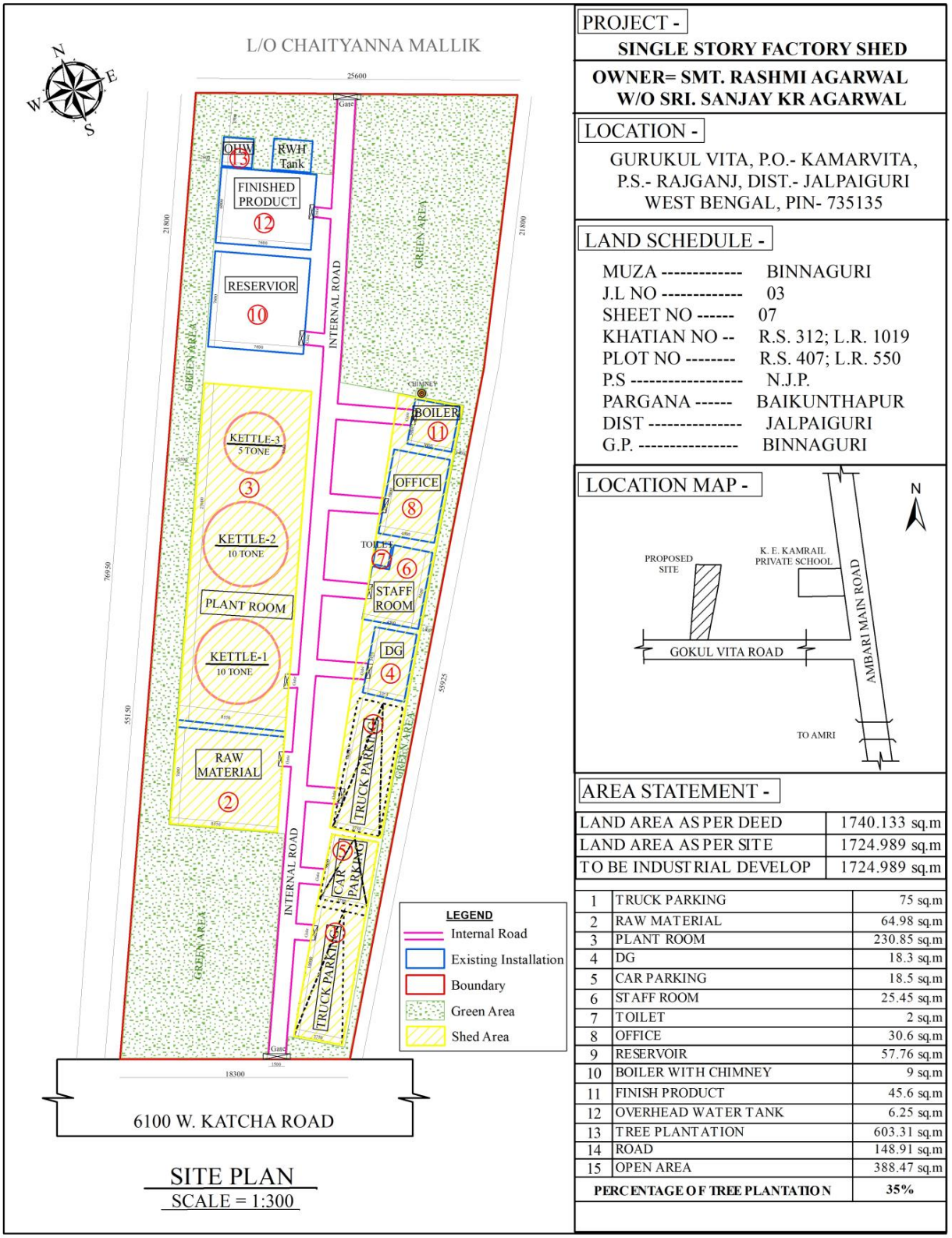
- Tolerance to specific conditions or alternatively wide adaptability to eco-physiological conditions;
- Rapid growth;
- Capacity to endure water stress and climate extremes after initial establishments;
- Differences in height and growth habits;
- Pleasing appearances;
- Providing shade and
- Improving waste lands.

Recommended Species for plantation

Based on climate and soil characteristics of the study area, some species are recommended for plantation. Out of the total plant area, around 33.87 % i.e 584.31 sq.m will be dedicated for plantation. Around 87 trees (@1500 nos. of tree per hectares) will be planted in the proposed green development area. A budget of Rs. 30,000 has been allotted for greenbelt development. The Layout plan showing the green belt Area is shown in **Figure 10.2.** The recommended species for plantation are given below:

Table 10.1: List of Green Belt Trees

Sl No.	Common Name	Scientific Name	Total
1	Simul	*Bombax ceiba*	7
2	Mango	*Mangifera indica*	8
3	Guava	*Psidium guajava*	6
4	Gamari	*Alsoniascholaris*	5
5	Sisoo	*Citrus limon*	7
6	Palash	*Butea monosperma*	8
7	Aswatha	*Ficus religiosa*	10
8	Indian Bael	*Aegle marmelos*	4
9	Neem	*Azadirachta indica*	5
10	Kadam	*Neolamarckiacadamba*	7
11	Devdaru	*Polyalthia longifolia*	9
12	Arjun Tree	*Terminalia arjuna*	8
13	Shal	*Alstoniascholaris*	3
Total			**87**



PROJECT -

SINGLE STORY FACTORY SHED

OWNER= SMT. RASHMI AGARWAL
W/O SRI. SANJAY KR AGARWAL

LOCATION -

GURUKUL VITA, P.O.- KAMARVITA,
P.S.- RAJGANJ, DIST.- JALPAIGURI
WEST BENGAL, PIN- 735135

LAND SCHEDULE -

MUZA ----------	BINNAGURI
J.L NO ----------	03
SHEET NO ------	07
KHATIAN NO --	R.S. 312; L.R. 1019
PLOT NO --------	R.S. 407; L.R. 550
P.S ----------	N.J.P.
PARGANA ------	BAIKUNTHAPUR
DIST ----------	JALPAIGURI
G.P. ----------	BINNAGURI

LOCATION MAP -

AREA STATEMENT -

LAND AREA AS PER DEED	1740.133 sq.m
LAND AREA AS PER SITE	1724.989 sq.m
TO BE INDUSTRIAL DEVELOP	1724.989 sq.m

1	TRUCK PARKING	75 sq.m
2	RAW MATERIAL	64.98 sq.m
3	PLANT ROOM	230.85 sq.m
4	DG	18.3 sq.m
5	CAR PARKING	18.5 sq.m
6	STAFF ROOM	25.45 sq.m
7	TOILET	2 sq.m
8	OFFICE	30.6 sq.m
9	RESERVOIR	57.76 sq.m
10	BOILER WITH CHIMNEY	9 sq.m
11	FINISH PRODUCT	45.6 sq.m
12	OVERHEAD WATER TANK	6.25 sq.m
13	TREE PLANTATION	603.31 sq.m
14	ROAD	148.91 sq.m
15	OPEN AREA	388.47 sq.m
PERCENTAGE OF TREE PLANTATION		**35%**

Figure 10.2: Layout Plan showing green belt area

10.8. RAIN WATER HARVESTING

Rain water will be collected from the roof of sheds and office building. The same will be directed towards the proposed water storage tank of capacity 15 Cu.M will be sufficient as daily fresh water demand is 5.78 KLD. The water from this tank shall be used in sprinkling for dust suppression and gardening purpose. The overflow, if any, from the tank shall be discharged through the seaware line. Calculation of Rain Water Harvesting potential is mentioned below:

Table 10.2: Rain Water harvesting potential calculation

Catchment area	Area in Sq. m.	Rainfall in m	Runoff coefficient	Total runoff generated (Cu.M /annum)
Roof Top of building/Shed/	334.5	3.4	0.85	933.705
Open Land	344.55	3.4	0.20	234.294
Green Belt	584.31	3.4	0.15	297.998
Total Rain water collection area (sq.m)	**1263.36**	**Total Quantum of available runoff (cum/y)**		**1499**

10.9. OCCUPATIONAL HEALTH AND SAFETY

All precautionary methods will be adopted by the company to reduce the risk of exposure of employees to occupational safety and health hazards. Pre & post medical check-ups will be done of all the employees. Employees will be regularly examined and the medical records will be maintained for each employee. Pulmonary function test and periodical medical check-up shall be done once in every year. The following tests shall be conducted for each worker.

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

For the safety of workers, personnel protective appliances like hand gloves, goggles, aprons, ear mufflers, nose mask etc. will be provided. Nose mask will be provided at places, where there is possibility of dust generation. In high noise generation areas ear mufflers will be provided for the workmen. Proper ventilation system will be provided in the process area.

10.10. BUDGETARY PROVISION FOR ENVIRONMENTAL MANAGEMENT PLAN

Table 10.3: EMP Budget

S.N.	Particulars	Amount in INR Lakhs	
		Capital Cost	Recurring Cost
1	Air Pollution Control System	3.0	1.0
2	Noise Control System	2.0	0.2
3	Green Belt Development	2.5	1.0
4	Environment Monitoring and Management	4.0	1.0
5	Water Pollution Control System	2.0	0.5
6	Occupational Health & Safety	1.0	0.3
	Total	**14.5**	**4.0**

10.11 BUDGET FOR CORPORATE ENVIRONMENT RESPONSIBILITY (NEED BASED ACTIVITY)

*The proponent proposes to invest 1.64 lakhs (~2% of the project cost) over a period of next 3 years, to be considered for implementing the activities in the context of the local scenario of the area as a part of EMP. Proposed Heads are as below-

Table 10.4: Budget for Social Environment Development

SN	Proposed Activity (Heads may vary as per demand analysis during PH and Recommendation of SEAC)	Investment (In Lacs)			Total
		1st Year	2nd Year	3rd Year	
1	Construction of Solid Waste management facility in nearby area	0.3	0.3	0.3	0.9
2	Road development in nearby area	0.2	0.2	0.34	0.74
	Total	**0.5**	**0.5**	**0.64**	**1.64**

CHAPTER 11 – CONSULTANT ENGAGED

11.1 CONSULTANTS ENGAGED

This EIA report is prepared on behalf of the proponents, taking inputs from proponent's office staff, Architects, Project Management Professionals etc. by Environmental Consultants **M/s. Ultra-Tech Environmental Consultancy and Laboratory, Thane**.

M/s Ultra-Tech Environmental Consultancy and Laboratory:

Ultra-Tech Environmental Consultancy and Laboratory [Lab Gazetted by MoEFCC – Govt. of India] not only give environmental solutions for sustainable development, but make sure that they are economically feasible. With innovative ideas and impact mitigation measures offered, make them distinguished in environmental consulting business. The completion of tasks in record time is the key feature of Ultra-Tech. A team of more than hundred environmental brigadiers consists of engineers, experts, ecologists, hydrologists, geologists, socio-economic experts, solid waste and hazard waste experts apart from environmental media sampling and monitoring experts and management experts , strive hard to serve the clients with up to mark and best services.

Ultra-Tech offers environmental consultancy services to assist its clients to obtain environmental clearance for their large buildings, construction, CRZ, SEZ, high rise buildings, township projects and industries covering sugar and distilleries from respective authorities.

Ultra-Tech also provide STP/ETP/WTP project consultancy on turn-key basis apart from Operation and Maintenance of these projects on annual contract basis. Also, having MoEFCC approved environmental laboratory, Ultra-Tech provide laboratory services for monitoring and analysis of various environmental media like air, water, waste water, stack, noise and meteorological data to its clients all over India and abroad.

Ownership of organization

Though, Ultra-Tech is a proprietorship firm, actually it is a confluence of environmental engineers, ecologists, geologists, hydrologists, socio-economic and management experts apart from environmental laboratory sampling and monitoring teams. The company is established in 1986 and celebrated 2011 as its silver jubilee year.

Table11.1: List of EIA Coordinator, Functional Area Experts & Associates:

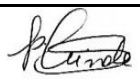
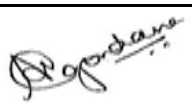
S. N	Name of Sector	Name of Project	Name of Client	EIA Coordinator		Functional Area Experts involved		
				Name/s	Signature	FA	Name/s	Signature
1.	5 (f), Synthetic Organic Chemicals Industry (Dyes and dye intermediates; bulk drugs and intermediates excluding drug formulations; Synthetic rubbers; Basic Organic chemicals, Other Synthetic Organic chemicals and chemical intermediates) (Category B)	Proposed Synthetic Resin Manufacturing Plant at R.S. Plot No 407; L.R. Plot No 550; Mouza – Binnaguri, Village – Gokul Vita, Pargana – Baikunthapur, Dist – Jalpaiguri, West Bengal.	**M/s Sawariya Chemical**	Mr. Adhikrao Govind Yewale		LU	Mr. Yogesh Raskar	
						SE		
						AP	Mr. Adhikrao Govind Yewale	
						WP		
						AQ		
						EB	Mrs. Padmini Sindhey	
						RH	Mrs. Ashwini Gangvir	
						SHW	Mrs. Dipa Tamhane Karnik	
						Team Members	Mr. Debasish Sengupta	
							Ms. Tuli Roy Chowdhury	

Table 11.2: Laboratory Details

NAME OF LABORATORY	SCOPE OF SERVICES	ACCREDITATION STATUS
Bharat foundation (Environmental Laboratory)	**Monitoring and Analysis of:** • Ambient Air Monitoring • Ground Water(Analysis) • Surface Water (Analysis) • Soil quality (Analysis) • Noise monitoring	Accredited by NABL Certificate No T-2226

STATE LEVEL ENVIRONMENT IMPACT ASSESSMENT AUTHORITY
Pranisampad Bhawan, 5th floor, LB 2, Sector-III, Salt Lake, Kolkata – 700 106
e-mail: environmentwb@gmail.com
Web Portal: www.environmentwb.gov.in

No. 1227 / EN / T – II – 1/ 028/ 2022 Date: 29th June, 2022

To
M/s. Sawariya Chemial,
Village : Gokul Vita,
P.O. Kamar Vita, P.S. N.J.P. Ambari,
Dist : Jalpaiguri, West Bengal.

Sub: ToR for doing EIA for the proposed Synthetic Resin (U-F, P-F and M-F) manufacturing plant at R.S. Plot No. 407, L.R. Plot No. 550, Mouza – Binnaguri, Village – Gokul Vita, Pargana – Baikunthapur, Dist : Jalpaiguri, West Bengal by M/s. Sawariya Chemical (Violation Case) (Proposal No. SIA/WB/IND3/74306/2022)

Sir,

This is to inform you that SEIAA in its meeting on 16.06.2022 considered your online application (vide Proposal No. SIA/WB/IND3/74306/2022) as well as the recommendations of SEAC for issuance of ToR and agreed with the recommendation including the additional conditions.

The ToR for conducting EIA study is attached herewith (annexure 1).

The ToR is valid for a period of 3 (three) years from the date of issue. EIA/EMP to be submitted before the expiry of the ToR for consideration of EC application or otherwise.

Enclo: Annexure 1

(K Balamurugan)
Member Secretary, SEIAA

No. 1227/1 / EN / T – II – 1/ 028/ 2022 Date: 29th June, 2022

Copy forwarded for the information to:

The Secretary, State Level Expert Appraisal Committee, 'Paribesh Bhavan', LA, Salt Lake Sector III, Kolkata- 700106

Member Secretary, SEIAA

A. STANDARD TERMS OF REFERENCE (TOR)

1) **Executive Summary – Annexure-A**

2) **Introduction**

i. Details of the EIA Consultant including NABET accreditation
ii. Information about the project proponent
iii. Importance and benefits of the project

3) **Project Description**

i. Cost of project and time of completion.
ii. Products with capacities for the proposed project.
iii. If expansion project, details of existing products with capacities and whether adequate land is available for expansion, reference of earlier EC if any.
iv. List of raw materials required and their source along with mode of transportation.
v. Other chemicals and materials required with quantities and storage capacities
vi. Details of Emission, effluents, hazardous waste generation and their management.
vii. Requirement of water, power, with source of supply, status of approval, water balance diagram, man-power requirement (regular and contract)
viii. Process description along with major equipment and machineries, process flow sheet (quantative) from raw material to products to be provided
ix. Hazard identification and details of proposed safety systems.
x. Expansion/modernization proposals:
   a) Copy of all the Environmental Clearance(s) including Amendments thereto obtained for the project from MOEF/SEIAA shall be attached as an Annexure. A certified copy of the latest Monitoring Report of the Regional Office of the Ministry of Environment and Forests as per circular dated 30th May, 2012 on the status of compliance of conditions stipulated in all the existing environmental clearances including Amendments shall be provided. In the project from SPCB shall be attached with the EIA-EMP report.
   b) In case the existing project has not obtained environmental clearance, reasons for not taking EC under the provisions of the EIA Notification 1994 and/or EIA Notification 2006 shall be provided. Copies of Consent to Establish/No Objection Certificate and Consent to Operate (in case of units operating prior to EIA Notification 2006, CTE and CTO of FY 2005-2006) obtained from the SPCB shall be submitted. Further, compliance report to the conditions of consents from the SPCB shall be submitted.

4) **Site Details**

i. Location of the project site covering village, Taluka/Tehsil, District and State, Justification for selecting the site, whether other sites were considered.
ii. A toposheet of the study area of radius of 10km and site location on 1:50,000/1:25,000 scale on an A3/A2 sheet. (including all eco-sensitive areas and environmentally sensitive places).
iii. Details w.r.t. option analysis for selection of site.
iv. Co-ordinates (lat-long) of all four corners of the site.
v. Google map-Earth downloaded of the project site.
vi. Layout maps indicating existing unit as well as proposed unit indicating storage area, plant area, greenbelt area, utilities etc. If located within an Industrial area/Estate/ Complex, layout of Industrial Area indicating location of unit within the Industrial area/Estate.

vii. Photographs of the proposed and existing (if applicable) plant site. If existing, show photographs of plantation/greenbelt, in particular.

viii. Land use break-up of total land of the project site (identified and acquired), government/private - agricultural, forest, wasteland, water bodies, settlements, etc. shall be included. (not required for industrial area)

ix. A list of major industries with name and type within study area (10km radius) shall be incorporated. Land use details of the study area

x. Geological features and Geo-hydrological status of the study area shall be included.

xi. Details of Drainage of the project upto 5km radius of study area. If the site is within 1 km radius of any major river, peak and lean season river discharge as well as flood occurrence frequency based on peak rainfall data of the past 30 years. Details of Flood Level of the project site and maximum Flood Level of the river shall also be provided. (mega green field projects)

xii. Status of acquisition of land. If acquisition is not complete, stage of the acquisition process and expected time of complete possession of the land.

xiii. R&R details in respect of land in line with state Government policy.

5) **Forest and wildlife related issues (if applicable):**

i. Permission and approval for the use of forest land (forestry clearance), if any, and recommendations of the State Forest Department. (if applicable)

ii. Land use map based on High resolution satellite imagery (GPS) of the proposed site delineating the forestland (in case of projects involving forest land more than 40 ha)

iii. Status of Application submitted for obtaining the stage I forestry clearance along with latest status shall be submitted.

iv. The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, the project proponent shall submit the map duly authenticated by Chief Wildlife Warden showing these features vis-à-vis the project location and the recommendations or comments of the Chief Wildlife Warden-thereon.

v. Wildlife Conservation Plan duly authenticated by the Chief Wildlife Warden of the State Government for conservation of Schedule I fauna, if any exists in the study area.

vi. Copy of application submitted for clearance under the Wildlife (Protection) Act, 1972, to the Standing Committee of the National Board for Wildlife.

6) **Environmental Status**

i. Determination of atmospheric inversion level at the project site and site-specific micrometeorological data using temperature, relative humidity, hourly wind speed and direction and rainfall.

ii. AAQ data (except monsoon) at 8 locations for PM10, PM2.5, SO2, NOX, CO and other parameters relevant to the project shall be collected. The monitoring stations shall be based CPCB guidelines and take into account the pre-dominant wind direction, population zone and sensitive receptors including reserved forests.

iii. Raw data of all AAQ measurement for 12 weeks of all stations as per frequency given in the NAQQM Notification of Nov. 2009 along with - min., max., average and 98% values for each of the AAQ parameters from data of all AAQ stations should be provided as an annexure to the EIA Report.

iv. Surface water quality of nearby River (100m upstream and downstream of discharge point) and other surface drains at eight locations as per CPCB/MoEF&CC guidelines.

v. Whether the site falls near to polluted stretch of river identified by the CPCB/MoEF& CC, if yes give details.
vi. Ground water monitoring at minimum at 8 locations shall be included.
vii. Noise levels monitoring at 8 locations within the study area.
viii. Soil Characteristic as per CPCB guidelines.
ix. Traffic study of the area, type of vehicles, frequency of vehicles for transportation of materials, additional traffic due to proposed project, parking arrangement etc.
x. Detailed description of flora and fauna (terrestrial and aquatic) existing in the study area shall be given with special reference to rare, endemic and endangered species. If Schedule-I fauna are found within the study area, a Wildlife Conservation Plan shall be prepared and furnished.
xi. Socio-economic status of the study area.

7) **Impact and Environment Management Plan**

i. Assessment of ground level concentration of pollutants from the stack emission based on site-specific meteorological features. In case the project is located on a hilly terrain, the AQIP Modelling shall be done using inputs of the specific terrain characteristics for determining the potential impacts of the project on the AAQ. Cumulative impact of all sources of emissions (including transportation) on the AAQ of the area shall be assessed. Details of the model used and the input data used for modelling shall also be provided. The air quality contours shall be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any.
ii. Water Quality modeling - in case of discharge in water body
iii. Impact of the transport of the raw materials and end products on the surrounding environment shall be assessed and provided. In this regard, options for transport of raw materials and finished products and wastes (large quantities) by rail or rail-cum road transport or conveyor cum-rail transport shall be examined.
iv. A note on treatment of wastewater from different plant operations, extent recycled and reused for different purposes shall be included. Complete scheme of effluent treatment. Characteristics of untreated and treated effluent to meet the prescribed standards of discharge under E(P) Rules.
v. Details of stack emission and action plan for control of emissions to meet standards.
vi. Measures for fugitive emission control
vii. Details of hazardous waste generation and their storage, utilization and management. Copies of MOU regarding utilization of solid and hazardous waste in cement plant shall also be included. EMP shall include the concept of waste-minimization, recycle/reuse/recover techniques, Energy conservation, and natural resource conservation.
viii. Proper utilization of fly ash shall be ensured as per Fly Ash Notification, 2009. A detailed plan of action shall be provided.
ix. Action plan for the green belt development plan in 33 % area i.e. land with not less than 1,500 trees per ha. Giving details of species, width of plantation, planning schedule etc. shall be included. The green belt shall be around the project boundary and a scheme for greening of the roads used for the project shall also be incorporated.
x. Action plan for rainwater harvesting measures at plant site shall be submitted to harvest rainwater from the roof tops and storm water drains and also to use for the various activities at the project site to conserve fresh water and reduce the water requirement from other sources.

xi. Total capital cost and recurring cost/annum for environmental pollution control measures shall be included.

xii. Action plan for post-project environmental monitoring shall be submitted.

xiii. Onsite and Offsite Disaster (natural and Man-made) Preparedness and Emergency Management Plan including Risk Assessment and damage control. Disaster management plan should be linked with District Disaster Management Plan.

8) **Occupational health**

i. Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers

ii. Details of exposure specific health status evaluation of worker. If the workers' health is being evaluated by pre designed format, chest x rays, Audiometry, Spirometry, Vision testing (Far & Near vision, colour vision and any other ocular defect) ECG, during pre-placement and periodical examinations give the details of the same. Details regarding last month analyzed data of above mentioned parameters as per age, sex, duration of exposure and department wise.

iii. Details of existing Occupational & Safety Hazards. What are the exposure levels of hazards and whether they are within Permissible Exposure level (PEL). If these are not within PEL, what measures the company has adopted to keep them within PEL so that health of the workers can be preserved,

iv. Annual report of health status of workers with special reference to Occupational Health and Safety.

9) **Corporate Environment Policy**

i. Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report.

ii. Does the Environment Policy prescribe for standard operating process / procedures to bring into focus any infringement / deviation / violation of the environmental or forest norms / conditions? If so, it may be detailed in the EIA.

iii. What is the hierarchical system or Administrative order of the company to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions? Details of this system may be given.

iv. Does the company have system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the company and / or shareholders or stakeholders at large? This reporting mechanism shall be detailed in the EIA report.

10) Details regarding infrastructure facilities such as sanitation, fuel, restroom etc. to be provided to the labour force during construction as well as to the casual workers including truck drivers during operation phase.

11) **Environment Management Plan (EMP)**

i. Adequate funds shall be earmarked towards Environment Management Plan based on Public Hearing issues and item-wise details along with time bound action plan shall be included. Socio-economic development activities need to be elaborated upon. The office Memorandum issued by the MoEF&CC vide F.No.22-65/2017-IA, III dated 30/09/2020 should be strictly followed.

12) Any litigation pending against the project and/or any direction/order passed by any Court of Law against the project, if so, details thereof shall also be included. Has the unit received any notice under the Section 5 of Environment (Protection) Act, 1986 or relevant Sections of Air and Water Acts? If so, details thereof and compliance/ATR to the notice(s) and present status of the case.

13) A tabular chart with index for point wise compliance of above TOR.

B. SPECIFIC TERMS OF REFERENCE FOR EIA STUDIES FOR SYNTHETIC ORGANIC CHEMICALS INDUSTRY (DYES & DYE INTERMEDIATES; BULK DRUGS AND INTERMEDIATES EXCLUDING DRUG FORMULATIONS; SYNTHETIC RUBBERS; BASIC ORGANIC CHEMICALS, OTHER SYNTHETIC ORGANIC CHEMICALS AND CHEMICAL INTERMEDIATES)

1. Details on solvents to be used, measures for solvent recovery and for emissions control.
2. Details of process emissions from the proposed unit and its arrangement to control.
3. Ambient air quality data should include VOC, other process-specific pollutants* like NH3*, chlorine*, HCl*, HBr*, H2S*, HF*, etc. (*-as applicable)
4. Work zone monitoring arrangements for hazardous chemicals.
5. Detailed effluent treatment scheme including segregation of effluent streams for units adopting 'Zero' liquid discharge.
6. Action plan for odour control to be submitted.
7. A copy of the Memorandum of Understanding signed with cement manufacturers indicating clearly that they co-process organic solid/hazardous waste generated.
8. Authorization/Membership for the disposal of liquid effluent in CETP and solid/hazardous waste in TSDF, if any.
9. Action plan for utilization of MEE/dryers salts.
10. Material Safety Data Sheet for all the Chemicals are being used/will be used.
11. Authorization/Membership for the disposal of solid/hazardous waste in TSDF.
12. Details of incinerator if to be installed.
13. Risk assessment for storage and handling of hazardous chemicals/solvents. Action plan for Handling & safety system to be incorporated.
14. Arrangements for ensuring health and safety of workers engaged in handling of toxic materials.

C. Additional ToR for violation projects :

1. Project description, its importance and the benefits.
2. Project site details (location on toposheet of the study area of 10m, coordinates. google Map, layout map land use geological features and geo-hydrological status of the study area, drainage),
3. Land use as per the approved Master Plan of the area. Permission/approvals required from the land owning agencies. Development Authorities, Local Body, Water Supply & Sewerage Board. etc,
4. Land acquisition status and R&R details.
5. Forest and Wildlife and eco-sensitive zones. if any in the study area of 10 km - Clearances require under the Forest (Conservation) Act. 1980, the Wildlife (Protection) Act, 1972 and/or the Environment (Protection) Act, 1986.
6. Baseline environmental study for ambient air (PM10, PM2.5, S02, NOx CO), water (both surface and ground) noise and soil for one month (except monsoon period) as per MoEF& CC/CPCB guidelines at minimum 5 locations in the study area of 10 km.

7. Details on flora and fauna and socio-economic aspects in the study area.

8. Likely Impact of the project on the environmental parameters (ambient air, surface and ground water, land, flora and fauna and socio-economic etc).

9. Source of water for different identified purposes with the permissions required from the concerned authorities, both for surface water and the ground water (by CGWA) as the case may be, Rain water harvesting, etc.

10. Waste water management (treatment, reuse and disposal) for the project and also the study area.

11. Management of solid waste and the construction & demolition waste for the project vis-à-vis the Solid Waste Management Rules, 2016 and the Construction Demolition Rules, 2016.

12. Energy efficient measures (LED lights, solar power, etc.) during construction as well as during operational phase of the project.

13. Assessment of ecological damage with respect to air, water, land and other environmental attributes. The collection and analysis of data shall be done by an environmental laboratory duly notified under the Environment (Protection) Act 1986. or an environmental laboratory accredited by NABL or a laboratory of a Council of Scientific and Industrial Research (CSIR) institution working in the field of environment.

14. Preparation of EMP comprising remediation plan and natural and community resource augmentation plan corresponding to the ecological damage assessed and economic benefits derived due to Violation.

15. The remediation plan and the natural and community resource augmentation plan to be prepared as an independent chapter in the EIA report by the accredited consultants.

D. Additional Conditions :

i) Notary Affidavit as per the enclosed format given in Annexure – B.
ii) Comparative statement of the salient features (existing and proposed) of the total project.
iii) Damage Assessment Plan,
iv) Remedial Plan.
v) Community Augmentation Plan.
vi) Authenticated documents for the total project cost for the entire project and cost incurred till submission of EIA/EMP.
vii) Gross turn-over of the project period till submission of EIA/EMP.

(The West Bengal Pollution Control Board shall arrange public hearing as per EIA Notification, 2006 on submission of draft EIA/EMP prepared by the Project Proponent as per the above mentioned ToRs. All the issues mentioned in the Public Hearing Report and public consultation must also be addressed and incorporated in the final EIA / EMP report. The project proponent is requested to pursue the matter with the WBPCB for organizing the public hearing/consultation on submission of the draft EIA/EMP report as per the provision of EIA notification 2006 and its amendments. The project proponent is requested to submit the final EIA/EMP prepared as per the above mentioned ToRs and incorporating all the issues raised during Public Hearing / Public Consultation for further consideration of the proposal for environmental clearance. The ToR is valid for a period of 3 (three) years from the date of issue.)

