

1 EXECUTIVE SUMMARY

1.1 About Project Proponent

Ahan Add-Chem Private Limited is a company formed by Mr. Rakesh Saraiya, currently the executive director of Parul Chemicals Limited, a closely held deemed public company promoted by the Saraiya family and in the business of Chlorine based Industrial Chemicals & Agrochemicals Formulations established in the year 1975.

1.2 About the Project and the Project Site

Ahan Add Chem Pvt Ltd plans to establish synthetic chemicals manufacturing facility greenfield facility at Village Ekalbara, Taluka Padra, District Vadodara, at an aerial distance about 13.07 km WSW of Vadodara City boundary. The site address is: Block No. 406, Ekalbara Village, Padra Taluka, Vadodara District, Gujarat, INDIA – 390 015.

The Project Site is located on non-agricultural land, permitted for industrial use.

1.3 Regulatory Requirement

Ahan Add Chem plans a Greenfield facility of the Ekalbara Facility on available land. Since the Project Site is located outside a notified industrial area, it falls in 'Category A' of the Schedule attached to the Environmental Impact Assessment (EIA) Notification, i.e. Project or Activity 5 (f) of the schedule to the EIA Notification dated Sept. 14, 2006 as amended till date, Synthetic Organic Chemicals, requiring Environmental Clearance (EC) from MoEF, New Delhi.

Details of the products capacities are provided in **Table 1-1**.

Table 1-1: Production Capacity

S. No.	Product	Production Capacity in MT/Annum
1.	Brominated Compound	2000
2.	Friedel Craft Reaction Chemicals	400
3.	Nitration Compound	200
4.	Catalytic Reduction Compound	200
5.	Organophosphinates	200

To manufacture these products, the facility will require plant & equipment for processing, water, waste water facilities, air pollution control facilities and other utilities.

1.3.1 Project Cost

The total estimated cost of the proposed project is ~ 8.43 crores.

1.3.2 Utilities

Power

Power from Grid

- From Grid: 250 HP/ 186 KW power will be the connected load and a contract demand of 175 KVA will be sourced from MGVCL, the local power utility.

Standby Power from D.G. Sets

DG sets are used only for standby power, i.e. they will be used during power outages only. Stand by: DG Sets: 1 No. of 250 KVA Infrastructural Facilities

Steam and Heat

The proposed project will require one boiler of 1 tonnes/hr capacity running on HSD/LDO as a fuel.

1.3.3 Water

Water Consumption

M/s Ahan Add Chem Pvt Ltd will require 70 KLD water if effluent disposal mode is discharge to CETP being operated by EICL and will require 66.1 KLD if in case waste water discharge is through a zero-liquid discharge system with recycling capacity. Water will be sourced from an in-house bore well & RO water tanker supplier. The area does not currently come under the purview (semi-critical, critical or over-exploited areas as defined by CGWA) of the CGWA Notification, and does not require permission from the CGWA prior to abstraction of ground water.

Waste Water Management

1. The GPCB currently does not allow new discharge of treated wastewater directly into the ECPL.
2. (a) The CETP operated by EICL, Umaraya has currently not been allowed to discharge additional effluents into the ECPL by the GPCB.
(b) EICL has granted permission to Ahan Add Chem for receiving upto 5 KLD waste water. However, Ahan cannot exercise this option due to discussed in point (1) & (2) (a).
3. Due to the above situation, GPCB has recommended that the MoEF issue ToR to Ahan conditional to Ahan setting up a ZLD system.
4. Consequently, Ahan plans a ZLD system to operationalize the unit. However, should in future, the GPCB allow new discharges into the ECPL, Ahan would prefer to send treated effluent to EICL for further treatment & discharge into ECPL.

The water balance is as follows:

Figure 1-1: Water Balance Diagram If Disposal Mode is discharge to the CETP being operated by EICL