ANNEXURE – II

Executive Summary

The Executive summary of the EIA/EMP report in about 8-10 pages should be prepared incorporating the information on following points:

1) Project name and location (Village, District, State, Industrial Estate (if applicable).
2) Products and capacities. If expansion proposal, then existing products with capacities and reference to earlier EC.
3) Requirement of land, raw material, water, power, fuel, with source of supply (Quantitative).
4) Process description in brief, specifically indicating the gaseous emission, liquid effluent and solid and hazardous wastes.
5) Measures for mitigating the impact on the environment and mode of discharge or disposal.
6) Capital cost of the project, estimated time of completion.
7) Site selected for the project - Nature of land - Agricultural (single/double crop), barren, Govt./private land, status of is acquisition, nearby (in 2-3 km.) water body, population, with in 10km. other industries, forest, eco-sensitive zones, accessibility, (note - in case of industrial estate this information may not be necessary).
8) Baseline environmental data - air quality, surface and ground water quality, soil characteristic, flora and fauna, socio-economic condition of the nearby population.
9) Identification of hazards in handling, processing and storage of hazardous material and safety system provided to mitigate the risk.
10) Likely impact of the project on air, water, land, flora-fauna and nearby population.
11) Emergency preparedness plan in case of natural or in plant emergencies.
12) Issues raised during public hearing (if applicable) and response given.
13) Environment Management Plan (EMP) as per Office Memorandum issued by the MoEF & CC vide F. No. 22-65/2017-IA.III dated 30.09.2020 with proposed expenditure.
14) Occupational Health Measures.
15) Post project monitoring plan.

ANNEXURE – B

UNDERTAKING for Industrial projects

(To be done on Non-Judicial Stamp Paper of valuation Rs.10/- and duly notarized)

I, son of _____(Father's Name)_____, resident of _____(Address)_____ presently working as ____(Designation)_____ of M/s. _____(Organization Name)_____ am an authorized person of the above named organization, do hereby solemnly declare and state as follows :

1) THAT M/s._____ are the project proponent in respect of the _____(Project Name)_____.

2. THAT M/s._____ has already started the proposed expansion activity consisting of _____ at _____.

3. THAT in terms of EIA Notification 2006 and amendments thereof, our project falls within the purview of environment clearance.

4. THAT M/s._____ has failed to get prior environmental clearance as per statutory provisions of EIA Notification due to the reasons mentioned below: (please mentioned the reasons) –

i.
ii.
iii.
iv.

5. THAT M/s._____ has submitted the application form for obtaining necessary Terms of Reference / Environmental Clearance as per EIA Notification, 2006 and its amendments issued by the Ministry of Environment, Forest & Climate Change & Standard Operating Procedure (SoP) issued by MoEF&CC vide its OM dated 07.07.2021 which was upheld by hon'ble Supreme Court vide its order dated 09.12.2021 (MoEF&CC O.M. No.22-21/2020-IA.III[E 138949] dated 28.01.2022).

6. Now I, on behalf of the Project Proponent undertake the followings :-

a) To comply with all statutory requirements/norms, for obtaining Environmental Clearance;

b) To take all necessary permissions/licences/clearances from the concerned Government Departments and to submit compliance before the State Level Appraisal Committee, West Bengal;

c) To take all measures for the protection of the environment as may be prescribed by the Central Government or the State Government from time to time at the expenses of the project proponent.

7. THAT the project proponent also undertakes not to repeat such violation in future, in case of violation, the ToR/EC shall be liable to be terminated.

The above-mentioned statements are true to the best of my knowledge and belief.

DEPONENT

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/1 1A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Test Report

Analysis Reports of Ambient Air Quality Monitoring

Name and Address of the Client		ULTRA-TECH , Unit No.224,225,206,Jai Commercial Complex, Eastern Express Highway, OPP: Cadbury Factory, Khopat, Thane (W),Pin : 400601						
Sample Location		Location Code : **AAQ 1**; Location Name : **Project Site of Sawariya Chemical** GPS Coordinates: 26°39'4.36"N, 88°29'45.04"E						
Date of Reporting		06.04.2022						
Date of Sampling	Report No.	PM10 (µg/m3)	PM2.5 (µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO mg/m3)
03.01.2022	AP/22/003/A/01	87.2	28.2	6.3	27.7	23.0	20.6	0.5
05.01.2022	AP/22/003/A/02	88.4	30.1	6.4	29.4	24.1	22.4	0.6
10.01.2022	AP/22/003/A/03	89.6	32.4	5.9	26.4	21.6	19.9	0.7
12.01.2022	AP/22/003/A/04	91.2	33.5	6.4	28.1	22.7	20.4	0.5
17.01.2022	AP/22/003/A/05	87.4	30.4	6.6	28.0	25.3	21.2	0.6
19.01.2022	AP/22/003/A/06	90.1	32.3	6.5	27.2	23.1	19.3	0.5
24.01.2022	AP/22/003/A/07	83.2	32.0	6.5	29.5	26.4	20.4	0.5
26.01.2022	AP/22/003/A/08	90.4	37.1	5.8	30.2	27.4	19.3	0.8
31.01.2022	AP/22/003/A/09	88.4	32.2	6.3	29.6	24.2	21.0	0.8
02.02.2022	AP/22/003/A/10	84.6	28.1	5.9	28.2	25.1	22.4	0.6
07.02.2022	AP/22/003/A/11	87.2	28.1	6.6	26.4	23.0	19.7	0.6
09.02.2022	AP/22/003/A/12	83.4	29.0	6.5	28.5	22.4	20.0	0.5
14.02.2022	AP/22/003/A/13	88.2	30.4	5.8	27.6	25.8	19.7	0.5
16.02.2022	AP/22/003/A/14	85.3	32.0	6.0	28.4	25.4	19.8	0.5
21.02.2022	AP/22/003/A/15	86.4	33.1	5.8	28.0	21.7	20.4	0.7
23.02.2022	AP/22/003/A/16	88.8	30.4	5.9	27.6	22.2	21.2	0.6
28.02.2022	AP/22/003/A/17	87.3	33.2	6.1	27.6	23.0	19.1	0.8
02.03.2022	AP/22/003/A/18	82.4	31.2	5.9	28.0	22.9	20.4	0.6
02.03.2022	AP/22/003/A/19	83.4	29.9	6.5	30.0	24.0	20.4	0.5
07.03.2022	AP/22/003/A/20	86.4	29.9	6.4	28.1	25.2	19.7	0.6
09.03.2022	AP/22/003/A/21	87.3	27.3	6.0	29.4	28.1	21.3	0.6
14.03.2022	AP/22/003/A/22	91.2	29.5	5.4	27.4	22.4	22.4	0.5
16.03.2022	AP/22/003/A/23	82.4	26.5	6.2	28.9	23.7	21.9	0.7
21.03.2022	AP/22/003/A/24	86.3	28.8	6.9	29.0	22.9	21.3	0.6
23.03.2022	AP/22/003/A/25	80.4	30.4	6.7	28.1	28.6	19.8	0.6
28.03.2022	AP/22/003/A/26	86.4	29.0	6.2	28.7	25.6	19.8	0.9
30.03.2022	AP/22/003/A/27	83.4	31.2	6.2	27.7	27.1	20.8	0.9
Average		**86.54**	**30.60**	**6.21**	**28.29**	**24.33**	**20.54**	**0.62**
Max		**91.20**	**37.10**	**6.90**	**30.20**	**28.60**	**22.40**	**0.9**
Min		**80.40**	**26.50**	**5.40**	**26.40**	**21.60**	**19.10**	**0.5**
98th Percentile		**91.20**	**35.23**	**6.80**	**30.10**	**28.34**	**22.40**	**0.9**

Authorised Signatory
For Bharat Foundation
A. Neogi
C. E. O. & Technical Manager

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Test Report

Analysis Reports of Ambient Air Quality Monitoring

Name and Address of the Industry	**ULTRA-TECH , Unit No.224,225,206,Jai Commercial Complex, Eastern Express Highway, OPP: Cadbury Factory, Khopat, Thane (W),Pin : 400601**
Sample Location	Location Code : **AAQ 2**; Location Name :**Ambari** GPS Coordinates: 26°38'34.41"N, 88°30'13.48"E
Date of Reporting	06.04.2022

Date of Sampling	Report No.	PM10 (µg/m3)	PM2.5 (µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO mg/m3)
03.01.2022	AP/22/003/B/01	92.6	34.2	6.4	26.8	24.8	20.7	0.5
05.01.2022	AP/22/003/B/02	92.3	30.2	6.2	27.4	25.6	19.3	0.6
10.01.2022	AP/22/003/B/03	93.7	35.4	6.6	28.2	27.2	19.6	0.7
12.01.2022	AP/22/003/B/04	88.5	31.0	6.8	26.0	25.4	20.8	0.6
17.01.2022	AP/22/003/B/05	90.6	37.5	7.1	29.7	24.6	21.5	0.6
19.01.2022	AP/22/003/B/06	88.2	30.0	6.5	29.4	26.4	19.8	0.7
24.01.2022	AP/22/003/B/07	85.1	32.2	5.9	29.2	25.0	19.3	0.5
26.01.2022	AP/22/003/B/08	83.0	30.6	6.3	27.1	27.3	22.0	0.6
31.01.2022	AP/22/003/B/09	91.0	34.6	6.0	30.4	27.3	20.4	0.8
02.02.2022	AP/22/003/B/10	90.6	30.5	6.4	31.4	26.3	20.7	0.7
07.02.2022	AP/22/003/B/11	98.2	38.4	7.4	32.6	22.3	21.3	0.6
09.02.2022	AP/22/003/B/12	88.4	30.4	6.0	29.0	24.0	19.4	0.4
14.02.2022	AP/22/003/B/13	93.3	39.8	6.5	28.7	25.1	19.4	0.5
16.02.2022	AP/22/003/B/14	96.5	38.8	7.0	26.8	21.2	19.8	0.9
21.02.2022	AP/22/003/B/15	94.4	32.1	7.1	27.1	26.1	21.6	0.7
23.02.2022	AP/22/003/B/16	98.1	33.3	6.3	29.4	26.4	21.7	0.6
28.02.2022	AP/22/003/B/17	84.5	29.5	6.4	30.4	28.1	20.0	0.8
02.03.2022	AP/22/003/B/18	83.1	28.7	6.4	27.6	22.2	21.3	0.5
02.03.2022	AP/22/003/B/19	88.8	30.0	6.0	27.6	28.4	21.3	0.5
07.03.2022	AP/22/003/B/20	88.7	31.2	6.3	28.0	23.7	19.7	0.5
09.03.2022	AP/22/003/B/21	89.4	30.1	6.1	27.3	23.0	20.0	0.6
14.03.2022	AP/22/003/B/22	80.6	32.3	6.6	27.6	23.4	21.3	0.5
16.03.2022	AP/22/003/B/23	84.1	32.6	6.3	29.0	24.0	22.2	0.7
21.03.2022	AP/22/003/B/24	80.5	27.9	7.4	27.6	23.1	22.1	0.5
23.03.2022	AP/22/003/B/25	80.8	27.6	6.1	27.0	23.0	22.0	0.6
28.03.2022	AP/22/003/B/26	82.3	26.7	6.2	26.4	27.1	21.6	0.9
30.03.2022	AP/22/003/B/27	86.3	29.8	6.0	26.6	25.4	20.4	0.9
Average		**88.65**	**32.05**	**6.46**	**28.31**	**25.05**	**20.71**	**0.63**
Max		**98.20**	**39.80**	**7.40**	**32.60**	**28.40**	**22.20**	**0.90**
Min		**80.50**	**26.70**	**5.90**	**26.00**	**21.20**	**19.30**	**0.40**
98th Percentile		**98.15**	**39.28**	**7.40**	**31.98**	**28.24**	**22.15**	**0.90**

Authorised Signatory

For Bharat Foundation

A. Neogi

C. E. O. & Technical Manager

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Test Report

Analysis Reports of Ambient Air Quality Monitoring

Name and Address of the Industry	**ULTRA-TECH , Unit No.224,225,206,Jai Commercial Complex, Eastern Express Highway, OPP: Cadbury Factory, Khopat, Thane (W),Pin : 400601**
Sample Location	Location Code : **AAQ 3**; Location Name: **Sitaguri** GPS Coordinates: 26°36'21.83"N, 89°29'24.34"E
Date of Reporting	06.04.2022

Date of Sampling	Report No.	PM10 (µg/m3)	PM2.5 (µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO mg/m3)
04.01.2022	AP/22/003/C/01	83.8	32.4	5.8	27.4	25.1	19.4	0.6
06.01.2022	AP/22/003/C/02	84.3	35.3	6.1	25.7	24.3	19.4	0.5
11.01.2022	AP/22/003/C/03	86.1	35.1	5.9	26.4	24.7	19.6	0.7
13.01.2022	AP/22/003/C/04	82.5	32.5	5.4	28.1	25.7	20.4	0.6
18.01.2022	AP/22/003/C/05	88.7	32.9	5.5	27.4	22.3	19.6	0.7
20.01.2022	AP/22/003/C/06	86.5	32.4	5.8	28.5	24.1	20.1	0.5
25.01.2022	AP/22/003/C/07	86.5	31.2	6.2	23.6	26.2	19.7	0.7
27.01.2022	AP/22/003/C/08	83.2	30.2	5.9	25.4	22.3	20.1	0.8
01.02.2022	AP/22/003/C/09	82.1	30.2	5.8	27.4	19.9	19.6	0.5
03.02.2022	AP/22/003/C/10	79.2	28.6	6.1	26.5	22.2	19.7	0.6
08.02.2022	AP/22/003/C/11	85.4	29.9	5.8	29.2	23.4	19.6	0.5
10.02.2022	AP/22/003/C/12	83.8	31.4	5.7	28.6	23.3	19.5	0.5
15.02.2022	AP/22/003/C/13	88.8	30.4	6.1	26.5	21.1	19.7	0.5
17.02.2022	AP/22/003/C/14	88.1	28.8	6.1	28.3	24.3	19.9	0.7
22.02.2022	AP/22/003/C/15	86.1	32.8	6	27.4	25.3	21.2	0.4
24.02.2022	AP/22/003/C/16	85.4	31.3	5.8	25.8	21.3	19.8	0.8
01.03.2022	AP/22/003/C/17	91.2	32.5	5.5	28.6	23.7	19.6	0.9
03.03.2022	AP/22/003/C/18	81.3	34.1	5.4	27.6	25.8	20.3	0.5
08.03.2022	AP/22/003/C/19	84.6	32.2	5.4	27.5	26.1	19.1	0.6
10.03.2022	AP/22/003/C/20	85.3	30.6	5.9	26.4	23.4	21.1	0.5
15.03.2022	AP/22/003/C/21	82.4	29.8	5.7	25.4	22.3	20.6	0.6
17.03.2022	AP/22/003/C/22	78.1	30.1	5.9	23.7	20.4	20.5	0.7
22.03.2022	AP/22/003/C/23	84.6	33.5	6.2	28.8	24.6	19.9	0.6
24.03.2022	AP/22/003/C/24	80.1	29.8	5.5	28	25.4	19.7	0.7
29.03.2022	AP/22/003/C/25	79.3	31.6	5.6	27.6	22.2	19.7	0.9
31.03.2022	AP/22/003/C/26	83.9	30.2	6.1	23.7	23.4	19.8	0.9
01.04.2022	AP/22/003/C/27	79.8	31.2	5.9	25.9	23.1	20.1	0.6
Average		**84.11**	**31.52**	**5.82**	**26.87**	**23.55**	**19.91**	**0.63**
Max		**91.20**	**35.30**	**6.20**	**29.20**	**26.20**	**21.20**	**0.90**
Min		**78.10**	**28.60**	**5.40**	**23.60**	**19.90**	**19.10**	**0.40**
98th Percentile		**89.95**	**35.20**	**6.20**	**28.99**	**26.15**	**21.15**	**0.90**

Authorised Signatory

For Bharat Foundation

A. Neogi

C. E. O. & Technical Manager

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Test Report

Analysis Reports of Ambient Air Quality Monitoring

Name and Address of the Industry	ULTRA-TECH , Unit No.224,225,206,Jai Commercial Complex, Eastern Express Highway, OPP: Cadbury Factory, Khopat, Thane (W),Pin : 400601
Sample Location	Location Code : AAQ 4; Location Name: Binnaguri GPS Coordinates: 26°38'13.93"N, 88°29'9.67"E
Date of Reporting	06.04.2022

Date of Sampling	Report No.	PM10 (µg/m3)	PM2.5 (µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO mg/m3)
04.01.2022	AP/22/003/D/01	88.3	27.6	6.2	29.7	21.5	19.8	0.6
06.01.2022	AP/22/003/D/02	90.4	29.4	6.2	30.4	21.4	19.6	0.5
11.01.2022	AP/22/003/D/03	89.5	30.5	6.0	32.4	24.6	19.8	0.5
13.01.2022	AP/22/003/D/04	88.6	32.2	6.3	30.0	25.9	21.3	0.7
18.01.2022	AP/22/003/D/05	92.3	31.5	6.0	30.4	24.5	20.4	0.5
20.01.2022	AP/22/003/D/06	90.4	32.1	5.8	29.8	25.1	19.6	0.5
25.01.2022	AP/22/003/D/07	90.6	31.2	5.5	30.2	26.7	20.4	0.6
27.01.2022	AP/22/003/D/08	92.0	32.1	5.7	32.5	24.3	22.4	0.8
01.02.2022	AP/22/003/D/09	90.6	32.0	6.2	32.1	25.6	20.5	0.5
03.02.2022	AP/22/003/D/10	88.8	32.1	6.0	31.8	26.5	20.3	0.6
08.02.2022	AP/22/003/D/11	94.3	31.7	6.1	30.0	22.5	21.3	0.4
10.02.2022	AP/22/003/D/12	89.7	30.6	6.0	31.4	21.7	21.3	0.5
15.02.2022	AP/22/003/D/13	93.3	32.0	6.0	32.3	24.5	19.8	0.6
17.02.2022	AP/22/003/D/14	90.7	29.8	6.0	30.0	22.2	20.5	0.7
22.02.2022	AP/22/003/D/15	94.3	31.1	5.9	31.8	24.0	21.3	0.7
24.02.2022	AP/22/003/D/16	93.6	30.2	6.1	32.6	23.7	21.4	0.8
01.03.2022	AP/22/003/D/17	92.4	29.7	6.3	32.4	23.4	19.8	0.6
03.03.2022	AP/22/003/D/18	90.4	29.8	5.8	33.5	21.6	20.1	0.8
08.03.2022	AP/22/003/D/19	86.5	27.9	6.0	30.8	23.5	19.6	0.6
10.03.2022	AP/22/003/D/20	89.4	32.4	6.0	33.0	23.9	19.7	0.5
15.03.2022	AP/22/003/D/21	88.7	29.8	6.0	30.0	25.0	20.4	0.5
17.03.2022	AP/22/003/D/22	90.5	31.6	6.3	32.6	25.3	21.6	0.9
22.03.2022	AP/22/003/D/23	90.1	31.4	6.2	30.0	24.8	22.3	0.5
24.03.2022	AP/22/003/D/24	90.0	30.9	6.0	32.4	26.4	22.2	0.5
29.03.2022	AP/22/003/D/25	91.3	31.0	5.8	32.3	24.5	19.8	0.9
31.03.2022	AP/22/003/D/26	89.6	30.5	6.0	33.0	24.7	21.9	0.9
01.04.2022	AP/22/003/D/27	88.4	31.4	6.1	34.1	25.1	20.4	0.6
Average		**90.54**	**30.83**	**6.02**	**31.54**	**24.18**	**20.65**	**0.62**
Max		**94.30**	**32.40**	**6.30**	**34.10**	**26.70**	**22.40**	**0.90**
Min		**86.50**	**27.60**	**5.50**	**29.70**	**21.40**	**19.60**	**0.40**
98th Percentile		**94.30**	**32.30**	**6.30**	**33.79**	**26.60**	**22.35**	**0.90**

Authorised Signatory

For Bharat Foundation

A. Neogi
C. E. O. & Technical Manager

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Test Report

Analysis Reports of Ambient Air Quality Monitoring

Name and Address of the Industry		ULTRA-TECH , Unit No.224,225,206,Jai Commercial Complex, Eastern Express Highway, OPP: Cadbury Factory, Khopat, Thane (W),Pin : 400601						
Sample Location		Location Code : **AAQ 5**; Location Name: Gander More GPS Coordinates: 26°37'27.47"N, 88°28'02.32"E						
Date of Reporting		06.04.2022						
Date of Sampling	Report No.	PM10 (µg/m3)	PM2.5 (µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO mg/m3)
06.01.2022	AP/22/003/E/01	78.4	27.1	5.5	28.3	22.5	22.0	0.6
08.01.2022	AP/22/003/E/02	83.4	24.6	5.4	29.7	23.4	22.4	0.5
13.01.2022	AP/22/003/E/03	79.6	27.0	6.0	28.4	22.3	22.0	0.6
13.01.2022	AP/22/003/E/04	80.4	25.6	5.4	29.4	23.4	19.8	0.7
15.01.2022	AP/22/003/E/05	82.7	26.8	5.5	27.6	21.5	21.6	0.5
20.01.2022	AP/22/003/E/06	77.6	27.6	5.6	29.6	23.0	19.8	0.5
22.01.2022	AP/22/003/E/07	78.2	28.5	5.4	29.0	24.4	21.4	0.9
27.01.2022	AP/22/003/E/08	76.5	28.2	5.6	28.4	27.8	19.8	0.8
29.02.2022	AP/22/003/E/09	78.6	27.1	5.6	28.7	25.5	21.7	0.5
03.02.2022	AP/22/003/E/10	80.1	25.4	5.9	29.1	21.7	21.3	0.6
05.02.2022	AP/22/003/E/11	80.6	28.0	5.2	28.6	22.0	20.3	0.6
10.02.2022	AP/22/003/E/12	79.4	27.6	5.4	28.0	23.4	21.2	0.5
12.02.2022	AP/22/003/E/13	74.6	27.0	5.8	28.0	23.5	22.4	0.5
17.02.2022	AP/22/003/E/14	75.3	24.9	5.2	29.4	27.7	21.4	0.7
19.02.2022	AP/22/003/E/15	80.5	26.5	5.9	27.7	24.5	20.4	0.6
24.02.2022	AP/22/003/E/16	80.5	25.8	5.6	29.4	28.4	21.3	0.8
26.02.2022	AP/22/003/E/17	80.6	26.4	5.2	26.7	28.0	20.0	0.6
03.03.2022	AP/22/003/E/18	78.7	27.6	5.5	27.7	23.9	20.3	0.8
05.03.2022	AP/22/003/E/19	83.4	27.0	5.4	26.4	24.7	20.5	0.5
10.03.2022	AP/22/003/E/20	73.6	26.6	5.9	28.3	25.4	21.1	0.5
12.03.2022	AP/22/003/E/21	76.6	27.3	5.4	26.0	26.0	21.6	0.5
17.03.2022	AP/22/003/E/22	78.7	26.6	5.2	29.7	26.0	20.3	0.9
19.03.2022	AP/22/003/E/23	80.6	27.2	5.9	29.0	23.4	20.0	0.6
24.03.2022	AP/22/003/E/24	76.9	26.9	5.8	29.5	23.4	22.1	0.5
26.03.2022	AP/22/003/E/25	80.5	27.0	5.7	27.6	22.7	21.0	0.9
31.03.2022	AP/22/003/E/26	80.6	26.5	5.3	27.0	23.7	20.0	0.9
02.04.2022	AP/22/003/E/27	82.0	26.0	5.2	27.7	26.1	21.3	0.6
Average		**79.21**	**26.77**	**5.54**	**28.33**	**24.38**	**21.00**	**0.64**
Max		**83.40**	**28.50**	**6.00**	**29.70**	**28.40**	**22.40**	**0.90**
Min		**73.60**	**24.60**	**5.20**	**26.00**	**21.50**	**19.80**	**0.50**
98th Percentile		**83.40**	**28.34**	**5.95**	**29.70**	**28.19**	**22.40**	**0.90**

Authorised Signatory

For Bharat Foundation

A. Neogi
C. E. O. & Technical Manager

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Test Report

Analysis Reports of Ambient Air Quality Monitoring

Name and Address of the Industry		ULTRA-TECH , Unit No.224,225,206,Jai Commercial Complex, Eastern Express Highway, OPP: Cadbury Factory, Khopat, Thane (W),Pin : 400601						
Sample Location		Location Code : **AAQ 6**; Location Name:Chakiabhita GPS Coordinates: 26°39'16.26"N, 88°30'53.65"E						
Date of Reporting		06.04.2022						
Date of Sampling	Report No.	PM10 (µg/m3)	PM2.5 (µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO mg/m3)
06.01.2022	AP/22/003/F/01	88.4	31.8	6.2	26.6	28.7	20.8	0.6
08.01.2022	AP/22/003/F/02	91.6	35.2	6.0	28.2	29.6	19.6	0.5
13.01.2022	AP/22/003/F/03	94.3	33.6	5.5	27.9	30.4	19.4	0.7
13.01.2022	AP/22/003/F/04	96.5	36.0	6.0	26.3	29.3	22.4	0.7
15.01.2022	AP/22/003/F/05	87.3	33.3	6.2	26.3	28.3	20.4	0.5
20.01.2022	AP/22/003/F/06	88.6	35.4	6.0	28.2	28.0	22.0	0.5
22.01.2022	AP/22/003/F/07	86.4	30.0	6.0	27.3	29.1	20.3	0.6
27.01.2022	AP/22/003/F/08	89.7	30.4	6.0	28.5	29.7	20.5	0.8
29.02.2022	AP/22/003/F/09	90.7	32.2	5.7	27.4	28.3	22.0	0.5
03.02.2022	AP/22/003/F/10	93.0	34.6	5.4	26.4	23.4	23.7	0.6
05.02.2022	AP/22/003/F/11	87.1	35.9	5.3	27.0	25.4	24.6	0.7
10.02.2022	AP/22/003/F/12	92.3	31.4	6.0	26.4	27.0	23.4	0.5
12.02.2022	AP/22/003/F/13	94.6	34.6	5.5	27.4	26.0	26.8	0.8
17.02.2022	AP/22/003/F/14	95.7	36.7	5.6	28.2	27.6	20.4	0.7
19.02.2022	AP/22/003/F/15	85.4	32.3	5.3	26.3	28.0	24.3	0.6
24.02.2022	AP/22/003/F/16	91.6	34.1	5.6	29.2	27.3	23.4	0.8
26.02.2022	AP/22/003/F/17	90.8	34.0	5.7	28.7	26.4	19.8	0.6
03.03.2022	AP/22/003/F/18	89.6	32.2	5.4	25.6	28.8	21.3	0.8
05.03.2022	AP/22/003/F/19	91.4	31.4	5.4	28.6	28.0	20.4	0.6
10.03.2022	AP/22/003/F/20	92.5	37.6	5.4	25.9	27.0	19.9	0.5
12.03.2022	AP/22/003/F/21	94.0	35.4	6.0	26.3	29.4	21.6	0.6
17.03.2022	AP/22/003/F/22	92.1	32.3	5.3	28.7	28.3	20.4	0.9
19.03.2022	AP/22/003/F/23	93.6	37.6	6.3	29.1	29.3	22.1	0.6
24.03.2022	AP/22/003/F/24	94.4	35.4	5.3	28.0	29.1	21.1	0.5
26.03.2022	AP/22/003/F/25	92.3	36.2	5.8	26.7	28.6	21.5	0.9
31.03.2022	AP/22/003/F/26	90.0	32.0	5.7	27.1	27.0	21.3	0.9
02.04.2022	AP/22/003/F/27	89.8	30.4	5.4	26.4	26.2	20.9	0.6
Average		**91.25**	**33.78**	**5.70**	**27.36**	**27.93**	**21.64**	**0.65**
Max		**96.50**	**37.60**	**6.30**	**29.20**	**30.40**	**26.80**	**0.90**
Min		**85.40**	**30.00**	**5.30**	**25.60**	**23.40**	**19.40**	**0.50**
98th Percentile		**96.08**	**37.60**	**6.25**	**29.15**	**30.04**	**25.66**	**0.90**

Authorised Signatory

For Bharat Foundation

A. Neogi
C. E. O. & Technical Manager

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Test Report

Analysis Reports of Ambient Air Quality Monitoring

Name and Address of the Industry		ULTRA-TECH , Unit No.224,225,206,Jai Commercial Complex, Eastern Express Highway, OPP: Cadbury Factory, Khopat, Thane (W),Pin : 400601						
Sample Location		Location Code : **AAQ 7**; Location Name:Ambari Road						
		GPS Coordinates: 26°37'31.79"N, 88°30'20.75"E						
Date of Reporting		06.04.2022						
Date of Sampling	Report No.	PM10 (µg/m3)	PM2.5 (µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO mg/m3)
03.01.2022	AP/22/003/G/01	83.0	29.2	5.4	28.5	22.0	22.1	0.6
05.01.2022	AP/22/003/G/02	78.5	29.7	5.8	29.4	22.0	22.5	0.5
10.01.2022	AP/22/003/G/03	85.2	30.0	5.7	29.4	23.7	19.7	0.6
12.01.2022	AP/22/003/G/04	83.6	31.6	5.6	28.5	24.3	19.6	0.7
17.01.2022	AP/22/003/G/05	87.6	28.4	5.5	29.4	22.2	19.8	0.5
19.01.2022	AP/22/003/G/06	86.2	31.2	6.0	26.7	22.8	19.7	0.5
24.01.2022	AP/22/003/G/07	88.4	32.0	5.4	29.9	24.1	23.7	0.4
26.01.2022	AP/22/003/G/08	88.3	31.5	6.0	31.4	22.3	19.2	0.8
31.01.2022	AP/22/003/G/09	83.1	31.0	5.5	28.6	22.4	20.4	0.5
02.02.2022	AP/22/003/G/10	80.7	29.8	5.2	30.0	24.1	20.4	0.6
07.02.2022	AP/22/003/G/11	88.6	35.2	5.8	30.1	22.3	23.8	0.6
09.02.2022	AP/22/003/G/12	86.5	34.9	5.2	28.6	22.7	20.4	0.5
14.02.2022	AP/22/003/G/13	85.2	35.0	5.3	28.6	25.1	19.8	0.8
16.02.2022	AP/22/003/G/14	82.7	33.0	5.3	29.7	22.9	20.5	0.7
21.02.2022	AP/22/003/G/15	77.3	28.2	5.2	28.7	25.5	19.5	0.6
23.02.2022	AP/22/003/G/16	81.4	31.6	5.3	29.4	22.0	19.8	0.8
28.02.2022	AP/22/003/G/17	84.5	33.4	5.5	29.4	24.3	20.4	0.6
02.03.2022	AP/22/003/G/18	80.6	34.0	5.8	30.1	22.8	22.0	0.8
02.03.2022	AP/22/003/G/19	87.4	32.3	5.4	29.6	21.9	19.9	0.6
07.03.2022	AP/22/003/G/20	87.6	33.4	5.8	28.8	21.6	21.4	0.5
09.03.2022	AP/22/003/G/21	86.4	30.8	5.6	27.9	23.4	20.7	0.5
14.03.2022	AP/22/003/G/22	82.0	32.7	5.5	28.4	22.8	19.8	0.9
16.03.2022	AP/22/003/G/23	87.1	32.0	5.6	29.0	21.9	22.2	0.6
21.03.2022	AP/22/003/G/24	83.6	31.4	5.7	26.8	22.2	20.7	0.5
23.03.2022	AP/22/003/G/25	88.0	31.0	5.6	26.5	22.1	19.6	0.9
28.03.2022	AP/22/003/G/26	87.4	31.4	5.4	27.9	21.8	19.5	0.9
30.03.2022	AP/22/003/G/27	86.0	31.0	5.4	26.7	21.7	19.7	0.6
Average		**84.70**	**31.69**	**5.54**	**28.81**	**22.85**	**20.62**	**0.63**
Max		**88.60**	**35.20**	**6.00**	**31.40**	**25.50**	**23.80**	**0.90**
Min		**77.30**	**28.20**	**5.20**	**26.50**	**21.60**	**19.20**	**0.50**
98th Percentile		**88.50**	**35.10**	**6.00**	**30.72**	**25.29**	**23.75**	**0.90**

Authorised Signatory

For Bharat Foundation

A. Neogi

C. E. O. & Technical Manager

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/1 1A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Test Report

Analysis Reports of Ambient Air Quality Monitoring

Name and Address of the Industry		ULTRA-TECH , Unit No.224,225,206,Jai Commercial Complex, Eastern Express Highway, OPP: Cadbury Factory, Khopat, Thane (W),Pin : 400601						
Sample Location		Location Code : **AAQ 8**; Location Name: Sahudangi GPS Coordinates: 26°40'21.02"N, 89°28'29.49"E						
Date of Reporting		06.04.2022						
Date of Sampling	Report No.	PM10 (µg/m3)	PM2.5 (µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO mg/m3)
06.01.2022	AP/22/003/H/01	86.2	29.4	5.4	29.8	21.0	20.0	0.6
08.01.2022	AP/22/003/H/02	87.6	29.8	5.2	29.7	21.4	19.8	0.5
13.01.2022	AP/22/003/H/03	82.4	29.0	5.6	29.8	20.6	20.1	0.5
13.01.2022	AP/22/003/H/04	89.0	30.4	6.1	28.4	23.3	19.7	0.9
15.01.2022	AP/22/003/H/05	88.0	29.4	5.7	29.6	22.4	20.4	0.5
20.01.2022	AP/22/003/H/06	79.9	27.6	5.5	29.8	23.5	19.6	0.5
22.01.2022	AP/22/003/H/07	81.0	31.0	5.6	30.2	23.4	19.7	0.6
27.01.2022	AP/22/003/H/08	88.4	29.7	5.8	32.5	21.3	19.7	0.8
29.02.2022	AP/22/003/H/09	88.5	29.8	6.0	28.4	20.4	20.2	0.5
03.02.2022	AP/22/003/H/10	89.2	29.4	5.7	29.5	22.2	20.0	0.6
05.02.2022	AP/22/003/H/11	87.3	28.6	5.7	30.0	21.6	19.7	0.7
10.02.2022	AP/22/003/H/12	88.0	38.4	5.7	29.4	21.4	19.8	0.5
12.02.2022	AP/22/003/H/13	88.1	29.5	5.4	28.6	22.3	19.6	0.8
17.02.2022	AP/22/003/H/14	89.0	30.0	5.6	28.6	22.2	19.6	0.7
19.02.2022	AP/22/003/H/15	89.6	31.1	5.9	29.0	21.6	21.4	0.8
24.02.2022	AP/22/003/H/16	88.3	27.6	6.2	28.7	20.7	20.7	0.8
26.02.2022	AP/22/003/H/17	89.7	29.7	5.8	29.6	22.1	19.7	0.6
03.03.2022	AP/22/003/H/18	90.4	30.8	5.8	29.7	20.6	22.2	0.8
05.03.2022	AP/22/003/H/19	87.9	30.2	6.0	30.8	22.5	19.0	0.9
10.03.2022	AP/22/003/H/20	86.4	32.4	6.4	27.8	24.4	22.8	0.6
12.03.2022	AP/22/003/H/21	87.9	29.7	6.0	29.7	25.0	20.4	0.5
17.03.2022	AP/22/003/H/22	88.3	29.0	5.9	27.8	24.1	22.3	0.9
19.03.2022	AP/22/003/H/23	83.6	28.6	6.3	30.0	23.3	20.4	0.6
24.03.2022	AP/22/003/H/24	88.1	27.6	6.0	29.0	24.3	21.6	0.5
26.03.2022	AP/22/003/H/25	83.4	28.7	5.9	29.6	24.5	22.7	0.6
31.03.2022	AP/22/003/H/26	84.5	27.9	5.4	28.4	22.2	21.9	0.9
02.04.2022	AP/22/003/H/27	85.0	30.4	5.8	29.4	20.3	21.3	0.6
Average		**86.88**	**29.84**	**5.79**	**29.40**	**22.32**	**20.53**	**0.66**
Max		**90.40**	**38.40**	**6.40**	**32.50**	**25.00**	**22.80**	**0.90**
Min		**79.90**	**27.60**	**5.20**	**27.80**	**20.30**	**19.00**	**0.50**
98th Percentile		**90.04**	**35.28**	**6.35**	**31.62**	**24.74**	**22.75**	**0.90**

Authorised Signatory

For Bharat Foundation

A. Neogi

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Test Report

Report no. G/22/04	
Analysis reports of noise monitoring- Project – SAWARIYA CHEMICALS	
Name and Address of the Industry	**ULTRA-TECH, Unit No.224,225,206,Jai Commercial Complex, Eastern Express Highway, OPP: Cadbury Factory, Khopat, Thane (W)Pin: 400601**
Date of Reporting	15-02-2022

RESULTS OF NOISE LEVELS

Location Code	Project Location	Location Coordinates	Date of monitoring 10.02.2022 (Leq in dBA)	
			Day Time	Night Time
ANQ- 1	Project site	26° 39'4.36" N, 88° 29'45.04"E	68.2	42.5
ANQ- 2	Ambari	26° 38'34.41" N, 88° 30'13.48"E	51.5	34.6
ANQ- 3	Sitaguri	26° 36'21.83" N, 88° 29'24.34"E	62.6	35.7
ANQ- 4	Binnaguri	26° 38'13.93" N, 88° 29'09.67"E	64.9	40.5
ANQ- 5	Gander More	26° 37'27.47" N, 88° 28'02.32"E	53.0	35.1
ANQ- 6	ChakiaBhita	26° 39'16.26" N, 88° 30'53.65"E	69.8	37.9
ANQ- 7	Ambari road	26° 37'31.79" N, 88° 30'20.75"E	65.7	40.3
ANQ- 8	Sahudangi	26° 40'21.02" N, 88° 28'29.49"E	64.3	39.5

----------End of the Report----------

Authorised Signatory

For Bharat Foundation

A. Neogi
C. E. O. & Technical Manager

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Format No.BF/FM/40A

Test Report

Report No.: W/22/002 Date of Reporting: 10.03.2022

Name of the Company & Address:	**ULTRA-TECH** Unit No.224,225,206,Jai Commercial Complex, Eastern Express Highway, OPP: Cadbury Factory, Khopat, Thane (W),Pin : 400601
Description of the Sample :	Surface Water.
Project :	Baseline Data For Sawariya Chemicals
Reference of sampling plan: Grab	Sampling Procedure: APHA 23rd Edition,
Location/Source of Sampling/Sample Marked As: 26° 38' 51.60" N, 88°30' 15.39" E	Korotoya Nodi (Ambari) **(SW1)**
Sample Collected/Submitted By:	Our Representative (Mr. T. Ghosh).
Date of Sampling: 13.02.2022	Date of Receipt of Sample At Laboratory: 15.02.2022
Date of Start of analysis :15.02.2022	Date of Completion of Analysis: 03.03.2022

TEST/ ANALYSIS RESULT

Sl. No.	Parameters	Specification, Standard Methods	Results
1.	pH (at 25°C)	APHA 23rd Edition, 4500-H B	7.80
2.	Conductivity (µmho/cm)	APHA 23rd Edition, 2510-B	140.6
3.	Turbidity, NTU, Max	APHA 23rd Edition, 2130 B.	<1
4.	Total Dissolved Solid , mg/l	APHA 23rd Edition, 2540 C	89.2
5.	Alkalinity (as $CaCO_3$), mg/l	IS 3025 (part-26) (RA:2019)	52.3
6.	Total Hardness (as$CaCO_3$)mg/l	APHA 23rd Edition, 2340 C	41.9
7.	Calcium (as Ca) ,mg/l	APHA 23rd Edition, 3500 Ca B	12.8
8.	Magnesium (as Mg) , mg/l	APHA 23rd Edition, 3500-Mg-B	2.1
9.	Chloride (as Cl), mg/l	APHA 23rd Edition,4500 Cl-B	22.3
10	Iron (as Fe), mg/l	APHA 23rd Edition, 3500 Fe B	0.11
11.	Fluoride, (as F), mg/l	APHA 23rd Edition, 4500 F- B	<0.5
12.	Sulphate (as SO_4) ,mg/l	APHA 23rd Edition, 4500-SO_4-E	6.6
13.	Nitrate (as NO_3) , mg/l	APHA 23rd Edition, 4500 NO_3 E	4.9
14.	Arsenic (as As) mg/l,	APHA 23rd Edition, 3500As-B	<0.01
15.	Chromium as Cr +6 mg/l,	APHA 23rdEdition, 3500 Cr-B	<0.05
16.	Copper as Cu (mg/l)	APHA 23rd Edition, 3500-Cu-B	<0.05
17.	Phenolic Compounds mg/l,	APHA 23rd Edition, 5530-Phenols-D	<0.01

For Bharat Foundation
Authorised Signatory
A. Neogi
C. E. O. & Technical Manager

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Format No.BF/FM/40A

Test Report

Report No.: W/22/002 Date of Reporting: 10.03.2022

TEST/ ANALYSIS RESULT

Sl. No.	Parameters	Specification, Standard Methods	Results
18.	Alluminium as Al (mg/l)	APHA 23rd Edition, 3500-Al-B	<0.03
19.	Boron as B (mg/l)	APHA 23rd Edition, 4500-B-C	<0.5
20.	Sodium(as Na) mg/l,	APHA 23rd Edition, 3500 Na-B	23.7
21.	Potassium(as K) mg./l,	APHA 23rd Edition, 3500 K-B	7.1
22.	Dissolved Oxygen	APHA 23rd Edition-4500-0-C	4.9
23.	Total Suspended Solids (mg/l)	APHA 23rd Edition, 2540D	19.4
24.	Oil & Grease (mg/l)	APHA 23rd Edition, 5520-B	<2.0
25.	Chemical Oxygen Demand (mg/l)	APHA 23rd Edition, 5220B	7.5
26.	Biological Oxygen Demand 3 days at 27°C (mg/l)	IS:3025,Part-44,2003, RA: 2019	4.2
27.	Phosphate as PO_4^{-3}	APHA 23rd Edition,4500 -P-D	0.92
28	**Total Coliform Count, MPN/100ml	IS: 1622-1981	540
29	**Faecal Coliform Count, MPN/100ml	IS: 1622-1981	310

- IS 10500 (1991): Norms for drinking water, as amended on 01, January 1993
- (**.):Not under NABL Scope.

----------End of the Report----------

Authorised Signatory

For Bharat Foundation

A. Neogi
C. E. O. & Technical Manager

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Format No.BF/FM/40A

Test Report

Report No.: W/22/002/01 Date of Reporting: 10.03.2022

Name of the Company & Address:	**ULTRA-TECH** Unit No.224,225,206,Jai Commercial Complex, Eastern Express Highway, OPP: Cadbury Factory, Khopat, Thane (W),Pin : 400601
Description of the Sample :	Surface Water.
Project :	Baseline Data For Sawariya Chemicals
Reference of sampling plan: Grab	Sampling Procedure: APHA 23rd Edition,
Location/Source of Sampling/Sample Marked As: 26° 36' 20.44" N, 88°29' 32.97" E	Sitaguri (**SW2**)
Sample Collected/Submitted By:	Our Representative (Mr. T. Ghosh).
Date of Sampling: 13.02.2022	Date of Receipt of Sample At Laboratory: 15.02.2022
Date of Start of analysis :15.02.2022	Date of Completion of Analysis: 03.03.2022

TEST/ ANALYSIS RESULT

Sl. No.	Parameters	Specification, Standard Methods	Results
1.	pH (at 25°C)	APHA 23rd Edition, 4500-H B	7.44
2.	Conductivity (µmho/cm)	APHA 23rd Edition, 2510-B	148.5
3.	Turbidity, NTU, Max	APHA 23rd Edition, 2130 B.	<1
4.	Total Dissolved Solid , mg/l	APHA 23rd Edition, 2540 C	89.6
5.	Alkalinity (as $CaCO_3$), mg/l	IS 3025 (part-26) (RA:2019)	55.2
6.	Total Hardness (as$CaCO_3$)mg/l	APHA 23rd Edition, 2340 C	48.3
7.	Calcium (as Ca) ,mg/l	APHA 23rd Edition, 3500 Ca B	15.1
8.	Magnesium (as Mg) , mg/l	APHA 23rd Edition, 3500-Mg-B	3.7
9.	Chloride (as Cl), mg/l	APHA 23rd Edition,4500 Cl-B	18.2
10	Iron (as Fe), mg/l	APHA 23rd Edition, 3500 Fe B	0.09
11.	Fluoride, (as F), mg/l	APHA 23rd Edition, 4500 F- B	<0.5
12.	Sulphate (as SO_4) ,mg/l	APHA 23rd Edition, 4500-SO_4-E	8.1
13.	Nitrate (as NO_3) , mg/l	APHA 23rd Edition, 4500 NO_3 E	3.9
14.	Arsenic (as As) mg/l,	APHA 23rd Edition, 3500As-B	<0.01
15.	Chromium as Cr +6 mg/l,	APHA 23rdEdition, 3500 Cr-B	<0.05
16.	Copper as Cu (mg/l)	APHA 23rd Edition, 3500-Cu-B	<0.05
17.	Phenolic Compounds mg/l,	APHA 23rd Edition, 5530-Phenols-D	<0.01

For Bharat Foundation

Authorised Signatory

A. Neogi
C. E. O. & Technical Manager

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Format No.BF/FM/40A

Test Report

Report No.: W/22/002/1

Date of Reporting: 10.03.2022

TEST/ ANALYSIS RESULT

Sl. No.	Parameters	Specification, Standard Methods	Results
18.	Alluminium as Al (mg/l)	APHA 23rd Edition, 3500-Al-B	<0.03
19.	Boron as B (mg/l)	APHA 23rd Edition, 4500-B-C	<0.5
20.	Sodium(as Na) mg/l,	APHA 23rd Edition, 3500 Na-B	19.8
21.	Potassium(as K) mg./l,	APHA 23rd Edition, 3500 K-B	6.9
22.	Dissolved Oxygen	APHA 23rd Edition-4500-0-C	3.9
23.	Total Suspended Solids (mg/l)	APHA 23rd Edition, 2540D	10.4
24.	Oil & Grease (mg/l)	APHA 23rd Edition, 5520-B	<2.0
25.	Chemical Oxygen Demand (mg/l)	APHA 23rd Edition, 5220B	6.4
26.	Biological Oxygen Demand 3 days at 27°C (mg/l)	IS:3025,Part-44,2003, RA: 2019	3.7
27.	Phosphate as PO4-3 (mg/l)	APHA 23rd Edition,4500 -P-D	1.02
28	**Total Coliform Count, MPN/100ml	IS: 1622-1981	490
29	**Faecal Coliform Count, MPN/100ml	IS: 1622-1981	380

- IS 10500 (1991): Norms for drinking water, as amended on 01, January 1993
- (**.): Not under NABL Scope.

----------End of the Report----------

Authorised Signatory

For Bharat Foundation

A. Neogi

C. E. O. & Technical Manager

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Format No.BF/FM/40A

Test Report

Report No.: W/22/002/02 Date of Reporting: 10.03.2022

Name of the Company & Address:	**ULTRA-TECH** Unit No.224,225,206,Jai Commercial Complex, Eastern Express Highway, OPP: Cadbury Factory, Khopat, Thane (W),Pin : 400601
Description of the Sample :	Surface Water.
Project :	Baseline Data For Sawariya Chemicals
Reference of sampling plan: Grab	Sampling Procedure: APHA 23rd Edition,
Location/Source of Sampling/Sample Marked As: 26° 35' 39" N, 88°29' 47" E	River at Rajganj (**SW3**)
Sample Collected/Submitted By:	Our Representative (Mr. T. Ghosh).
Date of Sampling: 13.02.2022	Date of Receipt of Sample At Laboratory: 15.02.2022
Date of Start of analysis :15.02.2022	Date of Completion of Analysis: 03.03.2022

TEST/ ANALYSIS RESULT

Sl. No.	Parameters	Specification, Standard Methods	Results
1.	pH (at 25°C)	APHA 23rd Edition, 4500-H B	6.99
2.	Conductivity (µmho/cm)	APHA 23rd Edition, 2510-B	115.8
3.	Turbidity, NTU, Max	APHA 23rd Edition, 2130 B.	<1
4.	Total Dissolved Solid , mg/l	APHA 23rd Edition, 2540 C	64.2
5.	Alkalinity (as $CaCO_3$), mg/l	IS 3025 (part-26) (RA:2019)	39.6
6.	Total Hardness (as$CaCO_3$)mg/l	APHA 23rd Edition, 2340 C	30.7
7.	Calcium (as Ca) ,mg/l	APHA 23rd Edition, 3500 Ca B	9.0
8.	Magnesium (as Mg) , mg/l	APHA 23rd Edition, 3500-Mg-B	3.1
9.	Chloride (as Cl), mg/l	APHA 23rd Edition,4500 Cl-B	13.5
10	Iron (as Fe), mg/l	APHA 23rd Edition, 3500 Fe B	0.14
11.	Fluoride, (as F), mg/l	APHA 23rd Edition, 4500 F- B	<0.5
12.	Sulphate (as SO_4) ,mg/l	APHA 23rd Edition, 4500-SO_4-E	7.7
13.	Nitrate (as NO_3) , mg/l	APHA 23rd Edition, 4500 NO_3 E	2.9
14.	Arsenic (as As) mg/l,	APHA 23rd Edition, 3500As-B	<0.01
15.	Chromium as Cr +6 mg/l,	APHA 23rdEdition, 3500 Cr-B	<0.05
16.	Copper as Cu (mg/l)	APHA 23rd Edition, 3500-Cu-B	<0.05
17.	Phenolic Compounds mg/l,	APHA 23rd Edition, 5530-Phenols-D	<0.01

For Bharat Foundation

Authorised Signatory

A. Neogi

C. E. O. & Technical Manager

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Format No.BF/FM/40A

Test Report

Report No.: W/22/002/02

Date of Reporting: 10.03.2022

TEST/ ANALYSIS RESULT

Sl. No.	Parameters	Specification, Standard Methods	Results
18.	Alluminium as Al (mg/l)	APHA 23rd Edition, 3500-Al-B	<0.03
19.	Boron as B (mg/l)	APHA 23rd Edition, 4500-B-C	<0.5
20.	Sodium(as Na) mg/l,	APHA 23rd Edition, 3500 Na-B	15.7
21.	Potassium(as K) mg./l,	APHA 23rd Edition, 3500 K-B	7.6
22.	Dissolved Oxygen	APHA 23rd Edition-4500-0-C	4.7
23.	Total Suspended Solids (mg/l)	APHA 23rd Edition, 2540D	14.4
24.	Oil & Grease (mg/l)	APHA 23rd Edition, 5520-B	<2.0
25.	Chemical Oxygen Demand (mg/l)	APHA 23rd Edition, 5220B	14.1
26.	Biological Oxygen Demand 3 days at 27°C (mg/l)	IS:3025,Part-44,2003, RA: 2019	6.9
27.	Phosphate as PO4-3 (mg/l)	APHA 23rd Edition,4500 -P-D	0.88
28	**Total Coliform Count, MPN/100ml	IS: 1622-1981	630
29	**Faecal Coliform Count, MPN/100ml	IS: 1622-1981	420

- IS 10500 (1991): Norms for drinking water, as amended on 01, January 1993
- (**.): Not under NABL Scope.

----------End of the Report----------

Authorised Signatory

For Bharat Foundation

A. Neogi
C. E. O. & Technical Manager

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Format No.BF/FM/40A

Test Report

Report No.: W/22/002/03 Date of Reporting: 10.03.2022

Name of the Company & Address:	**ULTRA-TECH** Unit No.224,225,206,Jai Commercial Complex, Eastern Express Highway, OPP: Cadbury Factory, Khopat, Thane (W),Pin : 400601
Description of the Sample :	Surface Water.
Project :	Baseline Data For Sawariya Chemicals
Reference of sampling plan: Grab	Sampling Procedure: APHA 23rd Edition,
Location/Source of Sampling/Sample Marked As: 26° 35' 51.93" N, 88°30' 24.48" E	Manuaganj (pond) **(SW4)**
Sample Collected/Submitted By:	Our Representative (Mr. T. Ghosh).
Date of Sampling: 13.02.2022	Date of Receipt of Sample At Laboratory: 15.02.2022
Date of Start of analysis :15.02.2022	Date of Completion of Analysis: 03.03.2022

TEST/ ANALYSIS RESULT

Sl. No.	Parameters	Specification, Standard Methods	Results
1.	pH (at 25^{0}C)	APHA 23rd Edition, 4500-H B	7.19
2.	Conductivity (µmho/cm)	APHA 23rd Edition, 2510-B	161.1
3.	Turbidity, NTU, Max	APHA 23rd Edition, 2130 B.	<1
4.	Total Dissolved Solid , mg/l	APHA 23rd Edition, 2540 C	102.2
5.	Alkalinity (as $CaCO_3$), mg/l	IS 3025 (part-26) (RA:2019)	59.2
6.	Total Hardness (as$CaCO_3$)mg/l	APHA 23rd Edition, 2340 C	47.8
7.	Calcium (as Ca) ,mg/l	APHA 23rd Edition, 3500 Ca B	18.5
8.	Magnesium (as Mg) , mg/l	APHA 23rd Edition, 3500-Mg-B	6.7
9.	Chloride (as Cl), mg/l	APHA 23rd Edition,4500 Cl-B	21.0
10	Iron (as Fe), mg/l	APHA 23rd Edition, 3500 Fe B	0.19
11.	Fluoride, (as F), mg/l	APHA 23rd Edition, 4500 F- B	<0.5
12.	Sulphate (as SO_4) ,mg/l	APHA 23rd Edition, 4500-SO_4-E	12.2
13.	Nitrate (as NO_3) , mg/l	APHA 23rd Edition, 4500 NO_3 E	5.1
14.	Arsenic (as As) mg/l,	APHA 23rd Edition, 3500As-B	<0.01
15.	Chromium as Cr +6 mg/l,	APHA 23rdEdition, 3500 Cr-B	<0.05
16.	Copper as Cu (mg/l)	APHA 23rd Edition, 3500-Cu-B	<0.05
17.	Phenolic Compounds mg/l,	APHA 23rd Edition, 5530-Phenols-D	<0.01

For Bharat Foundation

Authorised Signatory

A. Neogi
C. E. O. & Technical Manager

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Format No.BF/FM/40A

Test Report

Report No.: W/22/002/03 Date of Reporting: 10.03.2022

TEST/ ANALYSIS RESULT

Sl. No.	Parameters	Specification, Standard Methods	Results
18.	Alluminium as Al (mg/l)	APHA 23rd Edition, 3500-Al-B	<0.03
19.	Boron as B (mg/l)	APHA 23rd Edition, 4500-B-C	<0.5
20.	Sodium(as Na) mg/l,	APHA 23rd Edition, 3500 Na-B	13.4
21.	Potassium(as K) mg./l,	APHA 23rd Edition, 3500 K-B	8.9
22.	Dissolved Oxygen	APHA 23rd Edition-4500-0-C	3.9
23.	Total Suspended Solids (mg/l)	APHA 23rd Edition, 2540D	19.2
24.	Oil & Grease (mg/l)	APHA 23rd Edition, 5520-B	<2.0
25.	Chemical Oxygen Demand (mg/l)	APHA 23rd Edition, 5220B	20.4
26.	Biological Oxygen Demand 3 days at 27°C (mg/l)	IS:3025,Part-44,2003, RA: 2019	9.6
27.	Phosphate as PO4-3 (mg/l)	APHA 23rd Edition,4500 -P-D	1.68
28	**Total Coliform Count, MPN/100ml	IS: 1622-1981	430
29	**Faecal Coliform Count, MPN/100ml	IS: 1622-1981	290

- IS 10500 (1991): Norms for drinking water, as amended on 01, January 1993
- (**.): Not under NABL Scope.

----------End of the Report----------

Authorised Signatory

For Bharat Foundation

A. Neogi

C. E. O. & Technical Manager

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Format No.BF/FM/40A

Test Report

Report No.: W/22/002/04

Date of Reporting: 10.03.2022

Name of the Company & Address:	**ULTRA-TECH** Unit No.224,225,206,Jai Commercial Complex, Eastern Express Highway, OPP: Cadbury Factory, Khopat, Thane (W),Pin : 400601
Description of the Sample :	Surface Water.
Project :	Baseline Data For Sawariya Chemicals
Reference of sampling plan: Grab	Sampling Procedure: APHA 23rd Edition,
Location/Source of Sampling/Sample Marked As: 26° 37' 22.82" N, 88°27' 29.09" E	Bhutkir Hat (Sau River) (**SW5**)
Sample Collected/Submitted By:	Our Representative (Mr. T. Ghosh).
Date of Sampling: 13.02.2022	Date of Receipt of Sample At Laboratory: 15.02.2022
Date of Start of analysis :15.02.2022	Date of Completion of Analysis: 03.03.2022

TEST/ ANALYSIS RESULT

Sl. No.	Parameters	Specification, Standard Methods	Results
1.	pH (at 25°C)	APHA 23rd Edition, 4500-H B	7.98
2.	Conductivity (µmho/cm)	APHA 23rd Edition, 2510-B	220.6
3.	Turbidity, NTU, Max	APHA 23rd Edition, 2130 B.	<1
4.	Total Dissolved Solid , mg/l	APHA 23rd Edition, 2540 C	142.9
5.	Alkalinity (as $CaCO_3$), mg/l	IS 3025 (part-26) (RA:2019)	78.3
6.	Total Hardness (as$CaCO_3$)mg/l	APHA 23rd Edition, 2340 C	69.8
7.	Calcium (as Ca) ,mg/l	APHA 23rd Edition, 3500 Ca B	22.1
8.	Magnesium (as Mg) , mg/l	APHA 23rd Edition, 3500-Mg-B	9.8
9.	Chloride (as Cl), mg/l	APHA 23rd Edition,4500 Cl-B	32.8
10	Iron (as Fe), mg/l	APHA 23rd Edition, 3500 Fe B	0.13
11.	Fluoride, (as F), mg/l	APHA 23rd Edition, 4500 F- B	<0.5
12.	Sulphate (as SO_4) ,mg/l	APHA 23rd Edition, 4500-SO_4-E	10.2
13.	Nitrate (as NO_3) , mg/l	APHA 23rd Edition, 4500 NO_3 E	4.9
14.	Arsenic (as As) mg/l,	APHA 23rd Edition, 3500As-B	<0.01
15.	Chromium as Cr +6 mg/l,	APHA 23rdEdition, 3500 Cr-B	<0.05
16.	Copper as Cu (mg/l)	APHA 23rd Edition, 3500-Cu-B	<0.05
17.	Phenolic Compounds mg/l,	APHA 23rd Edition, 5530-Phenols-D	<0.01

For Bharat Foundation

Authorised Signatory

A. Neogi
C. E. O. & Technical Manager

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Format No.BF/FM/40A

Test Report

Report No.: W/22/002/04

Date of Reporting: 10.03.2022

TEST/ ANALYSIS RESULT

Sl. No.	Parameters	Specification, Standard Methods	Results
18.	Alluminium as Al (mg/l)	APHA 23rd Edition, 3500-Al-B	<0.03
19.	Boron as B (mg/l)	APHA 23rd Edition, 4500-B-C	<0.5
20.	Sodium(as Na) mg/l,	APHA 23rd Edition, 3500 Na-B	23.4
21.	Potassium(as K) mg./l,	APHA 23rd Edition, 3500 K-B	7.3
22.	Dissolved Oxygen	APHA 23rd Edition-4500-0-C	4.9
23.	Total Suspended Solids (mg/l)	APHA 23rd Edition, 2540D	14.4
24.	Oil & Grease (mg/l)	APHA 23rd Edition, 5520-B	<2.0
25.	Chemical Oxygen Demand (mg/l)	APHA 23rd Edition, 5220B	11.2
26.	Biological Oxygen Demand 3 days at 27°C (mg/l)	IS:3025,Part-44,2003, RA: 2019	4.3
27.	Phosphate as PO4-3 (mg/l)	APHA 23rd Edition,4500 -P-D	0.89
28	**Total Coliform Count, MPN/100ml	IS: 1622-1981	630
29	**Faecal Coliform Count, MPN/100ml	IS: 1622-1981	440

- IS 10500 (1991): Norms for drinking water, as amended on 01, January 1993
- (**.): Not under NABL Scope.