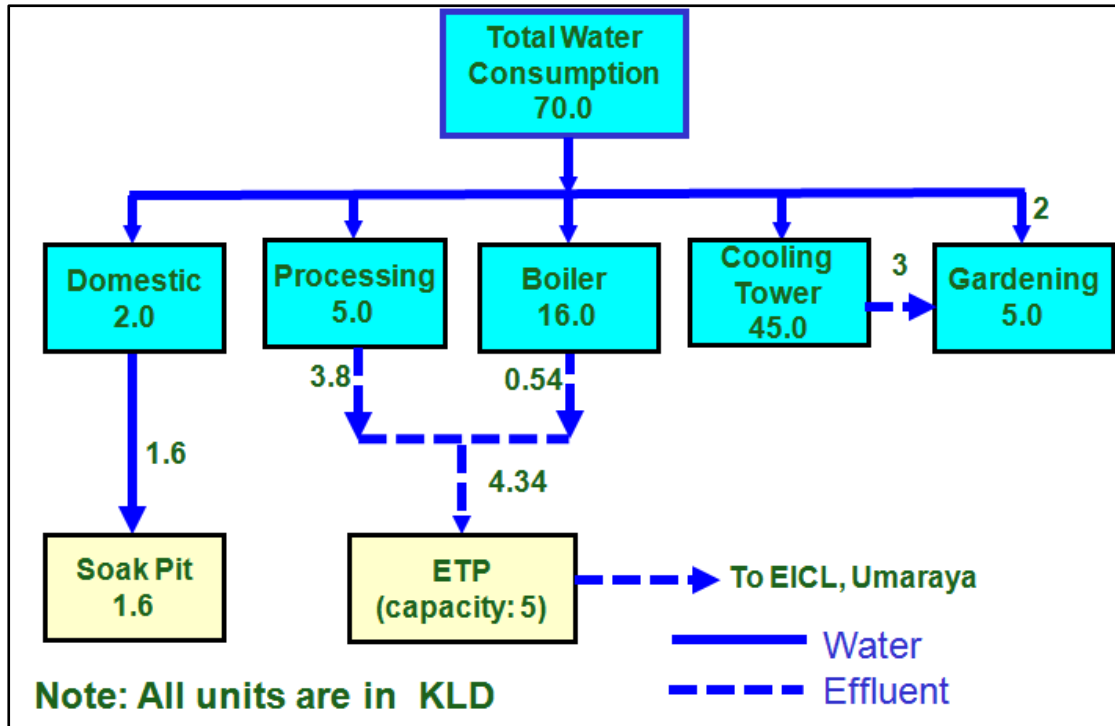
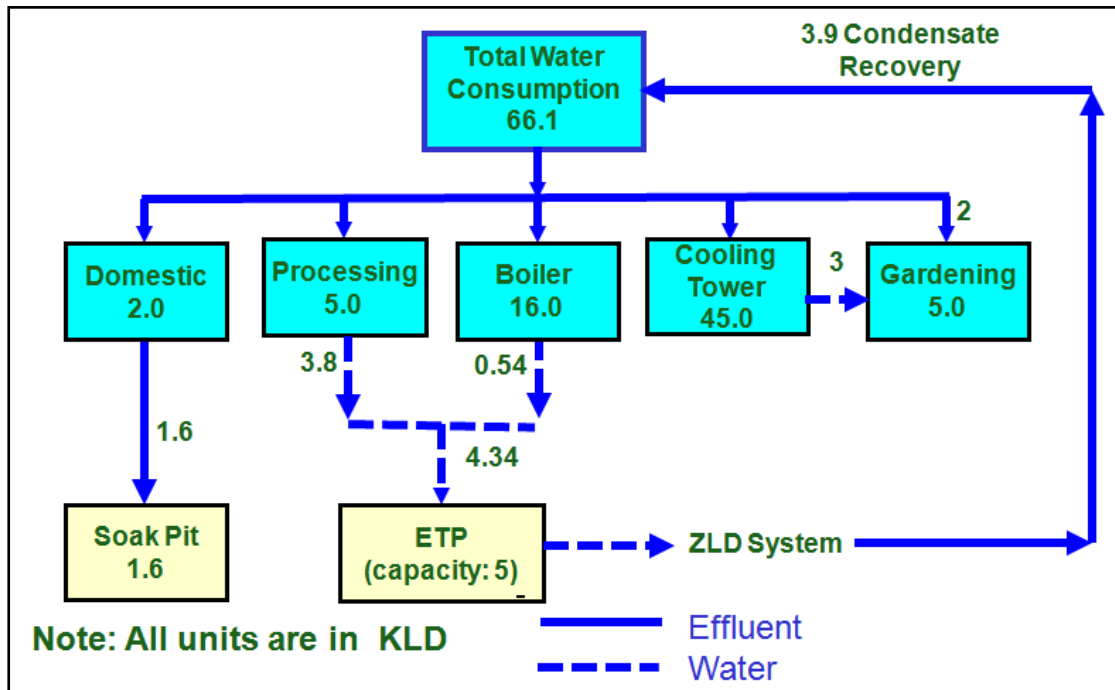


Figure 1-2: Water Balance chart (Zero Liquid Discharge System with Recycling Capability)



Water Generation

For the proposed project, total wastewater generation is 4.34 KLD. Cooling tower blow down TDS < 2100 mg/lit will be used for gardening. The contributing wastewater streams are the processing & boiler blow down. Effluent will be treated in ETP & then sent to the CETP operated

by EICL, Umaraya for further treatment / evaporated in a Multi Effect Evaporator (MEE) till EICL issues Ahan, additional permit for disposal.