----------End of the Report----------

Authorised Signatory

For Bharat Foundation

A. Neogi
C. E. O. & Technical Manager

Phone : 2405 5015

BHARAT FOUNDATION

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25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Format No.BF/FM/40A

Test Report

Report No.: W/22/002/05 Date of Reporting: 10.03.2022

Name of the Company & Address:	**ULTRA-TECH** Unit No.224,225,206,Jai Commercial Complex, Eastern Express Highway, OPP: Cadbury Factory, Khopat, Thane (W),Pin : 400601
Description of the Sample :	Surface Water.
Project :	Baseline Data For Sawariya Chemicals
Reference of sampling plan: Grab	Sampling Procedure: APHA 23rd Edition,
Location/Source of Sampling/Sample Marked As: 26° 40' 00" N, 88°29' 8" E	Teesta cannel (**SW6**)
Sample Collected/Submitted By:	Our Representative (Mr. T. Ghosh).
Date of Sampling: 13.02.2022	Date of Receipt of Sample At Laboratory: 15.02.2022
Date of Start of analysis :15.02.2022	Date of Completion of Analysis: 03.03.2022

TEST/ ANALYSIS RESULT

Sl. No.	Parameters	Specification, Standard Methods	Results
1.	pH (at 25^{0}C)	APHA 23rd Edition, 4500-H B	8.57
2.	Conductivity (µmho/cm)	APHA 23rd Edition, 2510-B	73.9
3.	Turbidity, NTU, Max	APHA 23rd Edition, 2130 B.	<1
4.	Total Dissolved Solid , mg/l	APHA 23rd Edition, 2540 C	49.2
5.	Alkalinity (as $CaCO_3$), mg/l	IS 3025 (part-26) (RA:2019)	39.2
6.	Total Hardness (as$CaCO_3$)mg/l	APHA 23rd Edition, 2340 C	33.1
7.	Calcium (as Ca) ,mg/l	APHA 23rd Edition, 3500 Ca B	9.1
8.	Magnesium (as Mg) , mg/l	APHA 23rd Edition, 3500-Mg-B	2.7
9.	Chloride (as Cl), mg/l	APHA 23rd Edition,4500 Cl-B	18.3
10	Iron (as Fe), mg/l	APHA 23rd Edition, 3500 Fe B	0.12
11.	Fluoride, (as F), mg/l	APHA 23rd Edition, 4500 F- B	<0.5
12.	Sulphate (as SO_4) ,mg/l	APHA 23rd Edition, 4500-SO_4-E	<5.0
13.	Nitrate (as NO_3) , mg/l	APHA 23rd Edition, 4500 NO_3 E	2.1
14.	Arsenic (as As) mg/l,	APHA 23rd Edition, 3500As-B	<0.01
15.	Chromium as Cr +6 mg/l,	APHA 23rdEdition, 3500 Cr-B	<0.05
16.	Copper as Cu (mg/l)	APHA 23rd Edition, 3500-Cu-B	<0.05
17.	Phenolic Compounds mg/l,	APHA 23rd Edition, 5530-Phenols-D	<0.01

Authorised Signatory

For Bharat Foundation

A. Neogi

C. E. O. & Technical Manager

Phone : 2405 5015

BHARAT FOUNDATION

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25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Format No.BF/FM/40A

Test Report

Report No.: W/22/002/05

Date of Reporting: 10.03.2022

TEST/ ANALYSIS RESULT

Sl. No.	Parameters	Specification, Standard Methods	Results
18.	Alluminium as Al (mg/l)	APHA 23rd Edition, 3500-Al-B	<0.03
19.	Boron as B (mg/l)	APHA 23rd Edition, 4500-B-C	<0.5
20.	Sodium(as Na) mg/l,	APHA 23rd Edition, 3500 Na-B	8.4
21.	Potassium(as K) mg./l,	APHA 23rd Edition, 3500 K-B	2.7
22.	Dissolved Oxygen	APHA 23rd Edition-4500-0-C	3.3
23.	Total Suspended Solids (mg/l)	APHA 23rd Edition, 2540D	14.4
24.	Oil & Grease (mg/l)	APHA 23rd Edition, 5520-B	<2.0
25.	Chemical Oxygen Demand (mg/l)	APHA 23rd Edition, 5220B	9.2
26.	Biological Oxygen Demand 3 days at 27°C (mg/l)	IS:3025,Part-44,2003, RA: 2019	3.9
27.	Phosphate as PO4-3 (mg/l)	APHA 23rd Edition,4500 -P-D	1.02
28	**Total Coliform Count, MPN/100ml	IS: 1622-1981	520
29	**Faecal Coliform Count, MPN/100ml	IS: 1622-1981	360

- IS 10500 (1991): Norms for drinking water, as amended on 01, January 1993
- (**.): Not under NABL Scope.

----------End of the Report----------

Authorised Signatory

For Bharat Foundation
A. Neogi
C. E. O. & Technical Manager

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Format No.BF/FM/40A

Test Report

Report No.: W/22/002/06 Date of Reporting: 10.03.2022

Name of the Company & Address:	**ULTRA-TECH** Unit No.224,225,206,Jai Commercial Complex, Eastern Express Highway, OPP: Cadbury Factory, Khopat, Thane (W),Pin : 400601
Description of the Sample :	Surface Water.
Project :	Baseline Data For Sawariya Chemicals
Reference of sampling plan: Grab	Sampling Procedure: APHA 23rd Edition,
Location/Source of Sampling/Sample Marked As: 26° 38' 40.00" N, 88°24' 6" E	Mahananda River (**SW7**)
Sample Collected/Submitted By:	Our Representative (Mr. T. Ghosh).
Date of Sampling: 13.02.2022	Date of Receipt of Sample At Laboratory: 15.02.2022
Date of Start of analysis :15.02.2022	Date of Completion of Analysis: 03.03.2022

TEST/ ANALYSIS RESULT

Sl. No.	Parameters	Specification, Standard Methods	Results
1.	pH (at 25°C)	APHA 23rd Edition, 4500-H B	7.82
2.	Conductivity (µmho/cm)	APHA 23rd Edition, 2510-B	86.9
3.	Turbidity, NTU, Max	APHA 23rd Edition, 2130 B.	<1
4.	Total Dissolved Solid , mg/l	APHA 23rd Edition, 2540 C	52.5
5.	Alkalinity (as $CaCO_3$), mg/l	IS 3025 (part-26) (RA:2019)	45.1
6.	Total Hardness (as$CaCO_3$)mg/l	APHA 23rd Edition, 2340 C	39.2
7.	Calcium (as Ca) ,mg/l	APHA 23rd Edition, 3500 Ca B	12.5
8.	Magnesium (as Mg) , mg/l	APHA 23rd Edition, 3500-Mg-B	3.9
9.	Chloride (as Cl), mg/l	APHA 23rd Edition,4500 Cl-B	19.2
10	Iron (as Fe), mg/l	APHA 23rd Edition, 3500 Fe B	0.14
11.	Fluoride, (as F), mg/l	APHA 23rd Edition, 4500 F- B	<0.5
12.	Sulphate (as SO_4) ,mg/l	APHA 23rd Edition, 4500-SO_4-E	6.1
13.	Nitrate (as NO_3) , mg/l	APHA 23rd Edition, 4500 NO_3 E	3.5
14.	Arsenic (as As) mg/l,	APHA 23rd Edition, 3500As-B	<0.01
15.	Chromium as Cr +6 mg/l,	APHA 23rdEdition, 3500 Cr-B	<0.05
16.	Copper as Cu (mg/l)	APHA 23rd Edition, 3500-Cu-B	<0.05
17.	Phenolic Compounds mg/l,	APHA 23rd Edition, 5530-Phenols-D	<0.01

Authorised Signatory

For Bharat Foundation

A. Neogi

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Format No.BF/FM/40A

Test Report

Report No.: W/22/002/06

Date of Reporting: 10.03.2022

TEST/ ANALYSIS RESULT

Sl. No.	Parameters	Specification, Standard Methods	Results
18.	Alluminium as Al (mg/l)	APHA 23rd Edition, 3500-Al-B	<0.03
19.	Boron as B (mg/l)	APHA 23rd Edition, 4500-B-C	<0.5
20.	Sodium(as Na) mg/l,	APHA 23rd Edition, 3500 Na-B	13.4
21.	Potassium(as K) mg./l,	APHA 23rd Edition, 3500 K-B	8.9
22.	Dissolved Oxygen	APHA 23rd Edition-4500-0-C	4.2
23.	Total Suspended Solids (mg/l)	APHA 23rd Edition, 2540D	14.4
24.	Oil & Grease (mg/l)	APHA 23rd Edition, 5520-B	<2.0
25.	Chemical Oxygen Demand (mg/l)	APHA 23rd Edition, 5220B	10.0
26.	Biological Oxygen Demand 3 days at 27°C (mg/l)	IS:3025,Part-44,2003, RA: 2019	3.2
27.	Phosphate as PO4-3 (mg/l)	APHA 23rd Edition,4500 -P-D	0.78
28	**Total Coliform Count, MPN/100ml	IS: 1622-1981	580
29	**Faecal Coliform Count, MPN/100ml	IS: 1622-1981	330

- IS 10500 (1991): Norms for drinking water, as amended on 01, January 1993
- (**.): Not under NABL Scope.

----------End of the Report----------

Authorised Signatory

For Bharat Foundation

A. Neogi
C. E. O. & Technical Manager

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Format No.BF/FM/40A

Test Report

Report No.: W/22/002/07 Date of Reporting: 10.03.2022

Name of the Company & Address:	**ULTRA-TECH** Unit No.224,225,206,Jai Commercial Complex, Eastern Express Highway, OPP: Cadbury Factory, Khopat, Thane (W),Pin : 400601
Description of the Sample :	Surface Water.
Project :	Baseline Data For Sawariya Chemicals
Reference of sampling plan: Grab	Sampling Procedure: APHA 23rd Edition,
Location/Source of Sampling/Sample Marked As: 26° 35' 7.06" N, 88°27' 30.13" E	Jamidar Para (Sannyasikata) **(SW 8)**
Sample Collected/Submitted By:	Our Representative (Mr. T. Ghosh).
Date of Sampling: 13.02.2022	Date of Receipt of Sample At Laboratory: 15.02.2022
Date of Start of analysis :15.02.2022	Date of Completion of Analysis: 03.03.2022

TEST/ ANALYSIS RESULT

Sl. No.	Parameters	Specification, Standard Methods	Results
1.	pH (at 25°C)	APHA 23rd Edition, 4500-H B	7.24
2.	Conductivity (µmho/cm)	APHA 23rd Edition, 2510-B	221.7
3.	Turbidity, NTU, Max	APHA 23rd Edition, 2130 B.	<1
4.	Total Dissolved Solid , mg/l	APHA 23rd Edition, 2540 C	158.2
5.	Alkalinity (as $CaCO_3$), mg/l	IS 3025 (part-26) (RA:2019)	62.9
6.	Total Hardness (as$CaCO_3$)mg/l	APHA 23rd Edition, 2340 C	55.4
7.	Calcium (as Ca) ,mg/l	APHA 23rd Edition, 3500 Ca B	19.2
8.	Magnesium (as Mg) , mg/l	APHA 23rd Edition, 3500-Mg-B	8.7
9.	Chloride (as Cl), mg/l	APHA 23rd Edition,4500 Cl-B	22.1
10	Iron (as Fe), mg/l	APHA 23rd Edition, 3500 Fe B	0.17
11.	Fluoride, (as F), mg/l	APHA 23rd Edition, 4500 F- B	<0.5
12.	Sulphate (as SO_4) ,mg/l	APHA 23rd Edition, 4500-SO_4-E	9.1
13.	Nitrate (as NO_3) , mg/l	APHA 23rd Edition, 4500 NO_3 E	4.6
14.	Arsenic (as As) mg/l,	APHA 23rd Edition, 3500As-B	<0.01
15.	Chromium as Cr +6 mg/l,	APHA 23rdEdition, 3500 Cr-B	<0.05
16.	Copper (as Cu) mg/l,	APHA 23rd Edition, 3500-Cu-B	<0.05
17.	Phenolic Compounds mg/l,	APHA 23rd Edition, 5530-Phenols-D	<0.01

For Bharat Foundation

Authorised Signatory

A. Neogi
C. E. O. & Technical Manager

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Format No.BF/FM/40A

Test Report

Report No.: W/22/002/07 Date of Reporting: 10.03.2022

TEST/ ANALYSIS RESULT

Sl. No.	Parameters	Specification, Standard Methods	Results
18.	Alluminium as Al (mg/l)	APHA 23rd Edition, 3500-Al-B	<0.03
19.	Boron as B (mg/l)	APHA 23rd Edition, 4500-B-C	<0.5
20.	Sodium(as Na) mg/l,	APHA 23rd Edition, 3500 Na-B	33.1
21.	Potassium(as K) mg./l,	APHA 23rd Edition, 3500 K-B	12.1
22.	Dissolved Oxygen	APHA 23rd Edition-4500-0-C	2.1
23.	Total Suspended Solids (mg/l)	APHA 23rd Edition, 2540D	24.4
24.	Oil & Grease (mg/l)	APHA 23rd Edition, 5520-B	<2.0
25.	Chemical Oxygen Demand (mg/l)	APHA 23rd Edition, 5220B	53.3
26.	Biological Oxygen Demand 3 days at 27°C (mg/l)	IS:3025,Part-44,2003, RA: 2019	20
27.	Phosphate as PO4-3 (mg/l)	APHA 23rd Edition,4500 -P-D	1.87
28	**Total Coliform Count, MPN/100ml	IS: 1622-1981	630
29	**Faecal Coliform Count, MPN/100ml	IS: 1622-1981	410

- IS 10500 (1991): Norms for drinking water, as amended on 01, January 1993
- (**.): Not under NABL Scope.

----------End of the Report----------

Authorised Signatory

For Bharat Foundation
A. Neogi
C. E. O. & Technical Manager

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Format No.BF/FM/40A

Test Report

Report No.: W/22/001 **Date of Reporting:** 10.03.2022

Name of the Company & Address:	**ULTRA-TECH** Unit No.224,225,206,Jai Commercial Complex, Eastern Express Highway, OPP: Cadbury Factory, Khopat, Thane (W),Pin : 400601
Description of the Sample:	Ground Water
Project:	Baseline Data For Sawariya Chemicals
Reference of sampling plan: Grab	Sampling Procedure: APHA 23rd Edition, 1060 B (a)
Location/Source of Sampling/Sample Marked As: 26° 39' 6.04"N, 88° 29' 46.45" E	**Project site (GW-1)**
Sample Collected/Submitted By:	Our Representative (Mr. T. Ghosh).
Date of Sampling: 12.02.2022	Date of Receipt of Sample At Laboratory: 14.02.2022
Date of Start of analysis : 14.02.2022	Date of Completion of Analysis: 24.02.2022

TEST/ ANALYSIS RESULT

Sl. No.	Parameters	Specification, Standard Methods	Results
1.	pH (at 25°C)	APHA 23rd Edition, 4500-H B	7.22
2.	Conductivity (µmho/cm)	APHA 23rd Edition, 2510-B	151.2
3.	Colour (Hazen)	APHA 23rd Edition, 2120-B	<5
4.	Turbidity, NTU, Max	APHA 23rd Edition, 2130 B.	<1
5.	Total Dissolved Solid , mg/l	APHA 23rd Edition, 2540 C	101.2
6.	Alkalinity (as $CaCO_3$), mg/l	IS 3025 (part-26) RA:2019	55.6
7.	Total Hardness (as$CaCO_3$)mg/l	APHA 23rd Edition, 2340 C	48.2
8.	Calcium (as Ca) ,mg/l	APHA 23rd Edition, 3500 Ca B	15.2
9.	Magnesium (as Mg) , mg/l	APHA 23rd Edition, 3500-Mg-B	2.4
10.	Chloride (as Cl), mg/l	APHA 23rd Edition,4500 Cl-B	13.4
11.	Iron (as Fe), mg/l	APHA 23rd Edition, 3500 Fe B	2.6
12.	Fluoride, (as F), mg/l	APHA 23rd Edition, 4500 F- B	<0.5
13.	Sulphate (as SO_4) ,mg/l	APHA 23rd Edition, 4500-SO_4-E	<5.0
14.	Arsenic (as As) mg/l,	APHA 23rd Edition, 3500As-B	<0.01
15.	Sodium(as Na) mg/l,	APHA 23rd Edition, 3500 Na-B	15.2
16.	Potassium(as K) mg./l,	APHA 23rd Edition, 3500 K-B	4.9
17.	**Total Coliform Count, MPN/100ml	IS: 1622-1981	Absent.

- IS 10500 (1991): Norms for drinking water, as amended on 01, January 1993
- (**.): Not under NABL Scope.

For Bharat Foundation

Authorised Signatory

A. Neogi

----------End of the Report----------

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Format No.BF/FM/40A

Test Report

Report No.: W/22/001/01 **Date of Reporting:** 10.03.2022

Name of the Company & Address:	**ULTRA-TECH** Unit No.224,225,206,Jai Commercial Complex, Eastern Express Highway, OPP: Cadbury Factory, Khopat, Thane (W),Pin : 400601
Description of the Sample :	Ground Water
Project:	Baseline Data For Sawariya Chemicals
Reference of sampling plan: Grab	Sampling Procedure: APHA 23rd Edition, 1060 B (a)
Location/Source of Sampling/Sample Marked As: 26° 38' 28.24" N, 88° 30' 36.79"E	**Ambari Falakata Railway station (GW-2)**
Sample Collected/Submitted By:	Our Representative (Mr. T. Ghosh).
Date of Sampling: 12.02.2022	Date of Receipt of Sample At Laboratory: 14.02.2022
Date of Start of analysis : 14.02.2022	Date of Completion of Analysis: 24.02.2022

TEST/ ANALYSIS RESULT

Sl. No.	Parameters	Specification, Standard Methods	Results
1.	pH (at 25°C)	APHA 23rd Edition, 4500-H B	7.02
2.	Conductivity (µmho/cm)	APHA 23rd Edition, 2510-B	460.0
3.	Colour (Hazen)	APHA 23rd Edition, 2120-B	<5
4.	Turbidity, NTU, Max	APHA 23rd Edition, 2130 B.	<1
5.	Total Dissolved Solid , mg/l	APHA 23rd Edition, 2540 C	298.0
6.	Alkalinity (as $CaCO_3$), mg/l	IS 3025 (part-26) RA:2019	176.8
7.	Total Hardness (as$CaCO_3$)mg/l	APHA 23rd Edition, 2340 C	155.2
8.	Calcium (as Ca) ,mg/l	APHA 23rd Edition, 3500 Ca B	44.1
9.	Magnesium (as Mg) , mg/l	APHA 23rd Edition, 3500-Mg-B	10.9
10.	Chloride (as Cl), mg/l	APHA 23rd Edition,4500 Cl-B	39.3
11.	Iron (as Fe), mg/l	APHA 23rd Edition, 3500 Fe B	<0.05
12.	Fluoride, (as F), mg/l	APHA 23rd Edition, 4500 F- B	<0.5
13.	Sulphate (as SO_4) ,mg/l	APHA 23rd Edition, 4500-SO_4-E	9.8
14.	Arsenic (as As) mg/l,	APHA 23rd Edition, 3500As-B	<0.01
15.	Sodium(as Na) mg/l,	APHA 23rd Edition, 3500 Na-B	57.6
16.	Potassium(as K) mg./l,	APHA 23rd Edition, 3500 K-B	16.1
17.	**Total Coliform Count, MPN/100ml	IS: 1622-1981	Absent.

- IS 10500 (1991): Norms for drinking water, as amended on 01, January 1993
- (**.): Not under NABL Scope.

Authorised Signatory
For Bharat Foundation

A. Neogi

----------End of the Report----------

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Format No.BF/FM/40A

Test Report

Report No.: W/22/001/02 **Date of Reporting:** 10.03.2022

Name of the Company & Address:	**ULTRA-TECH** Unit No.224,225,206,Jai Commercial Complex, Eastern Express Highway, OPP: Cadbury Factory, Khopat, Thane (W),Pin : 400601
Description of the Sample :	Ground Water
Project:	Baseline Data For Sawariya Chemicals
Reference of sampling plan: Grab	Sampling Procedure: APHA 23rd Edition, 1060 B (a)
Location/Source of Sampling/Sample Marked As: 26° 37' 33.18" N, 88° 30' 18.63"E	**Ambari Road (GW-3)**
Sample Collected/Submitted By:	Our Representative (Mr. T. Ghosh).
Date of Sampling: 12.02.2022	Date of Receipt of Sample At Laboratory: 14.02.2022
Date of Start of analysis : 14.02.2022	Date of Completion of Analysis: 24.02.2022

TEST/ ANALYSIS RESULT

Sl. No.	Parameters	Specification, Standard Methods	Results
1.	pH (at 25^{0}C)	APHA 23rd Edition, 4500-H B	6.82
2.	Conductivity (µmho/cm)	APHA 23rd Edition, 2510-B	649.0
3.	Colour (Hazen)	APHA 23rd Edition, 2120-B	<5
4.	Turbidity, NTU, Max	APHA 23rd Edition, 2130 B.	<1
5.	Total Dissolved Solid , mg/l	APHA 23rd Edition, 2540 C	401.0
6.	Alkalinity (as $CaCO_3$), mg/l	IS 3025 (part-26) RA:2019	165.2
7.	Total Hardness (as$CaCO_3$)mg/l	APHA 23rd Edition, 2340 C	205.1
8.	Calcium (as Ca) ,mg/l	APHA 23rd Edition, 3500 Ca B	62.2
9.	Magnesium (as Mg) , mg/l	APHA 23rd Edition, 3500-Mg-B	12.5
10.	Chloride (as Cl), mg/l	APHA 23rd Edition,4500 Cl-B	56.9
11.	Iron (as Fe), mg/l	APHA 23rd Edition, 3500 Fe B	0.16
12.	Fluoride, (as F), mg/l	APHA 23rd Edition, 4500 F- B	<0.5
13.	Sulphate (as SO_4) ,mg/l	APHA 23rd Edition, 4500-SO_4-E	12.4
14.	Arsenic (as As) mg/l,	APHA 23rd Edition, 3500As-B	<0.01
15.	Sodium(as Na) mg/l,	APHA 23rd Edition, 3500 Na-B	52.6
16.	Potassium(as K) mg./l,	APHA 23rd Edition, 3500 K-B	14.8
17.	**Total Coliform Count, MPN/100ml	IS: 1622-1981	Absent.

- IS 10500 (1991): Norms for drinking water, as amended on 01, January 1993
- (**.): Not under NABL Scope.

Authorised Signatory
For Bharat Foundation

----------End of the Report----------

A. Neogi

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Format No.BF/FM/40A

Test Report

Report No.: W/22/001/03 **Date of Reporting:** 10.03.2022

Name of the Company & Address:	**ULTRA-TECH** Unit No.224,225,206,Jai Commercial Complex, Eastern Express Highway, OPP: Cadbury Factory, Khopat, Thane (W),Pin : 400601
Description of the Sample :	Ground Water
Project:	Baseline Data For Sawariya Chemicals
Reference of sampling plan: Grab	Sampling Procedure: APHA 23rd Edition, 1060 B (a)
Location/Source of Sampling/Sample Marked As: 26° 36' 23.48" N, 88° 29' 17.54"E	**Sitaguri (GW-4)**
Sample Collected/Submitted By:	Our Representative (Mr. T. Ghosh).
Date of Sampling: 12.02.2022	Date of Receipt of Sample At Laboratory: 14.02.2022
Date of Start of analysis : 14.02.2022	Date of Completion of Analysis: 24.02.2022

TEST/ ANALYSIS RESULT

Sl. No.	Parameters	Specification, Standard Methods	Results
1.	pH (at 25^{0}C)	APHA 23rd Edition, 4500-H B	7.82
2.	Conductivity (µmho/cm)	APHA 23rd Edition, 2510-B	420.0
3.	Colour (Hazen)	APHA 23rd Edition, 2120-B	<5
4.	Turbidity, NTU, Max	APHA 23rd Edition, 2130 B.	<1
5.	Total Dissolved Solid , mg/l	APHA 23rd Edition, 2540 C	252.0
6.	Alkalinity (as $CaCO_3$), mg/l	IS 3025 (part-26) RA:2019	91.2
7.	Total Hardness (as$CaCO_3$)mg/l	APHA 23rd Edition, 2340 C	120.4
8.	Calcium (as Ca) ,mg/l	APHA 23rd Edition, 3500 Ca B	32.1
9.	Magnesium (as Mg) , mg/l	APHA 23rd Edition, 3500-Mg-B	9.8
10.	Chloride (as Cl), mg/l	APHA 23rd Edition,4500 Cl-B	43.5
11.	Iron (as Fe), mg/l	APHA 23rd Edition, 3500 Fe B	0.61
12.	Fluoride, (as F), mg/l	APHA 23rd Edition, 4500 F- B	<0.5
13.	Sulphate (as SO_4) ,mg/l	APHA 23rd Edition, 4500-SO_4-E	5.6
14.	Arsenic (as As) mg/l,	APHA 23rd Edition, 3500As-B	<0.01
15.	Sodium(as Na) mg/l,	APHA 23rd Edition, 3500 Na-B	29.8
16.	Potassium(as K) mg./l,	APHA 23rd Edition, 3500 K-B	9.7
17.	**Total Coliform Count, MPN/100ml	IS: 1622-1981	Absent.

- IS 10500 (1991): Norms for drinking water, as amended on 01, January 1993
- (**.): Not under NABL Scope.

Authorised Signatory
For Bharat Foundation

----------End of the Report----------

A. Neogi

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Format No.BF/FM/40A

Test Report

Report No.: W/22/001/04 **Date of Reporting:** 10.03.2022

Name of the Company & Address:	**ULTRA-TECH** Unit No.224,225,206,Jai Commercial Complex, Eastern Express Highway, OPP: Cadbury Factory, Khopat, Thane (W),Pin : 400601
Description of the Sample :	Ground Water
Project:	Baseline Data For Sawariya Chemicals
Reference of sampling plan: Grab	Sampling Procedure: APHA 23rd Edition, 1060 B (a)
Location/Source of Sampling/Sample Marked As: 26° 37' 29.15" N, 88° 28' 2.17"E	**Gander More (GW-5)**
Sample Collected/Submitted By:	Our Representative (Mr. T. Ghosh).
Date of Sampling: 12.02.2022	Date of Receipt of Sample At Laboratory: 14.02.2022
Date of Start of analysis : 14.02.2022	Date of Completion of Analysis: 24.02.2022

TEST/ ANALYSIS RESULT

Sl. No.	Parameters	Specification, Standard Methods	Results
1.	pH (at 25°C)	APHA 23rd Edition, 4500-H B	7.36
2.	Conductivity (µmho/cm)	APHA 23rd Edition, 2510-B	152.6
3.	Colour (Hazen)	APHA 23rd Edition, 2120-B	<5
4.	Turbidity, NTU, Max	APHA 23rd Edition, 2130 B.	<1
5.	Total Dissolved Solid , mg/l	APHA 23rd Edition, 2540 C	98.6
6.	Alkalinity (as $CaCO_3$), mg/l	IS 3025 (part-26) RA:2019	53.2
7.	Total Hardness (as$CaCO_3$)mg/l	APHA 23rd Edition, 2340 C	47.4
8.	Calcium (as Ca) ,mg/l	APHA 23rd Edition, 3500 Ca B	14.7
9.	Magnesium (as Mg) , mg/l	APHA 23rd Edition, 3500-Mg-B	3.0
10.	Chloride (as Cl), mg/l	APHA 23rd Edition,4500 Cl-B	17.1
11.	Iron (as Fe), mg/l	APHA 23rd Edition, 3500 Fe B	6.64
12.	Fluoride, (as F), mg/l	APHA 23rd Edition, 4500 F- B	<0.5
13.	Sulphate (as SO_4) ,mg/l	APHA 23rd Edition, 4500-SO_4-E	<5.0
14.	Arsenic (as As) mg/l,	APHA 23rd Edition, 3500As-B	<0.01
15.	Sodium(as Na) mg/l,	APHA 23rd Edition, 3500 Na-B	11.4
16.	Potassium(as K) mg./l,	APHA 23rd Edition, 3500 K-B	4.3
17.	**Total Coliform Count, MPN/100ml	IS: 1622-1981	Absent.

- IS 10500 (1991): Norms for drinking water, as amended on 01, January 1993
- (**.): Not under NABL Scope.

Authorised Signatory

For Bharat Foundation

A. Neogi

C. E. O. & Technical Manager

----------End of the Report----------

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Format No.BF/FM/40A

Test Report

Report No.: W/22/001/05 **Date of Reporting:** 10.03.2022

Name of the Company & Address:	**ULTRA-TECH** Unit No.224,225,206,Jai Commercial Complex, Eastern Express Highway, OPP: Cadbury Factory, Khopat, Thane (W),Pin : 400601
Description of the Sample :	Ground Water
Project:	Baseline Data For Sawariya Chemicals
Reference of sampling plan: Grab	Sampling Procedure: APHA 23rd Edition, 1060 B (a)
Location/Source of Sampling/Sample Marked As: 26° 41' 06.16" N, 88° 26' 33.69"E	**NJP Railway Station (GW-6)**
Sample Collected/Submitted By:	Our Representative (Mr. T. Ghosh).
Date of Sampling: 12.02.2022	Date of Receipt of Sample At Laboratory: 14.02.2022
Date of Start of analysis : 14.02.2022	Date of Completion of Analysis: 24.02.2022

TEST/ ANALYSIS RESULT

Sl. No.	Parameters	Specification, Standard Methods	Results
1.	pH (at 25°C)	APHA 23rd Edition, 4500-H B	7.10
2.	Conductivity (µmho/cm)	APHA 23rd Edition, 2510-B	110.9
3.	Colour (Hazen)	APHA 23rd Edition, 2120-B	<5
4.	Turbidity, NTU, Max	APHA 23rd Edition, 2130 B.	<1
5.	Total Dissolved Solid , mg/l	APHA 23rd Edition, 2540 C	69.4
6.	Alkalinity (as $CaCO_3$), mg/l	IS 3025 (part-26) RA:2019	32.1
7.	Total Hardness (as$CaCO_3$)mg/l	APHA 23rd Edition, 2340 C	28.2
8.	Calcium (as Ca) ,mg/l	APHA 23rd Edition, 3500 Ca B	8.2
9.	Magnesium (as Mg) , mg/l	APHA 23rd Edition, 3500-Mg-B	2.8
10.	Chloride (as Cl), mg/l	APHA 23rd Edition,4500 Cl-B	11.7
11.	Iron (as Fe), mg/l	APHA 23rd Edition, 3500 Fe B	7.97
12.	Fluoride, (as F), mg/l	APHA 23rd Edition, 4500 F- B	<0.5
13.	Sulphate (as SO_4) ,mg/l	APHA 23rd Edition, 4500-SO_4-E	<5.0
14.	Arsenic (as As) mg/l,	APHA 23rd Edition, 3500As-B	<0.01
15.	Sodium(as Na) mg/l,	APHA 23rd Edition, 3500 Na-B	9.9
16.	Potassium(as K) mg./l,	APHA 23rd Edition, 3500 K-B	3.1
17.	**Total Coliform Count, MPN/100ml	IS: 1622-1981	Absent.