1.3.4 Air Emissions

Atmospheric emissions will however take place in the form of emissions due to the boiler and at times of power outage from the standby Diesel Generator (DG) sets. The emissions will be in the form of respirable particulate matter (PM10), sulphur-di-oxide and oxides of nitrogen.

As already mentioned in **Section 1.3.2**, details of flue gas stacks are given in **Table 1-2**.

Table 1-2: Details of Flue Gas Stacks

S. No.	Stack Attached to	Stack height in m	Stack diameter in m
1.	Boiler	30	0.35
2.	DG Set (250 KVA)	7	0.1

1.3.5 Hazardous and Other Solid Wastes

Hazardous Wastes

Details regarding hazardous waste generated from proposed project are provided in **Table 1-3**.

Table 1-3: Hazardous Wastes Generated by the Ahan Add Chem

S. No	Waste Stream	Waste Category No as per HW(M,H&T)R1 2008	Total quantity in MT/Annum	Source	Method of packing	Disposal Method
1.	Waste / residue containing oil	5.2	0.2	Maintenance activities	MS Drum	Collection, storage, selling to actual recycler
2.	Spent Solvents	20.2	11.0	Distillation kettle	MS drum	To TSDF for incineration
3	Distillation Residue	20.3	65.0	Distillation kettle + MEE	HDPE carboys	To TSDF for incineration
4	Discarded containers / barrels / liners used for hazardous waste / chemicals	33.3	900 Nos.	Used drums / containers / liners	--	To authorized reprocessor
5	Sludge for wet scrubber	36.1	4	Rotary Vacuum Drier	Packed in HDPE Bogs	Send to TSDF
6	ETP Sludge	34.3	2.52	ETP Plant	Plastic Bogs	Send to TSDF

1.3.6 Greenbelt Development

Total plot area is ~6,750 m². Greenfield, the total area under green cover will be ~1955 m² or ~29% of the plot area.

1.4 Description of the Baseline Environment

Landuse of the Study Area

Landuse within 10 km radius site boundary has been determined based on standard methods with the help of satellite imagery, followed by ground truth verification and is provided in **Table 1-4**.

Table 1-4: Landuse Cover of the Study Area

S. No.	Category	Area in Sq km	% Area Cover
1.	Habitation	7.3067	2.336
2.	Industrial Area	1.2518	0.40
3.	Agricultural land	257.67	82.02
4.	Land Without Scrubs	0.6724	0.21
5.	Water Bodies	6.1068	1.94

¹ Hazardous Wastes (Management, Handling and Transboundary) Rules, 2008 as amended till date.

S. No.	Category	Area in Sq km	% Area Cover
6.	Mud Flat	3.2796	1.04
7.	Sandy Area	1.8406	0.59
8.	Land With Scrubs	36.022	11.47
Total		314.1593	100.0