IS 10500 (1991): Norms for drinking water, as amended on 01, January 1993

- (**.): Not under NABL Scope.

For Bharat Foundation

Authorised Signatory

A. Neogi
C. E. O. & Technical M

----------End of the Report----------

Phone : 2405 5015

BHARAT FOUNDATION

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25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Format No.BF/FM/40A

Test Report

Report No.: W/22/001/06 **Date of Reporting:** 10.03.2022

Name of the Company & Address:	**ULTRA-TECH** Unit No.224,225,206,Jai Commercial Complex, Eastern Express Highway, OPP: Cadbury Factory, Khopat, Thane (W),Pin : 400601
Description of the Sample :	Ground Water
Project:	Baseline Data For Sawariya Chemicals
Reference of sampling plan: Grab	Sampling Procedure: APHA 23rd Edition, 1060 B (a)
Location/Source of Sampling/Sample marked as: 26° 36' 11.28" N, 88° 32' 41.69"E	**Shikarpur (GW-7)**
Sample Collected/Submitted By:	Our Representative (Mr. T. Ghosh).
Date of Sampling: 12.02.2022	Date of Receipt of Sample At Laboratory: 14.02.2022
Date of Start of analysis : 14.02.2022	Date of Completion of Analysis: 24.02.2022

TEST/ ANALYSIS RESULT

Sl. No.	Parameters	Specification, Standard Methods	Results
1.	pH (at 25°C)	APHA 23rd Edition, 4500-H B	6.79
2.	Conductivity (µmho/cm)	APHA 23rd Edition, 2510-B	136.5
3.	Colour (Hazen)	APHA 23rd Edition, 2120-B	<5
4.	Turbidity, NTU, Max	APHA 23rd Edition, 2130 B.	<1
5.	Total Dissolved Solid , mg/l	APHA 23rd Edition, 2540 C	92.1
6.	Alkalinity (as $CaCO_3$), mg/l	IS 3025 (part-26) RA:2019	39.1
7.	Total Hardness (as$CaCO_3$)mg/l	APHA 23rd Edition, 2340 C	28.2
8.	Calcium (as Ca) ,mg/l	APHA 23rd Edition, 3500 Ca B	8.8
9.	Magnesium (as Mg) , mg/l	APHA 23rd Edition, 3500-Mg-B	2.7
10.	Chloride (as Cl), mg/l	APHA 23rd Edition,4500 Cl-B	11.6
11.	Iron (as Fe), mg/l	APHA 23rd Edition, 3500 Fe B	0.64
12.	Fluoride, (as F), mg/l	APHA 23rd Edition, 4500 F- B	<0.5
13.	Sulphate (as SO_4) ,mg/l	APHA 23rd Edition, 4500-SO_4-E	<5.0
14.	Arsenic (as As) mg/l,	APHA 23rd Edition, 3500As-B	<0.01
15.	Sodium(as Na) mg/l,	APHA 23rd Edition, 3500 Na-B	10.2
16.	Potassium(as K) mg./l,	APHA 23rd Edition, 3500 K-B	3.7
17.	**Total Coliform Count, MPN/100ml	IS: 1622-1981	Absent.

- IS 10500 (1991): Norms for drinking water, as amended on 01, January 1993
- (**.): Not under NABL Scope.

Authorised Signatory
For Bharat Foundation
A. Neogi

----------End of the Report----------

Phone : 2405 5015

BHARAT FOUNDATION

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25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Format No.BF/FM/40A

Test Report

Report No.: W/22/001/07 **Date of Reporting:** 10.03.2022

Name of the Company & Address:	**ULTRA-TECH** Unit No.224,225,206,Jai Commercial Complex, Eastern Express Highway, OPP: Cadbury Factory, Khopat, Thane (W),Pin : 400601
Description of the Sample:	Ground Water
Project:	Baseline Data For Sawariya Chemicals
Reference of sampling plan: Grab	Sampling Procedure: APHA 23rd Edition, 1060 B (a)
Location/Source of Sampling/Sample Marked As: 26° 35' 05.82" N, 88° 27' 32.23"E	**Sannyasikata (GW-8)**
Sample Collected/Submitted By:	Our Representative (Mr. T. Ghosh).
Date of Sampling: 12.02.2022	Date of Receipt of Sample At Laboratory: 14.02.2022
Date of Start of analysis : 14.02.2022	Date of Completion of Analysis: 24.02.2022

TEST/ ANALYSIS RESULT

Sl. No.	Parameters	Specification, Standard Methods	Results
1.	pH (at 25°C)	APHA 23rd Edition, 4500-H B	6.72
2.	Conductivity (µmho/cm)	APHA 23rd Edition, 2510-B	634.0
3.	Colour (Hazen)	APHA 23rd Edition, 2120-B	<5
4.	Turbidity, NTU, Max	APHA 23rd Edition, 2130 B.	<1
5.	Total Dissolved Solid , mg/l	APHA 23rd Edition, 2540 C	394.0
6.	Alkalinity (as $CaCO_3$), mg/l	IS 3025 (part-26) RA:2019	252.1
7.	Total Hardness (as$CaCO_3$)mg/l	APHA 23rd Edition, 2340 C	205.2
8.	Calcium (as Ca) ,mg/l	APHA 23rd Edition, 3500 Ca B	54.2
9.	Magnesium (as Mg) , mg/l	APHA 23rd Edition, 3500-Mg-B	14.5
10.	Chloride (as Cl), mg/l	APHA 23rd Edition,4500 Cl-B	65.8
11.	Iron (as Fe), mg/l	APHA 23rd Edition, 3500 Fe B	0.26
12.	Fluoride, (as F), mg/l	APHA 23rd Edition, 4500 F- B	<0.5
13.	Sulphate (as SO_4) ,mg/l	APHA 23rd Edition, 4500-SO_4-E	13.9
14.	Arsenic (as As) mg/l,	APHA 23rd Edition, 3500As-B	<0.01
15.	Sodium(as Na) mg/l,	APHA 23rd Edition, 3500 Na-B	37.6
16.	Potassium(as K) mg./l,	APHA 23rd Edition, 3500 K-B	9.1
17.	**Total Coliform Count, MPN/100ml	IS: 1622-1981	Absent.

IS 10500 (1991): Norms for drinking water, as amended on 01, January 1993

- (**.): Not under NABL Scope.

Authorised Signatory

For Bharat Foundation

A. Neogi

----------End of the Report----------

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Test Report

Report No.: G/22/04 **Date of Reporting:** 12.03.2022

Name of the Company & Address:	**ULTRA-TECH** Unit No.224,225,206,Jai Commercial Complex, Eastern Express Highway, OPP: Cadbury Factory, Khopat, Thane (W),Pin : 400601
Description of the Sample :	Soil
Project:	**SAWARIYA CHEMICALS**
Sample Collected/Submitted By:	Our Representative (Mr. T. Ghosh).
Date of Sampling: 14.02.2022	Date of Receipt of Sample At Laboratory: 16.02.2022
Date of Start of analysis : 16.02.2022	Date of Completion of Analysis: 26.02.2022

SL. NO	PARAMETERS	LOCATION AND COORDINATES			
		Project site (S-1)	**Shimulguri (S-2)**	**Shikarpur(S-3)**	**Manuaganj (S-4)**
		26° 39' 6.00" N, 88° 29' 46.60"E	26° 40' 22.12" N, 88° 31' 20.64"E	26° 37' 19.07" N, 88° 33' 21.29"E	26° 35' 48.56" N, 88° 30' 43.67"E
1	Colour	Hue 2.5YR-5/0gray	Hue 2.5YR-6/0 gray	Hue 5YR-5/1 gray	Hue 2.5YR-4/0 gray
2	Texture	Sand=22.9% Silt=47.2.% Clay=29.9% Texture: Silty clay	Sand=15.1% Silt=45.8% Clay=39.1% Texture: Silty clay	Sand=14.2% Silt=47.8% Clay=38.0% Texture: Siltyclay	Sand=13.3% Silt=54.6% Clay=31.1% Texture: Silty clay
3	pH (1:2.5 ratio)	7.87	7.89	7.91	7.36
4	Conductivity (µmhos/cm)	1289	1137	1121	1129
5	Sodium (as Na) mg/kg	0.025	0.022	0.019	0.025
6	Potassium (as K) mg/kg	0.014	0.017	0.015	0.019
7	Calcium (as Ca) mg/kg	0.42	0.31	0.38	0.49
8	Magnesium (as Mg) mg/kg	0.20	0.15	0.17	0.23
9	Nitrogenmg/kg	0.079	0.069	0.062	0.084
10	Phosphates (as P_2O_5) mg/kg	0.051	0.037	0.031	0.038
11	Total Organic Carbon %	3.39	3.03	3.18	3.31

Authorised Signatory

For Bharat Foundation

A. Neogi
C. E. O. & Technical Manager

Phone : 2405 5015

BHARAT FOUNDATION

(Recognised by WEST BENGAL POLLUTION CONTROL BOARD)

25/11A, K. P. Roy Lane, Kolkata - 700 031
E-mail : bharatfoundation@gmail.com

Test Report

Report No.: G/22/04 **Date of Reporting:** 12.03.2022

Name of the Company & Address:	**ULTRA-TECH** Unit No.224,225,206,Jai Commercial Complex, Eastern Express Highway, OPP: Cadbury Factory, Khopat, Thane (W),Pin : 400601
Description of the Sample :	Soil
Project:	**SAWARIYA CHEMICALS**
Sample Collected/Submitted By:	Our Representative (Mr. T. Ghosh).
Date of Sampling: 14.02.2022	Date of Receipt of Sample At Laboratory: 16.02.2022
Date of Start of analysis : 16.02.2022	Date of Completion of Analysis: 26.02.2022

SL. NO	PARAMETERS	LOCATION, CODE AND COORDINATES			
		Bhutkir Hat (S-5)	**Kamrangaguri/ Fulbari (S-6)**	**Mahanada Ghat (S-7)**	**Dabgram (S-8)**
		26° 37' 22.95" N, 88° 27' 26.63"E	26° 39' 22.12" N, 88° 25' 00.75"E	26° 40' 37.79" N, 88° 24' 50.50"E	26° 43' 20.04" N, 88° 28' 22.86"E
1	Colour	Hue 5YR-7/2 light Gray	Hue 5YR-6/1 Gray	Hue 5YR-4/1 DarkGray	Hue 5YR-6/1 Gray
2	Texture	Sand=17.2% Silt=54.0% Clay=28.8% Texture: Silty clay	Sand=14.8% Silt=50.4% Clay=34.8.8% Texture: Silty clay	Sand=12.3% Silt=49.7% Clay=38% Texture: Silty clay	Sand=15.8% Silt=57.2% Clay=27.-% Texture: Silty clay
3	pH (1:2.5 ratio)	8.03	7.13	8.41	7.71
4	Conductivity (µmhos/cm)	1081	1291	015	1098
5	Sodium (as Na) mg/kg	0.015	0.027	0.019	0.022
6	Potassium (as K) mg/kg	0.013	0.022	0.010	0.012
7	Calcium (as Ca) mg/kg	0.39	0.44	0.19	0.23
8	Magnesium (as Mg) mg/kg	0.22	0.29	0.13	0.15
9	Nitrogenmg/kg	0.073	0.095	0.076	0.085
10	Phosphates (as P_2O_5) mg/kg	0.029	0.044	0.021	0.035
11	Total Organic Carbon %	3.25	3.33	3.22	3.29

----------End of the Report----------

For Bharat Foundation
Authorised Signatory

A. Neogi
C. E. O. & Technical Manager

MEMO NO. 506 /SDLLRO(S)/JAL/12 DT. 29 4 19

Government of West Bengal

Office of the Sub-Divisional Land & Land Reforms Officer
সদর জলপাইগুড়ি

GOVT OF WEST BENGAL * S.D.L & L.R.O (S), JALPAIGURI *

To

শ্রীমতি রেশমী আগরওয়াল

পিতা/স্বামীর নাম: সঞ্জয় আগরওয়াল

গ্রাম ভাণী, ভানুনগর, শিলিগুড়ি জিলা. জলপাইগুড়ি

P.S.: রাজগঞ্জ District: জলপাইগুড়ি

Sub: Prayer for change of character of land from one class to another

Ref: His/Her application dated: 06/03/2019

In terms of the provision laid down in sec 4C of the West Bengal Land Reforms Act, 1955 as amended up to date read with the provision of Rule 5A of West Bengal Land Reforms Rules, 1965 permission is hereby accorded to him/her for conversion of land from one class to another as noted in the schedule-I below with effect from 29 4 19 subject to the terms and condition as noted in schedule-II

Schedule-I

(Schedule of Land for which conversion is allowed vide case no. CN/2019/0701/287)

Mouza With JL No. & PS	Khatian No. (LR)	Plot No.	Area (in Acres)	Classification as per ROR	Classification for which permission accorded
বিন্নাগুড়ি সিট নং-7, 3, রাজগঞ্জ	1019	550	0.4300	দহলা	কারখানা

Schedule – II

(Terms and conditions for conversion)

a) This permission for conversion is without prejudice to any of the provisions of chapter IIB of West Bengal Land Reforms Act, 1955.

b) This permission of conversion is also without prejudice to any the provision of the Urban Land (Ceiling and Regulation) Act , 1976 (Act 33 of 1976) & the Town & Country (Planning & Development) Act, 1979, if these are applicable to the land involved.

c) This permission for conversion will stand revoked - if there is any - violation of the provision of prevailing laws -enforcing prevention -of environmental pollution affecting public health in general of the locality at any point of time.

d) This -permission -of conversion will also stand -revoked if the land is used other than the purpose for which permission is given.

e) The Land Revenue shall be determined as per sec. 23 of amended WBLR Act.

29/4/19

Sub-Divisional Land & Land Reforms Officer
Sadar Jalpaiguri

29/04/2019

FORM 4

[See Rules 9(3) and 10(5)]

(EMBLEM OR HOLOGRAM OF THE CONCERNED AUTHORITY) 052977

PERMIT FOR SINKING OF NEW WELL

[U/S 7(3)(b) / 7(4)(b) / 7(5)(a) of the West Bengal Ground Water Resources (Management, Control and Regulation) Act 2005.]

PERMIT NO P0813003005500000001TSE

1. (a) Name of the applicant (user) : Shri/Smt. M/S SAWARIYA CHEMICAL
   (b) Son / Daughter of :
   (c) Address of the applicant : Vill: Gokulkata, Po: Kamarvita, Jalpaiguri
   (d) Category of farmer (Please tick) (in case of irrigation well) : Small Farmer / Marginal Farmer / Others
   (e) Serial No. of application Form and date of submission : BP/A-0811, SL-86, Date-16/5/22
   (f) Specimen signature of the user : Sanjay Kr Agarwal Jalpaiguri
2. Location particulars---
   (a) District
   (b) Block, Mouza, J. L. No., Plot No. : Rajganj, Binnaguri, 03, 550
   (c) Municipality / Corporation Ward No. / Borough No., Holding No. :
3. Particulars of the proposed well and pumping device---
   (a) Type of the well : Tube Well
   (b) Approx. depth of the well (m) : 60m
   (c) Purpose of the well : Industrial
   (d) Assembly size (for tube well) : 150 mm. X 100 mm.
   (e) Approx. strainer length (for tube well) : 2 m.
   (f) Diameter (for dug well) : —m.
   (g) Type of pump to be used : Submersible
   (h) H. P. of the pump : 2 H.P
   (i) Operational device : Electric Motor
   (j) Rate of withdrawal (m3 / hr.) : 6 m³/hr
   (k) Maximum allowable running hours per day : 1 hr

This permit authorizes the owner applicant (user) to sink a well in the location specified at S1. (2) for extraction of ground water at a rate not exceeding that as shown at S1. (3) (j) and for running hours / day as shown at S1. (3) (K), and is valid subject to the observance of the conditions stated overleaf.

Place : Jalpaiguri

Date : 16/8/2022

OFFICE SEAL

Signature of the Issuing Authority and Designation.

Member Secretary
District Ground Water
Competent Authority

Conditions :

(1) In case of any change of ownership of the proposed well, fresh registration has to be obtained.
(2) No change of location, design, rate of withdrawal and pumping device in respect of the proposed well as indicated at S1. (2) and (3) of this certificate shall be made without prior permission of the Competent Authority. Any deviation in this regard shall lead to cancellation of this permit.
(3) In case, any of the particulars / information furnished by the applicant in his application for issuance of this permit is found to be incorrect during verification at any subsequent stage, this permit is liable for cancellation.
(4) Any other condition imposed by the concerned Authority.

OFFICE SEAL

B.C.L./4/50,000/'06

CONDITIONALTIES:

1. Provisions of Water Meters in the Tube Well should be made for obtaining information about '*per day withdrawal*.' A log book for discharges per day should be maintained by the applicant.
2. Drawing of Water should be restricted to 1 Hours per day
3. The project will be monitored by SWID's Officers in particular to '*Water Quality Reports*' and the '*Abstraction of ground water per day*' reports in every 6 months.
4. The permit for new tube wells will be reviewed in each year following the month of issue of permits.
5. The E.I.A. will be arranged by the applicant after the report of West Bengal Pollution Control Board, Kol. 98 and required to be submitted at SWID.
6. Water Conservations by means of Roof Top Harvesting System should be adopted for storing and utilizing the water for various need, (Cleaning, Washing, Sanitation. Plantations etc.) & Waste Water Management, Recycling processes are also to be done by the applicant.
7. Tea Garden must supply drinking water to their Labour Line when required.

Sanjay Kr Agarwal

Signature of Applicant/user

Marked conditionality's must follow

16/6/11

Signature of Member Secretary

Material Safety Data Sheet

Cascophen SP-6502D

1. Product and company identification

Product name	Cascophen SP-6502D
MSDS Number	300000000237
Product Type	Phenol Formaldehyde Resin
Product use	Wood Adhesives, Composites, Laminates or Related Board Products
Manufacturer, **Importer**, **Supplier**	Hexion Specialty Chemicals, Inc. 155 West A Street, Bldg. A-1 Springfield OR 97477 hazcom@hexion.com
Print date	15-JAN-2009
Telephone	**For Emergency Medical Assistance** Call Health & Safety Information Services, 1-866-303-6949 **For Emergency Transportation Information** CHEMTREC US Domestic (800) 424-9300 CHEMTREC International (703) 527-3887 CANUTEC CA Domestic (613) 996-6666 For additional health and safety or regulatory information, call 1 888-4-Hexion.

Part of the CASCO® Brand of Adhesives and Resins from Hexion

2. Hazards identification

Form	Liquid
Odor	Slight aromatic
OSHA/HCS status	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Emergency overview	WARNING ! CAUSES EYE IRRITATION.

Potential acute health effects

Inhalation	Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs.
Ingestion	Not expected to be harmful under normal conditions of use.
Skin	May cause irritation on prolonged or repeated contact.
Eyes	Severely irritating to eyes. Risk of serious damage to eyes.

Potential chronic health effects

Chronic effects	No known significant effects or critical hazards.
Carcinogenicity	No known significant effects or critical hazards.

Mutagenicity	No known significant effects or critical hazards.
Teratogenicity	No known significant effects or critical hazards.
Developmental effects	No known significant effects or critical hazards.
Fertility effects	No known significant effects or critical hazards.
Target organs	Review Section 2 and 11 for any additional assessments.

Note: Residual formaldehyde gas may be released from this product during processing. The amount and level will depend on local conditions of use. Formaldehyde gas is irritating to the eyes and upper respiratory tract and may aggravate existing respiratory conditions or allergies. OSHA has listed formaldehyde as a potential human carcinogen. See the OSHA formaldehyde standard 29 CFR 1910.1048 for further details. The International Agency for Research on Cancer (IARC) has classified formaldehyde as carcinogenic to humans.

Over-exposure signs/symptoms

Inhalation	No specific data.
Ingestion	No specific data.
Skin	No specific data.
Eyes	Adverse symptoms may include the following: pain or irritation, watering, redness,
Medical conditions aggravated by over-exposure	None known.

See section 11 for more detailed information on health effects and symptoms.

3. Composition/Information on ingredients

Ingredient name	CAS number	%
Phenol-Formaldehyde Polymer Sodium Salt	40798-65-0	**10.0 - 30.0**
Formaldehyde, Polymer With Phenol, Potassium Salt	120712-84-7	**10.0 - 30.0**

*** Any applicable Canadian trade secret numbers will be listed in Section 15.*

4. First aid measures

Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention. Chemical burns must be treated promptly by a physician.
Skin contact	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.
Inhalation	Move exposed person to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if adverse health effects persist or are severe.

Ingestion	Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Protection of first aid personnel	No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.
Notes to physician	No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

See section 11 for more detailed information on health effects and symptoms.

5. Fire-fighting measures

Flammability of the product	In a fire or if heated, a pressure increase will occur and the container may burst.
Extinguishing media	
Suitable	Use an extinguishing agent suitable for the surrounding fire.
Not suitable	None known.
Special exposure hazards	Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
Special protective equipment for fire-fighters	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental release measures

Personal precautions	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).
Environmental precautions	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
Large spill	Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.
Small spill	Stop leak if without risk. Move containers from spill area. Dilute with

water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

7. Handling and storage

Handling

Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not breathe vapor or mist. Do not ingest. Avoid contact with eyes, skin and clothing. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Keep away from acids. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage

Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Separate from acids. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8. Exposure controls/personal protection

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures

If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures

No special ventilation requirements. Good general ventilation should be sufficient to control worker exposure to airborne contaminants. If this product contains ingredients with exposure limits, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure below any recommended or statutory limits.

Hygiene measures

Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Respiratory

Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Hands

Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Eyes	Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.
Skin	Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Environmental exposure controls	Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation.In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9. Physical and chemical properties

Form	Liquid
Flash point	Not applicable
Auto-ignition temperature	Not applicable
Flammable limits	
Lower:	Not applicable
Upper:	Not applicable
Color	Clear, reddish-brown
Odor	Slight aromatic
pH	11.0 - 12.0
Boiling point	Approx. 102 °C(216 °F)
Freezing Point	Less than 0 °C(32 °F)
Relative density	1.1991 - 1.2191
Vapor pressure	Approx. 50 mm Hg @ 25 °C(77 °F)
Odor threshold	Not available
Viscosity	Dynamic- 550 - 1,000 cPs Brookfield
Solubility	Infinite
Partition coefficient: n-octanol/water	Not available
Evaporation rate	Approx. 0.4 (n-Butyl acetate=1)
Vapor density	Not available
Typical % solids	45.00 % (m)

10. Stability and reactivity

Stability	Hazardous polymerization may occur under certain conditions of storage or use.
Conditions to avoid	Strong oxidizer,
Materials to avoid	Reactive or incompatible with the following materials: acids, oxidizing materials,
Hazardous decomposition products	Decomposition products may include the following materials: carbon monoxide, carbon dioxide, aldehydes (including formaldehyde), oxides of nitrogen particulate matter, other organic compounds,

11. Toxicological information

Acute toxicity
Product name
Cascophen SP-6502D

LC50	Inhalation	Rat	> 2501 ppm/1 hEstimated.

Acute toxicity
Ingredient name

Other Toxicological Information

Carcinogenicity
Classification
Ingredient name
Phenol-Formaldehyde Polymer Sodium Salt

ACGIH	Not classified
IARC	Not classified
NTP	Not listed
OSHA	Not regulated

Formaldehyde, Polymer With Phenol, Potassium Salt

ACGIH	Not classified
IARC	Not classified
NTP	Not listed
OSHA	Not regulated

12. Ecological information

Environmental effects
No known significant effects or critical hazards.

Biodegradability
Conclusion/Summary Phenol-formaldehyde polymers have a very low rate of biodegradation.

Other adverse effects
Bioaccumulation is expected to be minimal. Product is initially a mobile liquid which will solidify on aging. Unreacted monomer may be leached into ground water even after normal curing has occurred.

13. Disposal considerations

Waste disposal The generation of waste should be avoided or minimized wherever possible. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

14. Transportation

The data provided in this section is for information only and may not be specific to your package size or mode of transport. You will need to apply the appropriate regulations to properly classify your shipment for transportation.

International transport regulations

Regulatory information	UN number	Proper shipping name	Classes/*PG	Reportable Quantity (RQ)
CFR		Non-regulated		
TDG		Non-regulated		
IMO/IMDG		Non-regulated		
IATA (Cargo)		Non-regulated		

*PG : Packing group

15. Regulatory information

US regulations

HCS Classification Irritating material

U.S. Federal regulations

SARA 311/312 Classification Immediate (acute) health hazard, reactive

SARA 313 - Supplier Notification
This product contains the following toxic chemical(s) subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986, and Subpart C-Supplier Notification Requirement of 40 CFR Part 372.
None required.

SARA 302 Extremely Hazardous Substances None required.

State regulations

Massachusetts RTK Substances None required.

New Jersey RTK Hazardous Substances The following components are listed: Formaldehyde, Polymer With Phenol, Potassium Salt,

Pennsylvania RTK Hazardous Substances None required.

California Prop. 65: WARNING: This product contains a chemical known to the State of California to cause cancer. Formaldehyde **-** 50-00-0,

Canada

WHMIS (Canada) Class D-2A: Material causing other toxic effects (Very toxic).

Canadian lists **Canadian NPRI:** None required.

International regulations

Chemical inventories

Europe inventory Not determined.
Australia inventory (AICS) Not determined.
China inventory (IECSC) Not determined.
Japan inventory (ENCS) Not determined.
Japan inventory (ISHL) Not determined.
Korea inventory (KECI) All components are listed or exempted.
New Zealand Inventory of Chemicals (NZIoC) Not determined.
Philippines inventory (PICCS) Not determined.
United States inventory (TSCA 8b) All components are listed or exempted.
Canada inventory At least one component is not listed in DSL but all such components are listed in NDSL.

16. Other information

Hazardous Material Information System III (U.S.A.)

Health : 2
Flammability: 0
Physical hazards : 0
Chronic :

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.
The customer is responsible for determining the PPE code for this material.

Prepared by	Product Safety & Regulatory Compliance Group, (614)225-4778
Date of issue	12-DEC-2008
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Version	3

Notice to reader

The information provided herein was believed by Hexion Specialty Chemicals ("Hexion") to be accurate at the time of preparation or prepared from sources believed to be reliable, but it is the responsibility of the user to investigate and understand other pertinent sources of information, to comply with all laws and procedures applicable to the safe handling and use of the product and to determine the suitability of the product for its intended use. All products supplied by Hexion are subject to Hexion's terms and conditions of sale. HEXION MAKES NO WARRANTY, EXPRESS OR IMPLIED, CONCERNING THE PRODUCT OR THE MERCHANTABILITY OR FITNESS THEREOF FOR ANY PURPOSE OR CONCERNING THE ACCURACY OF ANY INFORMATION PROVIDED BY HEXION, except that the product shall conform to Hexion's specifications. Nothing contained herein constitutes an offer for the sale of any product.

Acetic Acid,ACS

SECTION 1 : Identification of the substance/mixture and of the supplier

Product name : **Acetic Acid,ACS**

Manufacturer/Supplier Trade name:

Manufacturer/Supplier Article number: **S25118**

Recommended uses of the product and uses restrictions on use:

Manufacturer Details:

AquaPhoenix Scientific
9 Barnhart Drive, Hanover, PA 17331

Supplier Details:

Fisher Science Education
15 Jet View Drive, Rochester, NY 14624

Emergency telephone number:

Fisher Science Education Emergency Telephone No.: 800-535-5053

SECTION 2 : Hazards identification

Classification of the substance or mixture:

Flammable
Flammable liquids, category 3

Corrosive
Serious eye damage, category 1
Skin corrosion, category 1A

Flammable liq. 3
Skin Corr. 1A
Eye Damage. 1
Acute toxicity, dermal. 4
Acute toxicity, oral. 5
Acute toxicity, inhalation. 3

Signal word :Danger

Hazard statements:
Flammable liquid and vapour
Causes severe skin burns and eye damage
May be harmful if swallowed
Toxic if inhaled
Harmful in contact with skin

Precautionary statements:
If medical advice is needed, have product container or label at hand
Keep out of reach of children
Read label before use
Keep away from heat/sparks/open flames/hot surfaces. No smoking
Wash skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection

Do not breathe dust/fume/gas/mist/vapours/spray
Use only outdoors or in a well-ventilated area
Keep container tightly closed
Ground/bond container and receiving equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Use explosion-proof electrical/ventilating/light/equipment
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting
Call a POISON CENTER or doctor/physician if you feel unwell
Take off contaminated clothing and wash before reuse
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing
Immediately call a POISON CENTER or doctor/physician
Specific treatment (see supplemental first aid instructions on this label)
In case of fire: Use agents recommended in section 5 for extinction
Store in a well ventilated place. Keep cool
Store locked up
Dispose of contents and container as instructed in Section 13

Other Non-GHS Classification:

WHMIS

B3 

D2B 

E 

NFPA/HMIS

NFPA SCALE (0-4)

HMIS RATINGS (0-4)

SECTION 3 : Composition/information on ingredients

Ingredients:

Acetic Acid,ACS

CAS 64-19-7	Acetic Acid, ACS	>90 %
		Percentages are by weight

SECTION 4 : First aid measures

Description of first aid measures

After inhalation: Move exposed individual to fresh air. Loosen clothing as necessary and position individual in a comfortable position.Seek medical advice if discomfort or irritation persists.Give artificial respiration if necessary. If breathing is difficult, give oxygen.

After skin contact: Wash affected area with soap and water. Rinse/flush exposed skin gently using water for 15-20 minutes. Seek medical attention if irritation persists or if concerned.

After eye contact: Protect unexposed eye. Rinse/flush exposed eye(s) gently using water for 15-20 minutes. Remove contact lens(es) if able to do so during rinsing. Seek medical attention if irritation persists or if concerned.