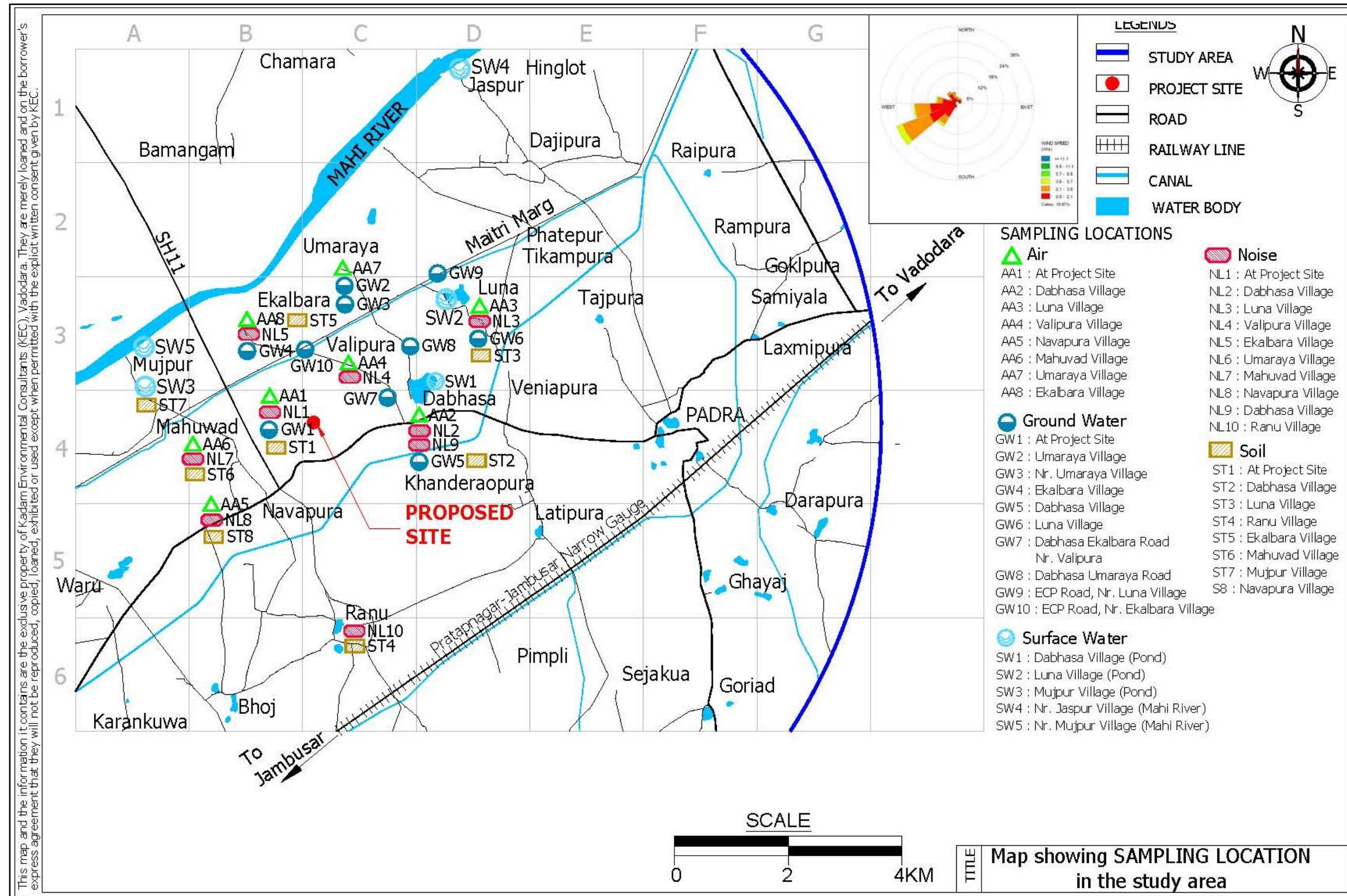
Agricultural land contributes to the largest portion of the study area landuse. No reserve forest or any other notified ecologically sensitive features in the study area were identified during the study.

Weather

Information of key weather data was collected at the site during the summer season of 2012 and is summarized as follows:

- Site specific meteorological data shows that average wind speed in the summer season is 1.8 m/s and maximum wind speed of 2.4 m/s.
- It can be observed that in the summer season, wind blows mostly from west south west sector. Calm wind contributes to about 10.87%.
- Mean temperature recorded for summer season was 30.7 °C with maximum temperature of 37.7 °C and minimum of 23.5 °C which is a characteristic of this study area.
- The average relative humidity recorded was 44.4 % with maximum relative humidity of 62.5 % and minimum of 27.7%.

Figure 1-3: Sampling Locations Map



Ambient Air Quality

Impacts on ambient air during operation phase would be due to emissions from stack of Boiler (Furnace Oil / LDO as a fuel) and D. G. Set (1 No.) (250 KVA)

Ambient air monitoring was carried out at eight stations during the summer season 2012 as mentioned in **Table 1-5**. The parameters monitored were Particulate Matter (PM₁₀), Sulphur Dioxide (SO₂), Oxides of Nitrogen (NO_x), Total Hydrocarbons (THCs) and Volatile Organic Carbons (VOCs) using standard methods.