After swallowing: Rinse mouth thoroughly. Do not induce vomiting. Have exposed individual drink sips of water. Seek medical attention if irritation, discomfort or vomiting persists.

Most important symptoms and effects, both acute and delayed:

Irritation, Nausea,Headache, Shortness of breath.;

Indication of any immediate medical attention and special treatment needed:

If seeking medical attention, provide SDS document to physician.

SECTION 5 : Firefighting measures

Extinguishing media

Suitable extinguishing agents: Use water, dry chemical, chemical foam, carbon dioxide, or alcohol-resistant foam.

For safety reasons unsuitable extinguishing agents:

Special hazards arising from the substance or mixture:

Use water spray to cool unopened containers.

Advice for firefighters:

Protective equipment: Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls.When necessary use NIOSH approved breathing equipment. Wear protective eyeware, gloves, and clothing. Refer to Section 8.

Additional information (precautions): Do not inhale gases, fumes, dust, mist, vapor, and aerosols. Remove all sources of ignition.

SECTION 6 : Accidental release measures

Personal precautions, protective equipment and emergency procedures:

Ensure adequate ventilation.Use personal protective equipment. Avoid contact with skin, eyes and clothing.Remove from all sources of ignition.

Environmental precautions:

Prevent from reaching drains, sewer or waterway. Do not let product enter drains.

Methods and material for containment and cleaning up:

If necessary, use trained response staff/contractor.Absorb with suitable absorbent material such as sand or earth and containerize for disposal. Dispose of empty containers as unused product. Refer to Section 13.Soak with inert material.Use spark-proof tools and explosion-proof equipment.

Reference to other sections:

SECTION 7 : Handling and storage

Precautions for safe handling:

Take measures to prevent the build up of electrostatic charge.Follow advice and precautions. Refer to Section 5.Use under a chemical fume hood.Use explosion-proof equipment.Wash hands after handling.Avoid contact with skin and eyes.Do not eat, drink, smoke, or use personal products when handling chemical substances. Use only in well ventilated areas.Do not inhale gases, fumes, dust, mist, vapor, and aerosols. Follow good hygiene procedures when handling chemical materials. Refer to Section 8.Keep away from open flames, hot surfaces, and sources of ignition.

Conditions for safe storage, including any incompatibilities:

Store in a cool location. Provide ventilation for containers. Avoid storage near extreme heat, ignition sources or open flame. Keep container tightly sealed.Store with like hazards. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

SECTION 8 : Exposure controls/personal protection




Control Parameters:	64-19-7, Acetic acid , ACGIH TLV: 25mg/m3 64-19-7, Acetic acid , OSHA PEL: 25mg/m3
Appropriate Engineering controls:	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of use or handling. Ensure that dust-handling systems (exhaust ducts, dust collectors, vessels, and processing equipment) are designed to prevent the escape of dust into the work area.Use chemical fume hood.Use explosion-proof equipment.
Respiratory protection:	Not required under normal conditions of use. Use suitable respiratory protective device when high concentrations are present.
Protection of skin:	Select glove material impermeable and resistant to the substance.Select glove material based on rates of diffusion and degradation.
Eye protection:	Safety goggles with face shield.
General hygienic measures:	Wash hands before breaks and at the end of work. Avoid contact with the eyes and skin.Perform routine housekeeping.Follow proper handling methods. Refer to Section 6.Follow proper handling methods. Refer to Section 7.

SECTION 9 : Physical and chemical properties

Appearance (physical state,color):	Clear colorless liquid	**Explosion limit lower**: **Explosion limit upper**:	4 % 19.9 %
Odor:	Pungent Vinegar	**Vapor pressure**:	73.3 hPa (55.0 mmHg) at 50.0°C/ 15.2 hPa (11.4 mmHg) at 20.0°C
Odor threshold:	Not Available	**Vapor density**:	Not Available
pH-value:	2.4 @ 60.05 g/l	**Relative density**:	1.049 g/cm3 at 25 °C

Melting/Freezing point:	16.2°C	**Solubilities**:	Completely soluble
Boiling point/Boiling range:	117 - 118°C	**Partition coefficient (n-octanol/water)**:	log Pow: -0.17
Flash point (closed cup):	Not Available	**Auto/Self-ignition temperature**:	485.0°C
Evaporation rate:	Not Available	**Decomposition temperature**:	Not Available
Flammability (solid,gaseous):	Not Available	**Viscosity**:	a. Kinematic:Not Available b. Dynamic: Not Available
Density: Not Available			

SECTION 10 : Stability and reactivity

Reactivity: Nonreactive under normal conditions.
Chemical stability: Stable under normal conditions.
Possible hazardous reactions: None under normal processing
Conditions to avoid: Moisture sensitive.Heat, flames and sparks.Incompatible Materials.
Incompatible materials: Oxidizing agents, Soluble carbonates and phosphates, Hydroxides, Metals, Peroxides, Permanganates, Potassium permanganate, Amines, Alcohols, and Nitric acid.Strong bases, strong oxidizers, metals.
Hazardous decomposition products: Oxides of carbon.

SECTION 11 : Toxicological information

Acute Toxicity:		
Oral:		LD50 Rat: 3,310 mg/kg
Dermal:		LD50 Rabbit: 1,112 mg/kg
Inhalation:		LC50 Rat: 11.4 mg/l - 4 h
Chronic Toxicity: No additional information.		
Corrosion Irritation:		
Ocular:		Eyes - rabbit Result: Corrosive to eyes
Sensitization:		No additional information.
Single Target Organ (STOT):		No additional information.
Numerical Measures:		No additional information.
Carcinogenicity:		No additional information.
Mutagenicity:		No additional information.
Reproductive Toxicity:		Experiments have shown reproductive toxicity effects on laboratory animals.

SECTION 12 : Ecological information

Ecotoxicity

Aquatic Tox.: Toxicity to fish semi-static test LC50 - Oncorhynchus mykiss (rainbow trout) - > 1,000 mg/l - 96 h (OECD Test Guideline 203)

Aquatic Tox.: Toxicity to daphnia and other aquatic invertebrates EC50 - Daphnia magna (Water flea) - > 300.82 mg/l - 48 h (OECD Test Guideline 202)

Persistence and degradability: Readily biodegradable.
Bioaccumulative potential:
Mobility in soil: Aqueous solution has high mobility in soil.
Other adverse effects:

SECTION 13 : Disposal considerations

Waste disposal recommendations:

It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities (US 40CFR262.11). Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.Contact a licensed professional waste disposal service to dispose of this material.

SECTION 14 : Transport information

UN-Number

2789

UN proper shipping name

Acetic acid, glacial

Transport hazard class(es)

Class:
3 Flammable liquids

Packing group:II
Environmental hazard:
Transport in bulk:
Special precautions for user:

SECTION 15 : Regulatory information

United States (USA)

SARA Section 311/312 (Specific toxic chemical listings):

Acute, Chronic, Fire

SARA Section 313 (Specific toxic chemical listings):

None of the ingredients is listed

RCRA (hazardous waste code):

None of the ingredients is listed

TSCA (Toxic Substances Control Act):

All ingredients are listed.

CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act):

64-19-7 Acetic Acid 5000 lb

Proposition 65 (California):

Chemicals known to cause cancer:

None of the ingredients is listed

Chemicals known to cause reproductive toxicity for females:

None of the ingredients is listed

Chemicals known to cause reproductive toxicity for males:

None of the ingredients is listed

Chemicals known to cause developmental toxicity:

None of the ingredients is listed

Canada

Canadian Domestic Substances List (DSL):

All ingredients are listed.

Canadian NPRI Ingredient Disclosure list (limit 0.1%):

None of the ingredients is listed

Canadian NPRI Ingredient Disclosure list (limit 1%):

64-19-7 Acetic Acid

SECTION 16 : Other information

This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.Note:. The responsibility to provide a safe workplace remains with the user.The user should consider the health hazards and safety information contained herein as a guide and should take those precautions required in an individual operation to instruct employees and develop work practice procedures for a safe work environment.The information contained herein is, to the best of our knowledge and belief, accurate.However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by the use of this material.It is the responsibility of the user to comply with all applicable laws and regulations applicable to this material.

GHS Full Text Phrases:

Abbreviations and acronyms:

IMDG: International Maritime Code for Dangerous Goods
PNEC: Predicted No-Effect Concentration (REACH)
CFR: Code of Federal Regulations (USA)
SARA: Superfund Amendments and Reauthorization Act (USA)
RCRA: Resource Conservation and Recovery Act (USA)
TSCA: Toxic Substances Control Act (USA)
NPRI: National Pollutant Release Inventory (Canada)
DOT: US Department of Transportation
IATA: International Air Transport Association
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
ACGIH: American Conference of Governmental Industrial Hygienists
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
WHMIS: Workplace Hazardous Materials Information System (Canada)
DNEL: Derived No-Effect Level (REACH)

Effective date : 01.06.2015
Last updated : 03.27.2015

SAFETY DATA SHEET

OxyChem®

Responsible Care® Good Chemistry at Work

CAUSTIC SODA LIQUID (ALL GRADES)

MSDS No.: M32415 **Rev. Date:** 31-May-2009 **Rev. Num.:** 05

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Company Identification:	Occidental Chemical Corporation 5005 LBJ Freeway P.O. Box 809050 Dallas, Texas 75380-9050
24 Hour Emergency Telephone Number:	1-800-733-3665 or 1-972-404-3228 (U.S.); 32.3.575.55.55 (Europe); 1800-033-111 (Australia)
To Request an MSDS:	MSDS@oxy.com or 1-972-404-3245
Customer Service:	1-800-752-5151 or 1-972-404-3700
Trade Name:	Caustic Soda Diaphragm Grade 10%, 15%, 18%, 20%, 25%, 30%, 35%, 40%, 50%, Caustic Soda Rayon Grade 18%, 20%, 25%, 30%, 50%, 50% Caustic Soda Rayon Grade OS, Caustic Soda Membrane 6%, 18%, 20%, 25%, 30%, 48%, 50%, 50% Caustic Soda Membrane OS, 50% Caustic Soda Diaphragm OS, Caustic Soda Low Salt 50%, 25% Caustic Soda Purified, 50% Caustic Soda Purified, 50% Caustic Soda Purified OS, Caustic Soda Liquid 70/30, Membrane Blended, 50% Caustic Soda Membrane (Northeast), 50% Caustic Soda Diaphragm (West Coast), 50% Blended Rayon Grade Blended, Membrane Cell Liquor
Synonyms:	Sodium hydroxide solution, Liquid Caustic, Lye Solution, Caustic, Lye, Soda Lye
Product Use:	Metal finishing, Cleaner, Process chemical, Petroleum industry

2. HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW:

Color:	Colorless to slightly colored
Physical State:	Liquid
Appearance:	Clear to opaque
Odor:	Odorless
Signal Word:	DANGER

2. HAZARDS IDENTIFICATION

MAJOR HEALTH HAZARDS: CORROSIVE. CAUSES BURNS TO THE RESPIRATORY TRACT, SKIN, EYES AND GASTROINTESTINAL TRACT. CAUSES PERMANENT EYE DAMAGE.
PHYSICAL HAZARDS: CORROSIVE. Mixing with water, acid or incompatible materials may cause splattering and release of heat.
ECOLOGICAL HAZARDS: Keep out of water supplies and sewers. This material is alkaline and may raise the pH of surface waters. This material has exhibited moderate toxicity to aquatic organisms.
PRECAUTIONARY STATEMENTS: Avoid contact with skin, eyes and clothing. Avoid breathing vapor or mist. Keep container tightly closed. Wash thoroughly after handling. Use only with adequate ventilation.
****

POTENTIAL HEALTH EFFECTS:

Inhalation: May cause irritation (possibly severe), chemical burns, and pulmonary edema.

Skin contact: May cause irritation (possibly severe) and chemical burns.

Eye contact: May cause irritation (possibly severe), chemical burns, eye damage, and blindness.

Ingestion: May cause irritation (possibly severe), chemical burns, nausea, and vomiting.

TARGET ORGAN(S): Respiratory System, Skin, Eye

Medical Conditions Aggravated by Exposure: Asthma, Respiratory disorders

See Section 11: TOXICOLOGICAL INFORMATION

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	Percentage	CAS Number
Water	48.5 - 94.5	7732-18-5
Sodium Hydroxide	5.5 - 51.5	1310-73-2
Sodium Chloride	1 - 5	7647-14-5

4. FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. If respiration or pulse has stopped, have a trained person administer basic life support (Cardio-Pulmonary Resuscitation and/or Automatic External Defibrillator) and CALL FOR EMERGENCY SERVICES IMMEDIATELY.

SKIN CONTACT: Immediately flush contaminated areas with water. Remove contaminated clothing, jewelry, and shoes immediately. Wash contaminated areas with soap and water. Thoroughly clean and dry contaminated clothing before reuse. Discard contaminated leather goods. GET MEDICAL ATTENTION IMMEDIATELY.

4. FIRST AID MEASURES

EYE CONTACT: Immediately flush eyes with a directed stream of water for at least 15 minutes, forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissues. Washing eyes within several seconds is essential to achieve maximum effectiveness. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION: Never give anything by mouth to an unconscious or convulsive person. If swallowed, do not induce vomiting. Give large amounts of water. If vomiting occurs spontaneously, keep airway clear. Give more water when vomiting stops. GET MEDICAL ATTENTION IMMEDIATELY.

Notes to Physician: The absence of visible signs or symptoms of burns does NOT reliably exclude the presence of actual tissue damage. Probable mucosal damage may contraindicate the use of gastric lavage.

5. FIRE-FIGHTING MEASURES

Fire Hazard: Negligible fire hazard

Extinguishing Media: Use extinguishing agents appropriate for surrounding fire.

Fire Fighting: Move container from fire area if it can be done without risk. Cool containers with water. Avoid contact with skin.

Sensitivity to Mechanical Impact: Not sensitive

Sensitivity to Static Discharge: Not sensitive

Flash point: Not flammable

6. ACCIDENTAL RELEASE MEASURES

Occupational Release:
Wear appropriate personal protective equipment recommended in Section 8 of the SDS. Completely contain spilled material with dikes, sandbags, etc. Shovel dry material into suitable container. Liquid material may be removed with a vacuum truck. Remaining material may be diluted with water and neutralized with dilute acid, then absorbed and collected. Flush spill area with water, if appropriate. Keep product and flush water out of water supplies and sewers. This material is alkaline and may raise the pH of surface waters with low buffering capacity. Releases should be reported, if required, to appropriate agencies.

7. HANDLING AND STORAGE

Storage Conditions: Store and handle in accordance with all current regulations and standards. Keep container tightly closed and properly labeled. Do not store in aluminum container or use aluminum fittings or transfer lines, as flammable hydrogen gas may be generated. Keep separated from incompatible substances (see Section 10 of SDS).

7. HANDLING AND STORAGE

Handling Procedures: Avoid breathing vapor or mist. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. When mixing, slowly add to water to minimize heat generation and spattering.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Regulatory Exposure limit(s):

Component	Argentina OELs	Brazil OELs	Chile OELs	Mexico OELS
Sodium Hydroxide 1310-73-2	2 mg/m^3 (Ceiling)	-----	2 mg/m^3 (Ceiling)	2 mg/m^3 (Peak)

Component	Austrailia OELs	China OELs	New Zealand OELs	Taiwan OELs	Turkey OELs	Korea OELs
Sodium Hydroxide 1310-73-2	2 mg/m^3 (Peak)	2 mg/m^3 (MAC)	2 mg/m^3 (Ceiling)	2 mg/m^3 [TWA] 4 mg/m^3 [STEL]	-----	2 mg/m^3 (Ceiling)

Component	Phillippines OELs	Japan OELs	OSHA Final PEL STEL	OSHA Final PEL TWA	OSHA Final PEL Ceiling
Sodium Hydroxide 1310-73-2	2 mg/m^3 (TWA)	2 mg/m^3 (Ceiling)	-----	2 mg/m^3	-----

OEL: Occupational Exposure Level; OSHA: United States Occupational Safety and Health Administration; PEL: Permissible Exposure Level; TWA: Time Weighted Average; STEL: Short Term Exposure Level

Non-Regulatory Exposure Limit(s):

Component	CAS Number	ACGIH TWA	ACGIH STEL	ACGIH Ceiling
Sodium Hydroxide	1310-73-2	-----	-----	2 mg/m³

- The American Conference of Governmental Industrial Hygienists (ACGIH) is a voluntary organization of professional industrial hygiene personnel in government or educational institutions in the United States. The ACGIH develops and publishes recommended occupational exposure limits each year called Threshold Limit Values (TLVs) for hundreds of chemicals, physical agents, and biological exposure indices.

ENGINEERING CONTROLS:
Provide local exhaust ventilation where dust or mist may be generated. Ensure compliance with applicable exposure limits.

PERSONAL PROTECTIVE EQUIPMENT:
Eye Protection: Wear chemical safety goggles with a faceshield to protect against eye and skin contact when appropriate. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Skin and Body Protection: Wear chemical resistant clothing and rubber boots when potential for contact with the material exists. Contaminated clothing should be removed, then discarded or laundered.

Hand Protection: Wear appropriate chemical resistant gloves

Protective Material Types: Natural rubber, Neoprene, Nitrile

Component	Immediately Dangerous to Life/ Health (IDLH)
Sodium Hydroxide	10 mg/m^3 IDLH

Respiratory Protection: An approved respirator with high efficiency particulate air filters / cartridges may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits, or when symptoms have been observed that are indicative of overexposure. If eye irritation occurs, a full face style mask should be used. A respiratory protection program that meets applicable regulatory requirements must be followed whenever workplace conditions warrant use of a respirator.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Appearance:	Clear to opaque
Color:	Colorless to slightly colored
Odor:	Odorless
Flash point:	Not flammable
Boiling Point/Range:	230 - 29°F (110 - 144°C)
Freezing Point/Range:	-26 to 59°F (-32 to 15 °C)
Vapor Pressure:	13 - 135 mmHg @ 60°C
Specific Gravity (water=1):	1.11 – 1.53 @ 15.6 °C
Water Solubility:	100%
pH:	14.0 (7.5% solution)
Volatility:	No data available
Evaporation Rate (ether=1):	No data available
Partition Coefficient (n-octanol/water):	No data available

10. STABILITY AND REACTIVITY

Reactivity/ Stability:	Stable at normal temperatures and pressures.
Conditions to Avoid:	Mixing with water, acid, or incompatible materials may cause splattering and release of large amounts of heat. Will react with some metals forming flammable hydrogen gas. Carbon monoxide gas may form upon contact with reducing sugars, food and beverage products in enclosed spaces.
Incompatibilities/ Materials to Avoid:	Acids, Halogenated compounds, Prolonged contact with aluminum, brass, bronze, copper, lead, tin, zinc or other alkali sensitive metals or alloys
Hazardous Decomposition Products:	Sodium oxides
Hazardous Polymerization:	Will not occur

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA:

Component	LD50 Oral	LC50 Inhalation	LD50 Dermal
Sodium Hydroxide	-----	-----	1350 mg/kg (Rabbit)

ACUTE TOXICITY:
The severity of the tissue damage is a function of its concentration, the length of tissue contact time, and local tissue conditions. After exposure, there may be a time delay before irritation and other effects occur. This material is a strong irritant and is corrosive to the skin, eyes, and mucous membranes. This material may cause severe burns and permanent damage to any tissue with which it comes into contact. Inhalation will cause severe irritation, possible burns with pulmonary edema, which may lead to pneumonitis. Skin contact with this material may cause severe irritation and corrosion of tissue. Repeated exposure may cause dermatitis. Eye contact can cause severe irritation, corrosion with possible corneal damage and blindness. Ingestion may cause irritation, corrosion/ulceration, nausea, and vomiting.

CARCINOGENICITY: This product is not classified as a carcinogen by NTP, IARC or OSHA.

12. ECOLOGICAL INFORMATION

ECOTOXICITY DATA:

- **Aquatic Toxicity:**
  This material has exhibited moderate toxicity to aquatic organisms
  Data provided are for sodium hydroxide

- **Freshwater Fish Toxicity:**
  LC50 brook trout: 25 ppm/ 24 hr
  LC50 king salmon: 48 ppm

- **Invertebrate Toxicity:**
  LC50 Daphnia magna: 100 ppm
  LC50 shrimp: 33 - 100 ppm/48 hr
  LC50 cockle: 330 - 1000 ppm/48 hr

FATE AND TRANSPORT:

BIODEGRADATION: This material is inorganic and not subject to biodegradation.

PERSISTENCE: This material is alkaline and may raise the pH of surface waters with low buffering capacity. This material is believed to exist in the disassociated state in the environment.

BIOCONCENTRATION: This material is not expected to bioconcentrate in organisms.

ADDITIONAL ECOLOGICAL INFORMATION:
This material has exhibited slight toxicity to terrestrial organisms.

13. DISPOSAL CONSIDERATIONS

Reuse or reprocess, if possible. Dispose in accordance with all applicable regulations. May be subject to disposal regulations: U.S. EPA 40 CFR 261. Hazardous Waste Number(s): D002.

14. TRANSPORT INFORMATION

U.S.DOT 49 CFR 172.101:

PROPER SHIPPING NAME: Sodium Hydroxide Solution
UN NUMBER: UN1824
HAZARD CLASS/ DIVISION: 8
PACKING GROUP: II
LABELING REQUIREMENTS: 8
DOT RQ (lbs): RQ 1000 lbs. (Sodium Hydroxide)

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:

UN NUMBER: UN1824
CLASS OR DIVISION: 8
PACKING/RISK GROUP: II

15. REGULATORY INFORMATION

International Inventory Status:

Australian Chemical Inventory:

Component	AICS:
Sodium Hydroxide	Listed
Sodium Chloride	Listed

Canadian Chemical Inventory:

Component	DSL	NDSL
Sodium Hydroxide	Listed	Not Listed
Sodium Chloride	Listed	Not Listed

China Chemical Inventory:

Component	IECS
Sodium Hydroxide	Listed
Sodium Chloride	Listed

European Union Chemical Inventory:

Component	EU - NLPL	ELINCS	EINECS:
Sodium Hydroxide	Not Listed	Not Listed	Listed [215-185-5]
Sodium Chloride	Not Listed	Not Listed	Listed [231-598-3]

Japan Chemical Inventory:

Component	ENCS
Sodium Hydroxide	Listed [1-410; 2-1972]
Sodium Chloride	Listed [1-236]

Korean Chemical Inventory:

Component	KECL
Sodium Hydroxide	Listed [KE-31487]
Sodium Chloride	Listed [KE-31387]

New Zealand Chemical Inventory:

Component	NZIOC
Sodium Hydroxide	Listed
Sodium Chloride	Listed

Philippines - Priority Chemical List:

Component	PICCS:
Sodium Hydroxide	Listed
Sodium Chloride	Listed

U.S. INVENTORY STATUS: Toxic Substance Control Act (TSCA):

Component	TSCA	TSCA 12(b)	TSCA-Section 5
Sodium Hydroxide	Listed	Not Listed	Not Listed
Sodium Chloride	Listed	Not Listed	Not Listed

16. OTHER INFORMATION

Prepared by: OxyChem Corporate HESS - Health Risk Management

IMPORTANT: The information presented herein, while not guaranteed, was prepared by technical personnel and is true and accurate to the best of our knowledge. NO WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, OR WARRANTY OR GUARANTY OF ANY OTHER KIND, EXPRESS OR IMPLIED, IS MADE REGARDING PERFORMANCE, SAFETY, SUITABILITY, STABILITY OR OTHERWISE. This information is not intended to be all-inclusive as to the manner and conditions of use, handling, storage, disposal and other factors that may involve other or additional legal, environmental, safety or performance considerations, and OxyChem assumes no liability whatsoever for the use of or reliance upon this information. While our technical personnel will be happy to respond to questions, safe handling and use of the product remains the responsibility of the customer. No suggestions for use are intended as, and nothing herein shall be construed as, a recommendation to infringe any existing patents or to violate any Federal, State, local or foreign laws.

End of Safety Data Sheet

SAFETY DATA SHEET

Creation Date 08-Feb-2010 **Revision Date** 25-Apr-2019 **Revision Number** 5

1. Identification

Product Name **Formaldehyde solution 37%**

Cat No. : **F75F-1GAL; F75P-1GAL; F75P-4; F75P-20**

Synonyms Formalin; Methanal; Methylene oxide; Oxymethane; Formic aldehyde; Methyl aldehyde

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number
CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 3
Acute oral toxicity	Category 3
Acute dermal toxicity	Category 3
Acute Inhalation Toxicity - Vapors	Category 3
Skin Corrosion/irritation	Category 1 B
Serious Eye Damage/Eye Irritation	Category 1
Skin Sensitization	Category 1
Germ Cell Mutagenicity	Category 2
Carcinogenicity	Category 1A
Specific target organ toxicity (single exposure)	Category 1
Target Organs - Respiratory system, Central nervous system (CNS), Optic nerve.	
Specific target organ toxicity - (repeated exposure)	Category 1
Target Organs - Kidney, Liver, Heart, spleen, Blood.	

Label Elements

Signal Word
Danger

Hazard Statements
Flammable liquid and vapor
Toxic if swallowed
Toxic in contact with skin
Causes severe skin burns and eye damage
May cause an allergic skin reaction
Toxic if inhaled
May cause respiratory irritation
May cause drowsiness or dizziness
Suspected of causing genetic defects
May cause cancer
Causes damage to organs
Causes damage to organs through prolonged or repeated exposure

Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Use only outdoors or in a well-ventilated area
Do not breathe dust/fume/gas/mist/vapors/spray
Contaminated work clothing should not be allowed out of the workplace
Wear protective gloves
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Keep cool
Response
Immediately call a POISON CENTER or doctor/physician
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
Wash contaminated clothing before reuse
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
If skin irritation or rash occurs: Get medical advice/attention
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Ingestion
Rinse mouth
Do NOT induce vomiting
Fire
In case of fire: Use CO2, dry chemical, or foam for extinction
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)
None identified
Other hazards
Poison, may be fatal or cause blindness if swallowed. Vapor harmful. Cannot be made non-poisonous.
WARNING. Reproductive Harm - https://www.p65warnings.ca.gov/.

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Water	7732-18-5	45 - 48
Formaldehyde	50-00-0	37 - 40
Methyl alcohol	67-56-1	15

4. First-aid measures

General Advice Immediate medical attention is required. Show this safety data sheet to the doctor in attendance.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

Inhalation If breathing is difficult, give oxygen. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Move to fresh air. Immediate medical attention is required.

Ingestion Do not induce vomiting. Call a physician or Poison Control Center immediately.

Most important symptoms and effects Breathing difficulties. Causes burns by all exposure routes. May cause allergic skin reaction. . Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting: Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation: Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Cool closed containers exposed to fire with water spray.

Unsuitable Extinguishing Media No information available

Flash Point 50 °C / 122 °F

Method - No information available

Autoignition Temperature No information available

Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Flammable. Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. The product causes burns of eyes, skin and mucous membranes. Thermal decomposition can lead to release of irritating gases and vapors.

Hazardous Combustion Products
Hydrogen Formaldehyde
Protective Equipment and Precautions for Firefighters
Thermal decomposition can lead to release of irritating gases and vapors. As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
3	2	0	N/A

6. Accidental release measures

Personal Precautions Use personal protective equipment. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Ensure adequate ventilation. Remove all sources of ignition. Take precautionary measures against static discharges.

Environmental Precautions Should not be released into the environment. Do not flush into surface water or sanitary sewer system. See Section 12 for additional ecological information.

Methods for Containment and Clean Up Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

7. Handling and storage

Handling Use only under a chemical fume hood. Do not breathe vapors or spray mist. Do not get in eyes, on skin, or on clothing. Wear personal protective equipment. Do not ingest. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. Take precautionary measures against static discharges.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Corrosives area. Keep away from heat and sources of ignition.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Formaldehyde	TWA: 0.1 ppm STEL: 0.3 ppm	(Vacated) TWA: 3 ppm (Vacated) STEL: 10 ppm (Vacated) Ceiling: 5 ppm TWA: 0.75 ppm STEL: 2 ppm	IDLH: 20 ppm TWA: 0.016 ppm Ceiling: 0.1 ppm	Ceiling: 0.3 ppm
Methyl alcohol	TWA: 200 ppm STEL: 250 ppm Skin	(Vacated) TWA: 200 ppm (Vacated) TWA: 260 mg/m^3 (Vacated) STEL: 250 ppm (Vacated) STEL: 325 mg/m^3 Skin TWA: 200 ppm TWA: 260 mg/m^3	IDLH: 6000 ppm TWA: 200 ppm TWA: 260 mg/m^3 STEL: 250 ppm STEL: 325 mg/m^3	TWA: 200 ppm STEL: 250 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures Use only under a chemical fume hood. Ensure that eyewash stations and safety showers

are close to the workstation location. Use explosion-proof electrical/ventilating/lighting/equipment. Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection Tightly fitting safety goggles. Face-shield.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	pungent
Odor Threshold	No information available
pH	No information available
Melting Point/Range	0 °C / 32 °F
Boiling Point/Range	101 °C / 213.8 °F
Flash Point	50 °C / 122 °F
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	> 1.0
Specific Gravity	No information available
Solubility	miscible
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat. Keep away from open flames, hot surfaces and sources of ignition.

Incompatible Materials Strong oxidizing agents, Strong bases, nitriles, Acids, Isocyanates, Acid anhydrides, Metals, Acid chlorides

Hazardous Decomposition Products Hydrogen, Formaldehyde

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Oral LD50 Category 3. ATE = 50 - 300 mg/kg.
Dermal LD50 Category 3. ATE = 200 - 1000 mg/kg.
Vapor LC50 Category 3. ATE = 2 - 10 mg/l.

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Water	-	Not listed	Not listed
Formaldehyde	500 mg/kg (Rat)	LD50 = 270 mg/kg (Rabbit)	0.578 mg/L (Rat) 4 h
Methyl alcohol	**Calc. ATE 60 mg/kg** LD50 > 1187 – 2769 mg/kg (Rat)	**Calc. ATE 60 mg/kg** LD50 = 17100 mg/kg (Rabbit)	**Calc. ATE 0.6 mg/L (vapours) or 0.5 mg/L (mists)** LC50 = 128.2 mg/L (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Causes burns by all exposure routes

Sensitization May cause sensitization by skin contact

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Water	7732-18-5	Not listed	Not listed	Not listed	Not listed	Not listed
Formaldehyde	50-00-0	Group 1	Known	A1	X	A2
Methyl alcohol	67-56-1	Not listed	Not listed	Not listed	Not listed	Not listed

IARC: (International Agency for Research on Cancer)

IARC: (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans

NTP: (National Toxicity Program)

NTP: (National Toxicity Program)
Known - Known Carcinogen
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)

A1 - Known Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Animal Carcinogen
ACGIH: (American Conference of Governmental Industrial Hygienists)

Mexico - Occupational Exposure Limits - Carcinogens

Mexico - Occupational Exposure Limits - Carcinogens
A1 - Confirmed Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Confirmed Animal Carcinogen
A4 - Not Classifiable as a Human Carcinogen
A5 - Not Suspected as a Human Carcinogen

Mutagenic Effects Mutagenic effects have occurred in humans.

Reproductive Effects Experiments have shown reproductive toxicity effects on laboratory animals.

Developmental Effects Developmental effects have occurred in experimental animals. Component substance is listed on California Proposition 65 as a developmental hazard.

Teratogenicity Teratogenic effects have occurred in experimental animals.

STOT - single exposure Respiratory system Central nervous system (CNS) Optic nerve
STOT - repeated exposure Kidney Liver Heart spleen Blood

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting: Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation: Symptoms

of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Do not empty into drains. The product contains following substances which are hazardous for the environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Formaldehyde	Not listed	Leuciscus idus: LC50 = 15 mg/L 96h	Not listed	EC50 = 20 mg/L 96h EC50 = 2 mg/L 48h
Methyl alcohol	Not listed	Pimephales promelas: LC50 > 10000 mg/L 96h	EC50 = 39000 mg/L 25 min EC50 = 40000 mg/L 15 min EC50 = 43000 mg/L 5 min	EC50 > 10000 mg/L 24h

Persistence and Degradability Miscible with water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility . Will likely be mobile in the environment due to its water solubility.

Component	log Pow
Formaldehyde	-0.35
Methyl alcohol	-0.74

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Formaldehyde - 50-00-0	U122	-
Methyl alcohol - 67-56-1	U154	-

14. Transport information

DOT

UN-No UN1198
Proper Shipping Name FORMALDEHYDE SOLUTIONS, FLAMMABLE
Hazard Class 3
Subsidiary Hazard Class 8
Packing Group III

TDG

UN-No UN1198
Proper Shipping Name FORMALDEHYDE SOLUTION, FLAMMABLE
Hazard Class 3
Subsidiary Hazard Class 8
Packing Group III

IATA

UN-No UN1198
Proper Shipping Name FORMALDEHYDE SOLUTION, FLAMMABLE
Hazard Class 3
Subsidiary Hazard Class 8
Packing Group III

IMDG/IMO

UN-No UN1198
Proper Shipping Name FORMALDEHYDE SOLUTION, FLAMMABLE
Hazard Class 3

Subsidiary Hazard Class 8
Packing Group III

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Water	7732-18-5	X	ACTIVE	-
Formaldehyde	50-00-0	X	ACTIVE	-
Methyl alcohol	67-56-1	X	ACTIVE	-

Legend:
TSCA - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Water	7732-18-5	X	-	231-791-2	X	-	X	X	KE-35400
Formaldehyde	50-00-0	X	-	200-001-8	X	X	X	X	KE-17074
Methyl alcohol	67-56-1	X	-	200-659-6	X	X	X	X	KE-23193

U.S. Federal Regulations

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Formaldehyde	50-00-0	37 - 40	0.1
Methyl alcohol	67-56-1	15	1.0

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Formaldehyde	X	100 lb	-	-

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Formaldehyde	X		-
Methyl alcohol	X		-

OSHA - Occupational Safety and Health Administration

Component	Specifically Regulated Chemicals	Highly Hazardous Chemicals
Formaldehyde	2 ppm STEL 0.5 ppm Action Level 0.75 ppm TWA	TQ: 1000 lb

CERCLA This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs

Formaldehyde	100 lb	100 lb
Methyl alcohol	5000 lb	-

California Proposition 65 This product contains the following proposition 65 chemicals

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Formaldehyde	50-00-0	Carc. (Gaseous only)	40 µg/day	Carcinogen
Methyl alcohol	67-56-1	Developmental	-	Developmental

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Water	-	-	X	-	-
Formaldehyde	X	X	X	X	X
Methyl alcohol	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): Y
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product contains the following DHS chemicals:
Legend - STQs = Screening Threshold Quantities, APA = A placarded amount

Component	DHS Chemical Facility Anti-Terrorism Standard
Formaldehyde	Release STQs - 15000lb (solution)

Other International Regulations

Mexico - Grade Moderate risk, Grade 2

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 08-Feb-2010
Revision Date 25-Apr-2019
Print Date 25-Apr-2019
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Creation Date 09-Dec-2010 **Revision Date** 01-Jan-2021 **Revision Number** 7

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

Product Description: Starch, maize
Cat No. : S/7880/60
Synonyms Potato starch: iodine indicator.; Corn starch
CAS-No 9005-25-8
EC-No. 232-679-6
Molecular Formula (C6 H10 O5)n

1.2. Relevant identified uses of the substance or mixture and uses advised against

Recommended Use Laboratory chemicals.
Uses advised against No Information available

1.3. Details of the supplier of the safety data sheet

Company

UK entity/business name
Fisher Scientific UK
Bishop Meadow Road, Loughborough,
Leicestershire LE11 5RG, United Kingdom

EU entity/business name
Acros Organics BVBA
Janssen Pharmaceuticalaan 3a
2440 Geel, Belgium

E-mail address begel.sdsdesk@thermofisher.com

1.4. Emergency telephone number

Tel: 01509 231166
Chemtrec US: (800) 424-9300
Chemtrec EU: 001 (202) 483-7616

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

CLP Classification - Regulation (EC) No 1272/2008

Physical hazards

Based on available data, the classification criteria are not met

Health hazards
Based on available data, the classification criteria are not met

Environmental hazards
Based on available data, the classification criteria are not met

Full text of Hazard Statements: see section 16

2.2. Label elements

Hazard Statements

Precautionary Statements

2.3. Other hazards

No information available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances

Component	CAS-No	EC-No.	Weight %	CLP Classification - Regulation (EC) No 1272/2008
Starch	9005-25-8	EEC No. 232-679-6	100	-

Full text of Hazard Statements: see section 16

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Wash off immediately with plenty of water. Get medical attention if symptoms occur.

Ingestion Do NOT induce vomiting. Get medical attention if symptoms occur.

Inhalation Remove to fresh air. If breathing is difficult, give oxygen. Get medical attention if symptoms occur.

Self-Protection of the First Aider No special precautions required.

4.2. Most important symptoms and effects, both acute and delayed

No information available.

4.3. Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically.

SECTION 5: FIREFIGHTING MEASURES

5.1. Extinguishing media

Suitable Extinguishing Media
Water spray. Carbon dioxide (CO_2). Dry chemical. Chemical foam.

Extinguishing media which must not be used for safety reasons
No information available.

5.2. Special hazards arising from the substance or mixture

Thermal decomposition can lead to release of irritating gases and vapors.

Hazardous Combustion Products
Carbon monoxide (CO), Carbon dioxide (CO_2).

5.3. Advice for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Use personal protective equipment as required. Ensure adequate ventilation. Avoid dust formation.

6.2. Environmental precautions

See Section 12 for additional Ecological Information.

6.3. Methods and material for containment and cleaning up

Sweep up and shovel into suitable containers for disposal. Avoid dust formation.

6.4. Reference to other sections

Refer to protective measures listed in Sections 8 and 13.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

Wear personal protective equipment/face protection. Ensure adequate ventilation. Avoid dust formation. Do not breathe dust. Avoid contact with skin and eyes.

Hygiene Measures
Handle in accordance with good industrial hygiene and safety practice. Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Wash hands before breaks and after work.

7.2. Conditions for safe storage, including any incompatibilities

Keep in a dry, cool and well-ventilated place. Keep container tightly closed.

Technical Rules for Hazardous Substances (TRGS) 510 Storage Class (LGK) (Germany) Class 11

7.3. Specific end use(s)

Use in laboratories

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Exposure limits
List source(s): **UK** - EH40/2005 Work Exposure Limits, Third edition. Published 2018. **IRE -** 2018 Code of Practice for the Chemical Agents Regulations, Schedule 1. Published by the Health and Safety Authority

Component	The United Kingdom	European Union	Ireland
Starch	STEL: 30 mg/m³ 15 min STEL: 12 mg/m³ 15 min TWA: 10 mg/m³ 8 hr TWA: 4 mg/m³ 8 hr		TWA: 10 mg/m³ 8 hr. total inhalable dust TWA: 4 mg/m³ 8 hr. respirable dust STEL: 30 mg/m³ 15 min STEL: 12 mg/m³ 15 min

Biological limit values
This product, as supplied, does not contain any hazardous materials with biological limits established by the region specific regulatory bodies

Monitoring methods
BS EN 14042:2003 Title Identifier: Workplace atmospheres. Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents.
MDHS14/3 General methods for sampling and gravimetric analysis of respirable and inhalable dust

Derived No Effect Level (DNEL) No information available

Route of exposure	Acute effects (local)	Acute effects (systemic)	Chronic effects (local)	Chronic effects (systemic)
Oral				
Dermal				
Inhalation				

Predicted No Effect Concentration (PNEC) No information available.

8.2. Exposure controls

Engineering Measures
Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protective equipment

Eye Protection Wear safety glasses with side shields (or goggles) (European standard - EN 166)

Hand Protection Protective gloves

Glove material	Breakthrough time	Glove thickness	EU standard	Glove comments
Nitrile rubber Neoprene Natural rubber PVC	See manufacturers recommendations	-	EN 374	(minimum requirement)

Skin and body protection Long sleeved clothing

Inspect gloves before use.
Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. (Refer to manufacturer/supplier for information)
Ensure gloves are suitable for the task: Chemical compatability, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.
Remove gloves with care avoiding skin contamination.

Respiratory Protection When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.

Large scale/emergency use Use a NIOSH/MSHA or European Standard EN 136 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced
Recommended Filter type: Particle filter 2

Small scale/Laboratory use Maintain adequate ventilation

Environmental exposure controls No information available.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Physical State	Powder Solid	
Appearance	Off-white	
Odor	Odorless	
Odor Threshold	No data available	
Melting Point/Range	No data available	
Softening Point	No data available	
Boiling Point/Range	No information available	
Flammability (liquid)	Not applicable	Solid
Flammability (solid,gas)	No information available	
Explosion Limits	No data available	
Flash Point	No information available	**Method -** No information available
Autoignition Temperature	400 °C / 752 °F	
Decomposition Temperature	200 °C	
pH	5 - 7	(2 %)
Viscosity	Not applicable	Solid
Water Solubility	Insoluble in cold water. Soluble in hot water	
Solubility in other solvents	No information available	
Partition Coefficient (n-octanol/water)		
Vapor Pressure	negligible	
Density / Specific Gravity	1.5	
Bulk Density	No data available	
Vapor Density	Not applicable	Solid
Particle characteristics	No data available	

9.2. Other information

Molecular Formula	(C6 H10 O5)n
Evaporation Rate	Not applicable - Solid

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

None known, based on information available

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	No information available.

10.4. Conditions to avoid

Avoid dust formation. Incompatible products. Excess heat.

10.5. Incompatible materials

None known.

10.6. Hazardous decomposition products

Carbon monoxide (CO). Carbon dioxide (CO_2).

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Product Information No acute toxicity information is available for this product

(a) acute toxicity;

Oral	No data available
Dermal	No data available
Inhalation	No data available

(b) skin corrosion/irritation; No data available

(c) serious eye damage/irritation; No data available

(d) respiratory or skin sensitization;

Respiratory	No data available
Skin	No data available

(e) germ cell mutagenicity; No data available

(f) carcinogenicity; No data available

There are no known carcinogenic chemicals in this product

(g) reproductive toxicity;	No data available
(h) STOT-single exposure;	No data available
(i) STOT-repeated exposure;	No data available
Target Organs	No information available.
(j) aspiration hazard;	Not applicable Solid
Symptoms / effects,both acute and delayed	No information available.

11.2. Information on other hazards

Endocrine Disrupting Properties	Assess endocrine disrupting properties for human health. This product does not contain any known or suspected endocrine disruptors.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity

Ecotoxicity effects	Contains no substances known to be hazardous to the environment or that are not degradable in waste water treatment plants.

12.2. Persistence and degradability

Persistence	Persistence is unlikely, based on information available.
12.3. Bioaccumulative potential	MATERIAL DOES NOT BIOACCUMULATE
12.4. Mobility in soil	The product is water soluble, and may spread in water systems. Will likely be mobile in the environment due to its water solubility. Highly mobile in soils
12.5. Results of PBT and vPvB assessment	No data available for assessment.

12.6. Endocrine disrupting properties

Endocrine Disruptor Information	This product does not contain any known or suspected endocrine disruptors

12.7. Other adverse effects

Persistent Organic Pollutant	This product does not contain any known or suspected substance
Ozone Depletion Potential	This product does not contain any known or suspected substance

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Waste from Residues/Unused Products	Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.
Contaminated Packaging	Empty remaining contents. Dispose of in accordance with local regulations. Do not re-use empty containers.
European Waste Catalogue (EWC)	According to the European Waste Catalog, Waste Codes are not product specific, but application specific.
Other Information	Waste codes should be assigned by the user based on the application for which the product was used.

SECTION 14: TRANSPORT INFORMATION

IMDG/IMO Not regulated

14.1. UN number
14.2. UN proper shipping name
14.3. Transport hazard class(es)
14.4. Packing group

ADR Not regulated

14.1. UN number
14.2. UN proper shipping name
14.3. Transport hazard class(es)
14.4. Packing group

IATA Not regulated

14.1. UN number
14.2. UN proper shipping name
14.3. Transport hazard class(es)
14.4. Packing group

14.5. Environmental hazards No hazards identified

14.6. Special precautions for user No special precautions required

14.7. Maritime transport in bulk according to IMO instruments Not applicable, packaged goods

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

International Inventories
X = listed, Europe (EINECS/ELINCS/NLP), U.S.A. (TSCA), Canada (DSL/NDSL), Philippines (PICCS), China (IECSC), Japan (ENCS), Australia (AICS), Korea (ECL).

Component	EINECS	ELINCS	NLP	TSCA	DSL	NDSL	PICCS	ENCS	IECSC	AICS	KECL
Starch	232-679-6	-		X	X	-	X	X	X	X	KE-32128

Regulation (EC) No 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of dangerous chemicals

Not applicable

National Regulations

WGK Classification See table for values

Component	Germany - Water Classification (VwVwS)	Germany - TA-Luft Class
Starch	WGK1	

UK - Take note of Control of Substances Hazardous to Health Regulations (COSHH) 2002 and 2005 Amendment

15.2. Chemical safety assessment

A Chemical Safety Assessment/Report (CSA/CSR) has not been conducted

SECTION 16: OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3

Legend

CAS - Chemical Abstracts Service

EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
IECSC - Chinese Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
ENCS - Japanese Existing and New Chemical Substances
AICS - Australian Inventory of Chemical Substances
NZIoC - New Zealand Inventory of Chemicals

WEL - Workplace Exposure Limit
ACGIH - American Conference of Governmental Industrial Hygienists
DNEL - Derived No Effect Level
RPE - Respiratory Protective Equipment
LC50 - Lethal Concentration 50%
NOEC - No Observed Effect Concentration
PBT - Persistent, Bioaccumulative, Toxic

TWA - Time Weighted Average
IARC - International Agency for Research on Cancer
Predicted No Effect Concentration (PNEC)
LD50 - Lethal Dose 50%
EC50 - Effective Concentration 50%
POW - Partition coefficient Octanol:Water
vPvB - very Persistent, very Bioaccumulative

ADR - European Agreement Concerning the International Carriage of Dangerous Goods by Road
IMO/IMDG - International Maritime Organization/International Maritime Dangerous Goods Code
OECD - Organisation for Economic Co-operation and Development
BCF - Bioconcentration factor

ICAO/IATA - International Civil Aviation Organization/International Air Transport Association
MARPOL - International Convention for the Prevention of Pollution from Ships
ATE - Acute Toxicity Estimate
VOC (volatile organic compound)

Key literature references and sources for data
https://echa.europa.eu/information-on-chemicals
Suppliers safety data sheet, Chemadvisor - LOLI, Merck index, RTECS

Training Advice
Chemical hazard awareness training, incorporating labelling, Safety Data Sheets (SDS), Personal Protective Equipment (PPE) and hygiene.

Creation Date 09-Dec-2010
Revision Date 01-Jan-2021
Revision Summary Update to CLP Format.

This safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006 COMMISSION REGULATION (EU) 2020/878 amending Annex II to Regulation (EC) No 1907/2006

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End of Safety Data Sheet

Material Safety Data Sheet
Melamine

ACC# 96668

Section 1 - Chemical Product and Company Identification

MSDS Name: Melamine
Catalog Numbers: AC125350000, AC125350010, AC125350025, AC125350050, AC220480000, AC220480050 AC220480050, AC220481000, AC220485000
Synonyms: 2,4,6-Triamino-s-triazine; Aero; Cyanuramide; Cyanurotriamide; Cyanurotriamine; Cymel.
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
108-78-1	Melamine	99	203-615-4

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: white crystalline powder.
Warning! Risk of explosion if heated under confinement. Harmful if absorbed through skin or if inhaled. May cause eye, skin, and respiratory tract irritation.
Target Organs: No data found.

Potential Health Effects

Eye: Causes mild eye irritation. Causes redness and pain.
Skin: May cause skin irritation. Harmful if absorbed through the skin. May cause dermatitis.
Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May be harmful if swallowed.
Inhalation: May cause respiratory tract irritation. Harmful if inhaled. Inhalation of decomposition products may cause severe injury or death.
Chronic: This substance has caused adverse reproductive and fetal effects in laboratory animals.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid imme diately.
Skin: Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.
Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. This material in sufficient quantity and reduced particle size is capable of creating a dust explosion. Risk of explosion if heated under confinement.
Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or chemical foam.
Flash Point: Not available.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 1; Instability: 1

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation. Wash clothing before reuse.
Storage: Store in a cool, dry place. Keep container closed when not in use.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Melamine	none listed	none listed	none listed

OSHA Vacated PELs: Melamine: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Crystalline powder
Appearance: fine - white
Odor: None reported.
pH: Not available.
Vapor Pressure: 50 mm Hg @ 315 C

Vapor Density: 4.34
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: sublimes
Freezing/Melting Point:< 250 deg C
Decomposition Temperature: Not available.
Solubility: Slightly soluble in water.
Specific Gravity/Density:1.57 g/cm3 @ 20°C
Molecular Formula:C3H6N6
Molecular Weight:126.12

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures. When heated to decompostion cyanide fumes are released. Risk of explosion if heated under confinement.
Conditions to Avoid: Dust generation, excess heat, temperatures above 300°C.
Incompatibilities with Other Materials: Strong oxidizing agents, strong acids.
Hazardous Decomposition Products: Nitrogen oxides, carbon monoxide, carbon dioxide, cyanide fumes.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 108-78-1: OS0700000
LD50/LC50:
CAS# 108-78-1:
Draize test, rabbit, eye: 500 mg/24H Mild;
Inhalation, rat: LC50 = 3248 mg/m3;
Oral, mouse: LD50 = 3296 mg/kg;
Oral, rat: LD50 = 3161 mg/kg;
Skin, rabbit: LD50 = >1 gm/kg;
.

Carcinogenicity:
CAS# 108-78-1: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information available.
Teratogenicity: No information available.
Reproductive Effects: No information available.
Mutagenicity: No information available.
Neurotoxicity: No information available.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	TOXIC SOLID, ORGANIC, N.O.S. (Melamine)	TOXIC SOLID, ORGANIC, N.O.S. (Melamine)
Hazard Class:	6.1	6.1
UN Number:	UN2811	UN2811
Packing Group:	III	III

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 108-78-1 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
Section 313 No chemicals are reportable under Section 313.
Clean Air Act:
This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 108-78-1 can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives
Hazard Symbols:
XN
Risk Phrases:
R 20/21 Harmful by inhalation and in contact with skin.
R 44 Risk of explosion if heated under confinement.

Safety Phrases:
S 36/37 Wear suitable protective clothing and gloves.

WGK (Water Danger/Protection)
CAS# 108-78-1: 1
Canada - DSL/NDSL

CAS# 108-78-1 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2B, D1B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 108-78-1 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 10/23/1998
Revision #4 Date: 2/12/2007

SAFETY DATA SHEET

Creation Date 17-Sep-2010 **Revision Date** 25-Apr-2019 **Revision Number** 4

1. Identification

Product Name **Urea**

Cat No. : **BP169-10; BP169-212; BP169-500 ; XXBP169100KG; NC131771**

CAS-No 57-13-6
Synonyms Carbamide

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number
CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Label Elements
None required

Hazards not otherwise classified (HNOC)
None identified

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Urea	57-13-6	>95

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If symptoms persist, call a physician.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Get medical attention immediately if symptoms occur.

Inhalation Remove to fresh air. Get medical attention immediately if symptoms occur. If not breathing, give artificial respiration.

Ingestion Do NOT induce vomiting. Get medical attention if symptoms occur.

Most important symptoms and effects None reasonably foreseeable.

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Substance is nonflammable; use agent most appropriate to extinguish surrounding fire.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature No information available

Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors. Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
Carbon monoxide (CO). Carbon dioxide (CO_2). Nitrogen oxides (NOx).
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
0	1	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment as required. Avoid dust formation.

Environmental Precautions Should not be released into the environment. See Section 12 for additional Ecological Information.

Methods for Containment and Clean Up Sweep up and shovel into suitable containers for disposal. Avoid dust formation.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Ensure adequate ventilation. Avoid ingestion and inhalation. Avoid contact with skin, eyes or clothing. Avoid dust formation. Protect from moisture.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limitsestablished by the region specific regulatory bodies.

Engineering Measures None under normal use conditions.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection No protective equipment is needed under normal use conditions.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	White
Odor	Ammonia-like
Odor Threshold	No information available
pH	7.5-9.5 10% aq. solution
Melting Point/Range	131 - 135 °C / 267.8 - 275 °F
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	1.25 mmHg @ 25 °C
Vapor Density	Not applicable
Specific Gravity	No information available
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	> 132°C
Viscosity	Not applicable
Molecular Formula	C H4 N2 O
Molecular Weight	60.06

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat. Avoid dust formation. Protect from moisture.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2), Nitrogen oxides (NOx)

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Urea	LD50 = 8471 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation May cause irritation of respiratory tract

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Urea	57-13-6	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

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Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Urea	Not listed	LC50: 16200 - 18300 mg/L, 96h (Poecilia reticulata)	= 23914 mg/L EC50 Photobacterium phosphoreum 5 min	EC50: > 10000 mg/L, 24h (Daphnia magna Straus) EC50: = 3910 mg/L, 48h Static (Daphnia magna)

Persistence and Degradability Persistence is unlikely

Bioaccumulation/ Accumulation No information available.

Mobility . Will likely be mobile in the environment due to its water solubility.

Component	log Pow
Urea	-1.59

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Urea	57-13-6	X	ACTIVE	-

Legend:
TSCA - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Urea	57-13-6	X	-	200-315-5	X	X	X	X	KE-35144

U.S. Federal Regulations

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Not applicable

Health Administration

CERCLA	Not applicable
California Proposition 65	This product does not contain any Proposition 65 chemicals.
U.S. State Right-to-Know Regulations	Not applicable

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security	This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade	No information available

16. Other information

Prepared By	Regulatory Affairs Thermo Fisher Scientific Email: EMSDS.RA@thermofisher.com
Creation Date	17-Sep-2010
Revision Date	25-Apr-2019
Print Date	25-Apr-2019
Revision Summary	This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET
SDS No. 940C
Revision Date: 1/6/2020 Version: 3.0

☑ GHS Compliant

Section 1 - Identification of the substance/mixture and of the company/undertaking

1.1 Product Identifier
Trade Name: duoMatrix® G C2, FORTON® MG MF-415, Melamine Formaldehyde Resin

1.2 Relevant identified uses of the substance or mixture and uses advised against
General Use: Casting Resin
Restrictions on Use: None known

1.3 Details of the supplier of the safety data sheet:
Company: Smooth-On, Inc.,
5600 Lower Macungie Rd., Macungie, PA 18062

Telephone: Phone (610) 252-5800 FAX (610) 252-6200

E-mail address: Visit our website at www.smooth-on.com or email www.sds@smooth-on.com

1.4 Emergency Contact: Chem-Tel Domestic: 800-255-3924 International: 813-248-0585

Section 2 – Hazard(s) Identification

2.1 Classification of the substance or mixture:

GHS Classification in accordance with 29 CFR 1910.1200 (OSHA HCS)

H315 Skin irritation – Category 2
H317 Skin sensitization – Category 1
H350 Carcinogenicity – Category 1A

2.2 GHS Label elements, including precautionary statements

Pictogram(s):

Signal word: Warning

Health Hazards

H315	Causes skin irritation
H317	May cause an allergic skin reaction
H350	May cause cancer.

General Precautions

P101	If medical advice is needed, have product container or label at hand.
P102	Keep out of reach of children.
P103	Read label before use.

Prevention Precautions

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P264	Wash skin thoroughly after handling.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

Response Precautions

P308 + P313 IF exposed or concerned: Get medical advice/ attention.

P332 + P313 If skin irritation occurs: Get medical advice/attention.

Storage Precautions

P405 Store locked up.

Disposal Precautions

P501 Dispose of contents/container according to local, state and federal laws.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS – none known

Section 3 - Composition / Information on Ingredients

3.1 Substances/Mixtures

The following ingredients are hazardous according to Regulation 2012 OSHA Hazard Communication Standard: 29 CFR 1910.1200:

Chemical name	CAS-No.	Concentration
Melamine formaldehyde resin	9003-08-1	>99%
Formaldehyde	50-00-0	<1.0%

Section 4 - First Aid Measures

4.1 Description of first aid measures

Inhalation

Remove source(s) of contamination and move victim to fresh air. If breathing has stopped, give artificial respiration, then oxygen if needed. Contact physician immediately.

Eye Contact

Flush eyes with plenty of water occasionally lifting the upper and lower eyelids. Check and remove any contact lenses if safe to do so. Continue to rinse for at least 15 minutes. If irritation develops, seek medical attention.

Skin Contact

In case of skin contact, wash thoroughly with soap and water. Continue to rinse for at least 15 minutes. Chemical burns must be treated promptly by a physician.

Ingestion

Do not induce vomiting unless instructed by a physician. Never give anything by mouth to an unconscious person. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. if vomiting occurs, the head should be kept low so that vomit does not enter the lungs.

4.2 Most important symptoms and effects, both acute and delayed

In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

4.3 Indication of any immediate medical attention and specific treatment needed, if necessary.

Section 5 - Fire-Fighting Measures

5.1 Extinguishing Media
Water Fog, Dry Chemical, and Carbon Dioxide Foam

5.2 Special hazards arising from the substance or mixture
In a fire or if heated, a pressure increase will occur, and the container may burst.

5.3 Advice for firefighters
Use water spray to cool fire-exposed surfaces and to protect personnel. Shut off "fuel" to fire. If a leak or spill has not ignited, use water spray to disperse the vapors. Either allow fire to burn under controlled conditions or extinguish with foam or dry chemical. Try to cover liquid spills with foam. Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full-face piece operated in pressure demand or positive-pressure mode.

Section 6 - Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures
Only properly protected personnel should remain in the spill area; dike and contain spill. Stop or reduce discharge if it can be done safely**.**

6.2 Environmental precautions
Stop spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains or unauthorized drainage systems and natural waterways by using sand, earth, or other appropriate barriers. No special environmental precautions required.

6.3 Methods and material for containment and cleaning up
Put on appropriate protective gear including NIOSH/MSHA approved self-contained breathing apparatus, rubber boots and heavy rubber gloves. Dike and contain spill; absorb or scrape up excess into suitable container for disposal; wash area with dilute ammonia solution. Stop or reduce discharge if it can be done safely**.** Follow applicable OSHA regulations (29 CFR 1910.120) for disposal.

6.4 Reference to other sections
See Section 3 for list of Hazardous Ingredients; Sections 8 for Exposure Controls; and Section 13 for Disposal.

Section 7 - Handling and Storage

7.1 Precautions for safe handling
Use good general housekeeping procedures. Wash hands after use. Do not get in eyes, on skin or on clothing. Do not breathe vapors or mists. Use good personal hygiene practices.

7.2 Conditions for safe storage, including any incompatibilities
Keep container(s) tightly closed and properly labeled. Store in cool, dry, well ventilated place away from heat, direct sunlight, strong oxidizers and any incompatibles. Store in approved containers and protect against physical damage. Keep containers securely sealed when not in use. Indoor storage should meet local standards and appropriate fire codes. Containers that have been opened must be carefully resealed to prevent leakage. Empty containers retain residue and may be dangerous. Avoid water contamination.

7.3 Specific end use(s)
These precautions are for room temperature handling. Other uses including elevated temperatures or aerosol/spray applications may require added precautions.

Section 8 - Exposure Controls / Personal Protection

8.1 Control parameters

Component	CAS Number	ACGIH TWA	Exposure Limits OSHA PEL	Weight Percent (%)
Melamine Formaldehyde Resin	9003-08-1	10mg/m^3 total dust 5mg/m^3 respir dust	15mg/m^3 total dust 5mg/m^3 respir. dust	**>99**
Formaldehyde	50-00-0	1 ppm	0.75 ppm	**<1.0**

8.2 Exposure controls

Respiratory Protection
Respiratory protection is not normally required when using this product with adequate local exhaust ventilation. Where risk assessment shows air-purifying respirators are appropriate, follow OSHA respirator regulations 29 CFR 1910.134 and European Standards EN 141, 143 and 371; wear an MSHA/NIOSH or European Standards EN 141, 143 and 371 approved respirators equipped with appropriate filter cartridges as a backup to engineering controls.

Hand Protection
Wear any liquid-tight gloves such as butyl rubber, neoprene or PVC.

Eye Protection
Safety glasses with side shields per OSHA eye- and face-protection regulations 29 CFR 1910.133 and European Standard EN166. Contact lenses are not eye protective devices. Appropriate eye protection must be worn instead of, or in conjunction with contact lenses.