Table 1-5: Ambient Air Quality Monitoring Locations and Results

AAQM Station	Location	Distance from Project Site, km, and (Direction)	Justification for Selection of Station	Mean Results (In ug/nm ³ , unless otherwise stated; permissible 24 hour limits as per NAAQS ² in brackets)	
				Parameter	Value
AA 1	At Site	0.00 (Core)	Base	PM ₁₀	56 (100)
				SO ₂	9.2 (80)
				NO _x	12.0 (80)
				VOCs	<0.25 ppm (NS)
				THCs	1042 (NS)
AA 2	Dabhasa Village	1.76 (E)	Downwind	PM ₁₀	91 (100)
				SO ₂	9.3 (80)
				NO _x	13.0 (80)
				VOCs	<0.25 ppm (NS)
				THCs	1093 (NS)
AA 3	Luna Village	3.54 (NE)	Downwind	PM ₁₀	77 (100)
				SO ₂	9.6 (80)
				NO _x	13.2 (80)
				VOCs	<0.25 ppm (NS)
				THCs	1087 (NS)
AA 4	Valipura Village	1.21 (NE)	Downwind	PM ₁₀	78 (100)
				SO ₂	9.0 (80)
				NO _x	15.1 (80)
				VOCs	<0.25 ppm (NS)
				THCs	1089 (NS)
AA 5	Navapura Village	1.96 (SW)	Upwind	PM ₁₀	79 (100)
				SO ₂	9.8 (80)
				NO _x	14.3 (80)
				VOCs	<0.25 ppm (NS)
				THCs	1100 (NS)
AA 6	Mahuvad Village	1.54 (W)	Upwind	PM ₁₀	78 (100)
				SO ₂	9.0 (80)
				NO _x	13.2 (80)

² National Ambient Air Quality Standards, notified by the Central Pollution Control Board with effect from 18th November 2009, vide Notification No. B-29016/20/90/PCI-I

AAQM Station	Location	Distance from Project Site, km, and (Direction)	Justification for Selection of Station	Mean Results (In ug/nm ³ , unless otherwise stated; permissible 24 hour limits as per NAAQS ² in brackets)	
AA 7	Umaraya Village	2.74 (NNE)	Crosswind	VOCs	<0.25 ppm (NS)
				THCs	1036 (NS)
				PM ₁₀	88 (100)
				SO ₂	8.3 (80)
				NO _x	11.3 (80)
				VOCs	<0.25 ppm (NS)
				THCs	1116 (NS)
AA 8	Ekalbara(Mota) Village	2.10 (NNW)	Crosswind	PM ₁₀	80 (100)
				SO ₂	8.4 (80)
				NO _x	12.1 (80)
				VOCs	<0.25 ppm (NS)
				THCs	1089 (NS)

A comparison of the above results with the value range indicators provided by CPCB. The results indicate that the level of these pollutants is within specified limits in the NAAQS by the MoEF.

Noise

Noise monitoring was done at ten locations within the study area. The results are given as below:

Table 1-6: Sampling Locations of Noise Monitoring

Station Code	Noise Monitoring Location	Date of Monitoring	Category of Area/Zone	Leq _(Day) dB A	Leq _(Night) dB A	Leq _(Day) dB A	Leq _(Night) dB A
				AAQS W.R.T. Noise		Observed Value	
N-1	At Site	7/7/2011	Residential	55	45	50.6	43.2
N-2	Dabhasa (Bus Stand)	4/5/2011	Residential	55	45	67.1	58.5
N-3	Luna Village	4/29/2011	Residential	55	45	55.1	48.7
N-4	Valipura Village	7/13/2011	Residential	55	45	51.4	47.8
N-5	Ekalbara Village	3/3/2011	Residential	55	45	58.8	50.9
N-6	Umaraya Village	7/10/2011	Residential	55	45	59.2	56.7
N-7	Mahuvad Village	7/7/2011	Residential	55	45	64.3	49.3
N-8	Navapura Village	7/11/2011	Residential	55	45	61.2	57.9
N-9	Dabhasa Village	7/9/2011	Residential	55	45	54.1	47.9
N-10	Ranu Village	7/12/2011	Residential	55	45	58.7	51.0

Noise levels were recorded at eight different locations within the study area.

- Noise level during day time was observed in range of 50.6 dBA (At Project Site) to 69.0 (Mahuvad Village). Noise level during day time was observed within the CPCB standards for residential area (55 dBA) except Dabhasa bus stand, Luna Village, Ekalbara Village, Umaraya Village, Mahuvad Village, Navapura Village and Ranu Village. These locations are on Village road having vehicular movement. These activity may have increased the Noise level
- Night time Noise level was in range of 43.2 dBA (At Project Site) to 63.2 dBA (Mahuvad Village). Noise level during night time was observed not within the CPCB standards for residential area (45 dBA) except at Project Site. These locations are on Village road having vehicular movement. These activities may have increased the Noise level.