Other Protective Clothing/Equipment
Additional protective clothing or equipment is not normally required. Provide eye bath and safety shower.

Comments
Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics. Wash thoroughly after handling.

Section 9 - Physical and Chemical Properties

9.1 Information on basic physical and chemical properties

Appearance:	off white powder	**Vapor pressure:**	None (Polymeric Resin)
Odor:	slight irritating	**Vapor density (Air=1):**	>1
pH:	(50% in water) 8 - 10	**Evaporation rate:**	0.65
Flash Point:	>200 °F	**Solubility in water:**	slightly soluble
Melting / freezing point:	221 – 239 °F	**Specific Gravity (H2O=1, at 4 °C):**	No data
Low / high boiling point:	No data	**Relative density:**	No data
Upper flammability limits:	No data	**Decomposition temperature:**	No data
Lower flammability limits:	f.p. at or above 200 °F	**Viscosity:**	powder

Section 10 - Stability and Reactivity

10.1 Reactivity
No hazardous reactions if stored and handled as prescribed/indicated., No corrosive effect on metal. Not fire propagating.

10.2 Chemical stability
These products are stable at room temperature in closed containers under normal storage and handling conditions.

10.3 Possibility of hazardous reactions
Hazardous polymerization cannot occur

.

10.4 Conditions to avoid
None known

10.5 Incompatible materials
Strong bases and acids

10.6 Hazardous decomposition products
Thermal oxidative decomposition can produce carbon oxides, gasses/vapors, and traces of incompletely burned carbon compounds.

Section 11- Toxicological Information

11.1 Information on toxicological effects

Acute Toxicity
No data available

Skin Corrosion/Irritation
No data available

Serious Eye Damage/Irritation
No data available

Respiratory/Skin Sensitization
No data available

Germ Cell Mutagenicity
No data available

Carcinogenicity
No component of these products present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by IARC, ACGIH or NTP.

Reproductive Toxicity
No data available

Specific Target Organ Toxicity – Single Exposure
No data available

Specific Target Organ Toxicity – Repeated Exposure
No data available

Aspiration Hazard
No data available

Potential Health Effects – Miscellaneous
No data available

Section 12 - Ecological Information

12.1 Toxicity
No data available

12.2 Persistence and Degradability
No data available

12.3 Bioaccumulative Potential
No data available

12.4 Mobility in Soil
No data available

12.5 Results of PBT and vPvB assessment
No data available

12.6 Other Adverse Effects
No data available

Section 13 - Disposal Considerations

13.1 Waste treatment methods
Under Resource Conservation and Recovery Act (RCRA) it is the responsibility of the user of the product to determine at the time of disposal whether the product meets RCRA criteria for hazardous waste as defined in 40 CFR Part 261. Waste management should be in full compliance with federal, state and local laws. Regulations may vary in various locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator.

Container disposal
Steel drums must be emptied and can be sent to a licensed drum reconditioner for reuse, a scrap metal dealer or an approved landfill. Do not attempt to refill or clean containers since residue is difficult to remove. Under no circumstances should empty drums be burned or cut open with gas or electric torch as toxic decomposition products may be liberated. Do not reuse empty containers.

Section 14 - Transport Information

Not regulated by DOT / IMDG / IATA

Section 15 - Regulatory Information

15.1 Safety health and environmental regulations/legislation specific for the substance or mixture:

REACH: Regulation (EC) No 1907/2006 of The European Parliament and of The Council of December 2006 (including amendments and corrigenda as of 16 July 2019)
This product complies with REACH or is not subject to regulation under REACH. The product does not contain an ingredient listed on either the Candidate List or Authorization List for Substances of Very High Concern (SVHC).

TSCA Inventory Status (40 CFR710)
All components of this formulation are listed in the TSCA Inventory. No component of this formulation has been determined to be subject to manufacturing or use restrictions under the Significant New Use Rules (SNURs).

EPA Regulations:

RCRA Hazardous Waste Number: Not listed (40 CFR 261.33)

CERCLA Hazardous Substance (40 CFR 302.4) listed specific per RCRA, Sec. 3001; CWA,

Sec. 311 (b)(4); CWA, Sec. 307(a), CAA, Sec. 112

Chemical Name	RQ	% Reportable Component
Formaldehyde	100 lbs.	<1.0

SARA Toxic Chemical (40 CFR 372.65):

Chemical Name	CAS #	% by Weight
Formaldehyde	50-00-0	<1.0

SARA EHS (Extremely Hazardous Substance) (40 CFR 355):

Chemical Name	TPQ	% Reportable Component
Formaldehyde	500 lbs.	<1.0

This product contains the following chemicals that are subject to release reporting requirements under **section 313 of SARA Title III.**

Chemical Name	CAS #	% by Weight
Formaldehyde	50-00-0	<1.0

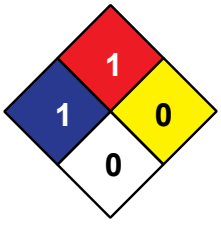
California Proposition 65
This product does not intentionally contain any chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

15.2 Chemical safety assessment

No chemical safety assessment has been carried out for this substance/mixture by the supplier.

16 - Other Information

HMIS	
H	1
F	1
R	0



NFPA

Revision Date: 1/6/2020 Version: 3.0

Abbreviations and acronyms

ACGIH-American Conference of Governmental Industrial Hygienists; ANSI-American National Standards Institute; Canadian TDG-Canadian Transportation of Dangerous Goods; CAS-Chemical Abstract Service; Chemtrec-Chemical Transportation Emergency Center (US); CHIP-Chemical Hazard Information and Packaging; DSL-Domestic Substances List; EC-Equivalent Concentration; EH40 (UK)-HSE Guidance Note EH40 Occupational Exposure Limits; EPCRA-Emergency Planning and Community Right-To-Know Act; ESL-Effects screening levels; GHS-Globally Harmonized System of Classification and Labelling of Chemicals; HMIS-Hazardous Material Information Service; IATA-International Air Transport Association; IMDG-International Maritime Dangerous Goods Code; LC-Lethal Concentration; LD-Lethal Dose; NFPA-National Fire Protection Association; OEL-Occupational Exposure Limit; OSHA-Occupational Safety and Health Administration, US Dept. of Labor; PEL-Permissible Exposure Limit; SARA (Title III)-Superfund Amendments and Reauthorization Act; SARA 313-Superfund Amendments and Reauthorization Act, Section 313; SCBA-Self-Contained Breathing Apparatus; STEL-Short Term Exposure Limit; TCEQ-Texas Commission on Environmental Quality; TLV-Threshold Limit Value; TSCA-Toxic Substances Control Act Public Law 94-469; TWA-Time Weighted Value; US DOT-US Department of Transportation; WHMIS-Workplace Hazardous Materials Information System.

Disclaimer

The information contained in this Safety Data Sheet (SDS) is considered accurate as of the version date. However, no warranty is expressed or implied regarding the accuracy of the data. Since the use of this product is not within the control of Smooth-On Inc., it is the user's obligation to determine the suitability of the product for its intended application and assumes all risk and liability for its safe use.

This SDS is prepared to comply with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as prescribed by the United States (US) Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (29 CFR 1910.1200), the Canadian Workplace Hazardous Materials Information System (WHMIS), and European Union Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 (REACH).

Classifications of the chemical in accordance with 29 CFR 1910.1200, signal word, hazard and precautionary statement(s), symbol(s) and other information are based on listed concentration of each hazardous ingredient. Unlisted ingredients are not "hazardous" per the OSHA Hazard Communication Standard (29 CFR 1910.1200), WHMIS and EC No 1907/2006 and are considered trade secrets under US Federal Law (29 CFR and 40 CFR), Canadian Law (Health Canada Legislation), and European Union Directives.

SAFETY DATA SHEET

FOR INDUSTRIAL USE ONLY

Casco-Resin(TM) CR-596

Section 1. Product and company identification

GHS product identifier : Casco-Resin(TM) CR-596
MSDS Number : 000000100507
Product type : Urea Formaldehyde Resin
Material uses : Wood Adhesives, Composites, Laminates or Related Board Products

Manufacturer/Supplier/Importer : Hexion Inc.
180 East Broad Street
Columbus, Ohio
43215 USA

Contact person : 4information@hexion.com

Telephone : For additional health and safety or regulatory information, call 1 888 443 9466.

Emergency telephone number : For Emergency Medical Assistance
Call Health & Safety Information Services
1-866-303-6949

For Emergency Transportation Information
CHEMTREC US Domestic (800) 424-9300
CHEMTREC International (703) 527-3887
CANUTEC CA Domestic (613) 996-6666

Part of the CASCO® Brand of Adhesives and Resins from Hexion Inc.

Section 2. Hazards identification

Classification of the substance or mixture : RESPIRATORY SENSITIZATION - Category 1
SKIN SENSITIZATION - Category 1
CARCINOGENICITY - Category 1B
TOXIC TO REPRODUCTION - Category 1B
TOXIC TO REPRODUCTION - Category 1B

GHS label elements

Hazard pictograms :

Signal word : Danger
Hazard statements : H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H317 May cause an allergic skin reaction.
H350 May cause cancer.

H360F May damage fertility.
H360 May damage the unborn child.

Precautionary statements

General : Not applicable.

Prevention : Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Use personal protective equipment as required.
Wear protective gloves.
In case of inadequate ventilation wear respiratory protection.
Avoid breathing vapor.
Contaminated work clothing should not be allowed out of the workplace.

Response : IF exposed or concerned:
Get medical attention.
IF INHALED:
If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.
If experiencing respiratory symptoms:
Call a POISON CENTER or physician.
IF ON SKIN:
Wash with plenty of soap and water.
Wash contaminated clothing before reuse.
If skin irritation or rash occurs:
Get medical attention.

Storage : Store locked up.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Other hazards which do not result in classification : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Ingredient name	% by weight	CAS number
Methanol	0.2 - 1	67-56-1
Formaldehyde	0.1 - 0.2	50-00-0
Triethanolamine	0.1 - 0.2	102-71-6

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.
Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In the event of any complaints or symptoms, avoid further exposure.

Skin contact : Wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Protection of first aid personnel : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media	:	Use an extinguishing agent suitable for the surrounding fire.
Unsuitable extinguishing media	:	None known.
Specific hazards arising from the chemical	:	In a fire or if heated, a pressure increase will occur and the container may burst.
Hazardous thermal decomposition products	:	Decomposition products may include the following materials: carbon dioxide carbon monoxide nitrogen oxides
Special protective actions for fire-fighters	:	Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
Special protective equipment for fire-fighters	:	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel	:	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
For emergency responders	:	If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".
Environmental precautions	:	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and material for containment and cleaning up

Small spill	:	Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
Large spill	:	Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13 of SDS). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 of SDS for emergency contact information and section 13 of SDS for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see section 8 of SDS). Persons with a history of skin sensitization problems or asthma, allergies or chronic or recurrent respiratory disease should not be employed in any process in which this product is used. Avoid exposure - obtain special instructions before use. Avoid exposure during pregnancy. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapor or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10 of SDS) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Methanol	**ACGIH TLV (1994-09-01)** Time Weighted Average (TWA) 262 mg/m3 200 ppm **Short Term Exposure Limit (STEL)** 328 mg/m3 250 ppm **OSHA PEL (1993-06-30)** Time Weighted Average (TWA) 260 mg/m3 200 ppm **NIOSH REL (1994-06-01)** Time Weighted Average (TWA) 260 mg/m3 200 ppm **Pollutant concentration that should not be exceeded during working hours and which workers are believed to be exposed during a period of 15 minutes maximum, without experiencing: a) irritation. b) chronic or irreversible tissue damage. c) dependent toxic effects of exposure rate. d) Narcosis of sufficient magnitude to increase susceptibility to accidents. e) The reduction of ability to get to safety by their own means.** 325 mg/m3 250 ppm

Formaldehyde	**ACGIH TLV (2000-03-01)** Ceiling 0.37 mg/m3 0.3 ppm **OSHA PEL (1993-06-30)** Time Weighted Average (TWA) 0.75 ppm **Pollutant concentration that should not be exceeded during working hours and which workers are believed to be exposed during a period of 15 minutes maximum, without experiencing: a) irritation. b) chronic or irreversible tissue damage. c) dependent toxic effects of exposure rate. d) Narcosis of sufficient magnitude to increase susceptibility to accidents. e) The reduction of ability to get to safety by their own means.** 2 ppm **NIOSH REL (1994-06-01)** Time Weighted Average (TWA) 0.016 ppm **Ceiling** 0.1 ppm
Triethanolamine	**ACGIH TLV (1994-09-01)** Time Weighted Average (TWA) 5 mg/m3

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

Appropriate engineering controls : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the

following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Hand protection	:	Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
Body protection	:	Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Other skin protection	:	Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Respiratory protection	:	Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state	:	Liquid
Color	:	Opaque, white
Odor	:	Little or none
Odor threshold	:	Not available
pH	:	7.7 - 8.2 @ 25 °C (77.00 °F)
Melting point/ Freezing point	:	-10 °C (14.00 °F)
Boiling point	:	102 °C (215.60 °F)
Flash point	:	Not determined
Burning time	:	Not available
Burning rate	:	Not available
Evaporation rate	:	0.3 ((n-Butyl acetate=1))
Flammability (solid, gas)	:	Not available
Lower and upper explosive (flammable) limits	:	**Lower:** Not applicable. **Upper:** Not applicable.
Vapor pressure	:	22 mm Hg @ 25 °C (77.00 °F)

Vapor density	:	Not available
Relative density	:	1.290 - 1.302
Solubility	:	Not available
Solubility in water	:	Soluble
Partition coefficient: n-octanol/water	:	Not available
Auto-ignition temperature	:	Not applicable.
Decomposition temperature	:	Not available
SADT	:	Not available
Viscosity	:	**Dynamic:** 1,300 - 1,800 cPs (Brookfield) **Kinematic:** Not available

Other information

The SDS is not to be used as a specification sheet. For Specific technical information on the product listed above, a sales specification sheet should be obtained from your Hexion representative.

Section 10. Stability and reactivity

Reactivity	:	Normally stable, but will polymerize at high temperatures with some evolution of heat.
Chemical stability	:	The product is stable.
Possibility of hazardous reactions	:	Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid	:	Strong oxidizer,
Incompatible materials	:	Reactive or incompatible with the following materials: oxidizing materials acids
Hazardous decomposition products	:	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Methanol				
	LD50 Oral	Rat	5,628 mg/kg	-
Formaldehyde				
	LD50 Oral	Rat	800 mg/kg	-

	LC50 Inhalation	Rat	0.578 mg/l	2 h
	LD50 Dermal	Rabbit	270 mg/kg	-
Triethanolamine				
	LD50 Oral	Rat	7,390 mg/kg	-
	LD50 Dermal	Rabbit	> 2,000 mg/kg	-

Conclusion/Summary **:** Not available

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Formaldehyde	Skin - Erythema/Eschar	Rabbit	2.5	20 hrs	-
	Skin - Edema	Rabbit	3	20 hrs	-
	eyes - Cornea opacity	Mouse	> 3		-
Triethanolamine	Skin - Severe irritant	Mouse			-
	Skin - Mild irritant	Human		72 hrs	-
	Skin - Mild irritant	Rabbit		24 hrs	-
	eyes - Severe irritant	Rabbit			-
	eyes - Mild irritant	Rabbit			-

Conclusion/Summary
Skin **:** Not available
eyes **:** Not available
Respiratory **:** Not available

Sensitization

Conclusion/Summary
Skin **:** Not available
Respiratory **:** Not available

Mutagenicity

Conclusion/Summary **:** Not available

Carcinogenicity

Product/ingredient name	Result	Species	Dose	Exposure
Formaldehyde	- - - - -	-		
Remarks:	The National Toxicology Program (NTP) classifies formaldehyde as "known to be a human carcinogen" with respect to nasopharyngeal cancer, sinonasal cancer and myeloid leukemia. The International Agency for Research on Cancer (IARC) classifies formaldehyde as "carcinogenic to humans". U.S. OSHA regulates formaldehyde as a potential human carcinogen. See the OSHA Formaldehyde Workplace Standard at 29 CFR 1920.1048 (the "OSHA			

	Standard"). Safe handling and use instructions are provided in this SDS and in the OSHA Standard. OSHA has identified 0.5 ppm, calculated as an eight-hour time-weighted average ("TWA") concentration, as the "Action Level". Please review and understand the guidance contained in this MSDS, and refer to the OSHA Standard for regulatory requirements that might be applicable to your operation and use. Many studies and other evaluations have been performed concerning formaldehyde's potential to cause cancer. To review some of these studies and for further information go to www.osha.gov/SLTC/formaldehyde; http://monographs.iarc.fr; http://ntp-server.niehs.nih.gov; http://epa.gov/iris/subst/0419.htm; http://www.nap.edu/catalog.php?record_id=13142 and other authoritative websites.

Conclusion/Summary : Not available

Reproductive toxicity

Conclusion/Summary : Not available

Teratogenicity

Conclusion/Summary : Not available

Specific target organ toxicity (single exposure)

Product/ingredient name	Category	Route of exposure	Target organs
Methanol	Category 3 Category 1 Category 2		Respiratory tract irritation central nervous system (CNS) optic nerve
Formaldehyde	Category 3		Respiratory tract irritation
Triethanolamine	Category 3		Respiratory tract irritation

Specific target organ toxicity (repeated exposure)

Product/ingredient name	Category	Route of exposure	Target organs
Methanol	Category 2		kidneys liver gastrointestinal tract skin respiratory tract
Formaldehyde	Category 2		respiratory tract skin
Triethanolamine	Category 2		liver kidneys

Aspiration hazard

Not available

Information on the likely routes of : Not available

exposure

Potential acute health effects

Eye contact	:	No known significant effects or critical hazards.
Inhalation	:	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
Skin contact	:	May cause an allergic skin reaction.
Ingestion	:	No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact	:	No specific data.
Inhalation	:	Adverse symptoms may include the following: wheezing and breathing difficulties asthma reduced fetal weight increase in fetal deaths skeletal malformations
Skin contact	:	Adverse symptoms may include the following: irritation redness reduced fetal weight increase in fetal deaths skeletal malformations
Ingestion	:	Adverse symptoms may include the following: reduced fetal weight increase in fetal deaths skeletal malformations

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects	:	Not available
Potential delayed effects	:	Not available

Long term exposure

Potential immediate effects	:	Not available
Potential delayed effects	:	Not available

Potential chronic health effects

Conclusion/Summary	:	Not available
General	:	Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.
Carcinogenicity	:	May cause cancer. Risk of cancer depends on duration and level of exposure.
Mutagenicity	:	No known significant effects or critical hazards.
Teratogenicity	:	May damage the unborn child.
Developmental effects	:	No known significant effects or critical hazards.
Fertility effects	:	May damage fertility.

Numerical measures of toxicity

Acute toxicity estimates

Not available

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
methanol			
	Acute EC50 13,000 mg/l Fresh water	Fish - Rainbow trout,donaldson trout	4 d
formaldehyde			
	Acute LC50 6.7 mg/l -	Fish - Striped bass	96 h
	Acute LC50 6.9 mg/l -	Fish - Zebra danio	6 d
	Acute NOEC > 47.9 mg/l -	Fish - Medaka, high-eyes	28 d
	Acute EC50 5.8 mg/l Fresh water	Aquatic invertebrates. Water flea	2 d
	Acute EC50 4.9 mg/l Fresh water	Aquatic plants - Algae	72 h
	Acute EC50 4.3 mg/l Fresh water	Aquatic plants - Algae	48 h
	Acute EC50 19 mg/l -	Micro-organism - Soil organisms	3 h
2,2',2"-nitrilotriethanol			
	Acute LC50 11,800,000 µg/l Fresh water	Fish - Fathead minnow	96 h
	Chronic NOEC 16 mg/l Fresh water	Aquatic invertebrates. Water flea	21 d

Conclusion/Summary : Not available

Persistence/degradability

Conclusion/Summary : Not available

Bioaccumulative potential

Product/ingredient name	LogPow	BCF	Potential
Methanol	-0.77	-	low
Formaldehyde	0.35	< 1	low
Triethanolamine	-1	3.90	low

Mobility in soil

Soil/water partition coefficient (KOC) : Not available

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

The data provided in this section is for information only and may not be specific to your package size or mode of transport. You will need to apply the appropriate regulations to properly classify your shipment for transportation.

International transport regulations

Regulatory information	UN/NA number	Proper shipping name	Classes/*PG	Reportable Quantity (RQ)
CFR		Non-regulated		
TDG		Non-regulated		
IMO/IMDG		Non-regulated		
IATA (Cargo)		Non-regulated		

*PG : Packing group

Special precautions for user : Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.'

Section 15. Regulatory information

United States

U.S. Federal regulations : **United States - TSCA 12(b) - Chemical export notification:** None required.
United States - TSCA 5(a)2 - Final significant new use rules: Not listed
United States - TSCA 5(a)2 - Proposed significant new use rules: Not listed
United States - TSCA 5(e) - Substances consent order: Not listed

SARA 313

		Product name	CAS number
Form R - Reporting requirements	:	Formaldehyde	50-00-0
Supplier notification	:	Formaldehyde	50-00-0

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

California Prop. 65: : WARNING: This product contains a chemical known to the State of California to cause cancer., WARNING: This product contains less than 1% of a chemical known to the State of California to cause birth defects or other reproductive harm.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Methanol	No.	Yes.	No.	No.
Formaldehyde	Yes.	No.	40 µg/day	No.

United States inventory (TSCA 8b) : All components are listed or exempted.

Canada

WHMIS (Canada) : Class D-2A: Material causing other toxic effects (Very toxic).

Canadian lists

Canadian NPRI : None required.

CEPA Toxic substances : The following components are listed: Formaldehyde

International regulations

International lists : **Australia inventory (AICS):** All components are listed or exempted.
Taiwan inventory (CSNN): Not determined.
Canada inventory: All components are listed or exempted.
Japan inventory: All components are listed or exempted.
China inventory (IECSC): All components are listed or exempted.
Korea inventory: All components are listed or exempted.
New Zealand Inventory (NZIoC): Not determined.
Philippines inventory (PICCS): All components are listed or exempted.
United States inventory (TSCA 8b): All components are listed or exempted.

Section 16. Other information

Hazardous Material Information System III (U.S.A.) :

Health	*	1
Flammability		1
Physical hazards		0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.
The customer is responsible for determining the PPE code for this material.

Full text of abbreviated H statements	**:**	Not applicable.

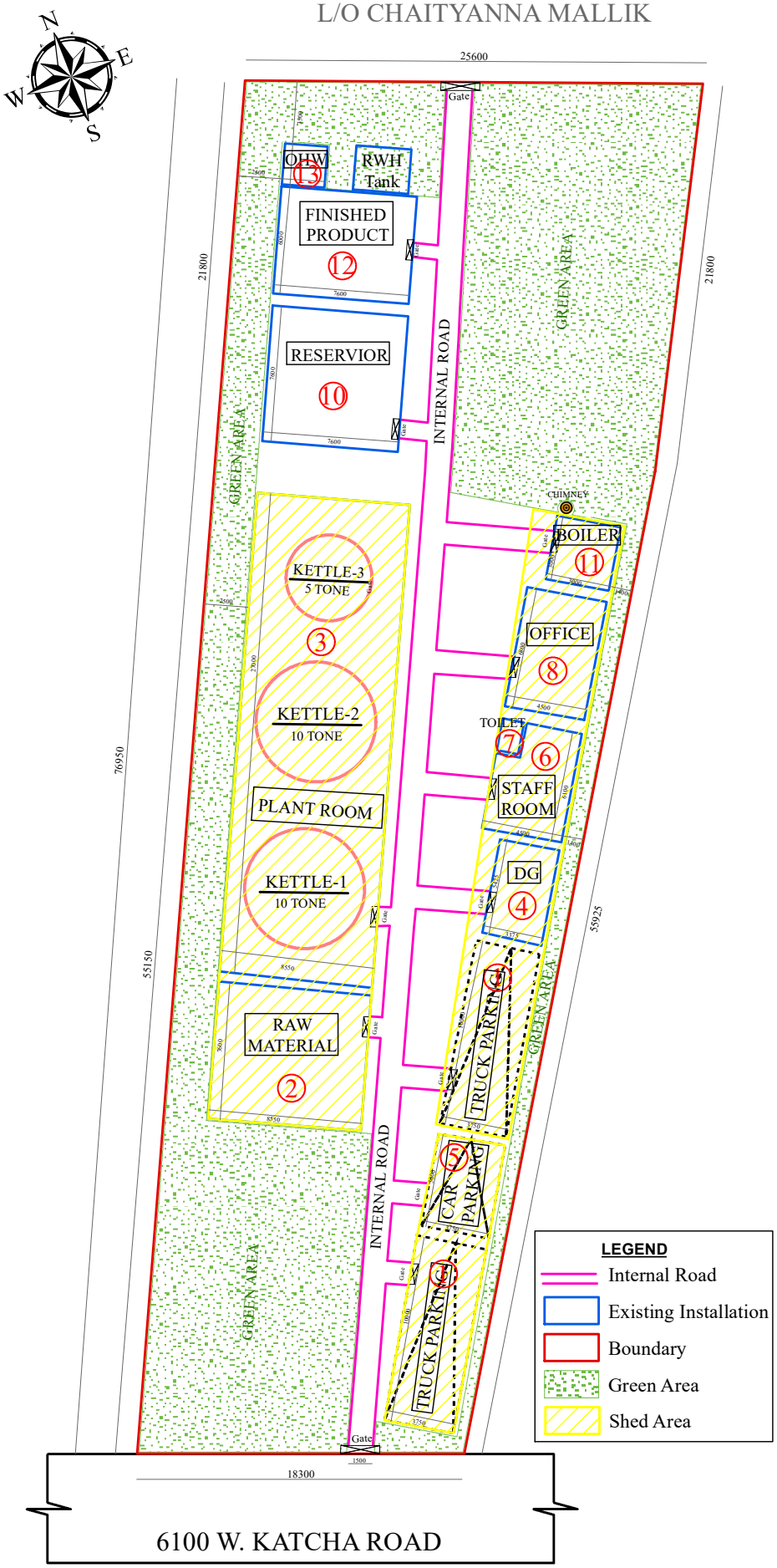
History

Date of printing	**:**	07/28/2015
Date of issue/Date of revision	**:**	04/11/2015
Date of previous issue	**:**	04/14/2014
Version	**:**	6.0
Prepared by	**:**	Product Safety Stewardship
Key to abbreviations	**:**	ATE = Acute Toxicity Estimate BCF = Bioconcentration Factor GHS = Globally Harmonized System of Classification and Labelling of Chemicals IATA = International Air Transport Association IBC = Intermediate Bulk Container IMDG = International Maritime Dangerous Goods LogPow = logarithm of the octanol/water partition coefficient MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution) RID = The Regulations concerning the International Carriage of Dangerous Goods by Rail UN = United Nations
References	**:**	Not available

Notice to reader

The information provided herein was believed by Hexion Inc. ("Hexion") to be accurate at the time of preparation or prepared from sources believed to be reliable, but it is the responsibility of the user to investigate and understand other pertinent sources of information, to comply with all laws and procedures applicable to the safe handling and use of the product and to determine the suitability of the product for its intended use. All products supplied by Hexion are subject to Hexion's terms and conditions of sale. HEXION MAKES NO WARRANTY, EXPRESSED OR IMPLIED, CONCERNING THE PRODUCT OR THE MERCHANTABILITY OR FITNESS THEREOF FOR ANY PURPOSE OR CONCERNING THE ACCURACY OF ANY INFORMATION PROVIDED BY HEXION, except that the product shall conform to Hexion's specifications. Nothing contained herein constitutes an offer for the sale of any product.

L/O CHAITYANNA MALLIK



SITE PLAN

SCALE = 1:300

PROJECT -

SINGLE STORY FACTORY SHED

OWNER= SMT. RASHMI AGARWAL
W/O SRI. SANJAY KR AGARWAL

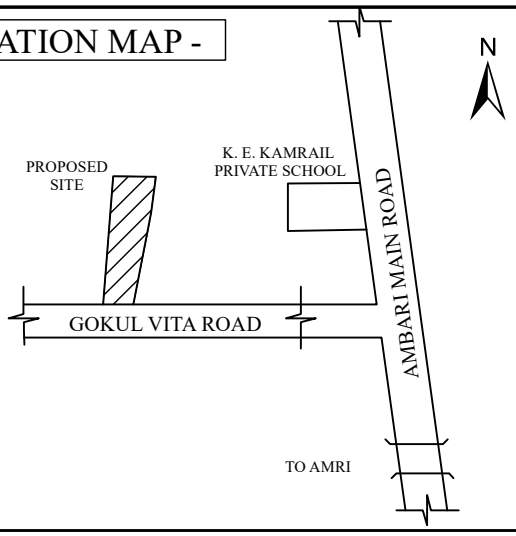
LOCATION -

GURUKUL VITA, P.O.- KAMARVITA,
P.S.- RAJGANJ, DIST.- JALPAIGURI
WEST BENGAL, PIN- 735135

LAND SCHEDULE -

MUZA ---------- BINNAGURI
J.L NO ---------- 03
SHEET NO ------ 07
KHATIAN NO -- R.S. 312; L.R. 1019
PLOT NO -------- R.S. 407; L.R. 550
P.S ---------- N.J.P.
PARGANA ------ BAIKUNTHAPUR
DIST ---------- JALPAIGURI
G.P. ---------- BINNAGURI

LOCATION MAP -



AREA STATEMENT -

LAND AREA AS PER DEED	1740.133 sq.m
LAND AREA AS PER SITE	1724.989 sq.m
TO BE INDUSTRIAL DEVELOP	1724.989 sq.m

1	TRUCK PARKING	75 sq.m
2	RAW MATERIAL	64.98 sq.m
3	PLANT ROOM	230.85 sq.m
4	DG	18.3 sq.m
5	CAR PARKING	18.5 sq.m
6	STAFF ROOM	25.45 sq.m
7	TOILET	2 sq.m
8	OFFICE	30.6 sq.m
9	RESERVOIR	57.76 sq.m
10	BOILER WITH CHIMNEY	9 sq.m
11	FINISH PRODUCT	45.6 sq.m
12	OVERHEAD WATER TANK	6.25 sq.m
13	TREE PLANTATION	603.31 sq.m
14	ROAD	148.91 sq.m
15	OPEN AREA	388.47 sq.m
PERCENTAGE OF TREE PLANTATION		**35%**