Ground Water Quality

Ground Water was sampled at nine different locations as shown as below:

Table 1-7: Groundwater Sampling Locations

Code	Location	Source	Date of Sampling	Distance from Project Site in Km	Direction w.r.t Project Site	Parameters Exceeding Permissible Limits as per IS: 10500
GW 1	At Site	Tube Well	30/03/2012	0.0	Core area	-
GW 2	Dabhasa Village	Bore Well	20/03/2012	1.76	E	TDS, Chlorides, Sulphates, Total Hardness, Magnesium
GW 3A	Luna Village	Dug Well	20/03/2012	3.54	NE	TDS, Sulphates, Total Hardness
GW 3B	Luna Village	Bore Well	20/03/2012	3.54	NE	-
GW4	Mujpur Village	Bore Well	25/05/2012	2.76	NW	TDS, Chlorides, Total Hardness, Magnesium
GW 5	Navapura Village	Hand Pump	26/05/2012	1.96	SW	Total Hardness, Magnesium
GW 6	Mahuvad Village	Bore Well	09/06/2012	1.54	W	-
GW 7	Umaraya Village	Hand Pump	20/03/2012	2.74	NNE	-
GW 8	Ekalbara Village	Bore Well	20/03/2012	2.10	NNW	-
GW 9	Ranu Village	Tube Well	31/05/2012	3.65	S	-

Analysis of the samples that collected was compared for all parameters with the specified limit for drinking water as per IS: 10500.

Surface Water Quality

Surface water samples were collected from four ponds, one canals and one river water as mention below:

Table 1-8: Surface Water Sampling Locations

Code	Location	Date of Sampling	Source	Distance from Project Site in Km	Direction w.r.t Project Site	Parameters Exceeding Permissible Limits as per IS: 10500
SW 1	Dabhasa	20/03/2012	Pond	1.76	E	TDS, Turbidity, Chlorides, Total Hardness, Fecal Coliform and total Coliform
SW 2	Luna	20/03/2012	Pond	3.54	NE	Turbidity, Fecal Coliform and total Coliform
SW 3	Mujpur	20/03/2012	Pond	2.64	NW	Fecal Coliform and total Coliform
SW 4	Near Jaspur	30/03/2012	Mahi River	4.60	W	Fecal Coliform and total Coliform
SW 5	Mujpur	20/03/2012	Mahi River	4.91	NE	Turbidity, Fecal Coliform and total Coliform

Collected samples were analysed and compared for all parameters with the specified limit for drinking water as per IS: 10500.

The results related to River & Canal samples were analysed and compared for all parameters with the specified limit and it was observed within specific limit.

Soil

Surface soil samples were taken from locations as mentioned as below:

Table 1-9: Soil Sampling Locations

Code	Location	Date of Sampling	Source	Distance from Project Site in Km	Direction w.r.t Project Site
ST 1	At Site	10/06/2011	Industrial	0.0	Core area
ST 2	Dabhasa Village	25/05/2011	Agriculture Surface Soil	1.76	E
ST 3	Luna Village	26/05/2011	Agriculture Surface Soil	3.54	NE
ST 4	Ranu Village	31/05/2011	Agriculture Surface Soil	3.65	S
ST 5	Ekalbara Village	08/06/2011	Agriculture Surface Soil	2.10	NNW
ST 6	Mahuvad Village	06/06/2011	Agriculture Surface Soil	1.54	W
ST 7	Mujpur Village	10/06/2011	Agriculture Surface Soil	2.76	NW
ST 8	Navapura Village	12/06/2011	Agriculture Surface Soil	1.96	SW

Soil samples were collected from eight locations within the study area.

- Porosity of soil samples were in the range of 40% (Ranu Village) to 50% (Mahuvad Village)
- Water Holding Capacity of Soil samples were in range of 49.38% (At Site) to 66.02% (Ekalbara Village)
- Permeability of Soil samples were in range of $1.39E \times 10^{-4}$ cm/sec (Luna Village) to $8.21E \times 10^{-4}$ cm/sec (Navapura Village)
- Cation Exchange Capacity of Soil samples were in range of 13.6 mg/100gm (Mahuvad Village) to 18.4 mg/100gm (Ekalbara Village)
- Electrical Conductivity of Soil samples were in range of 241 μ mho/cm (Dabhasa Village) to 557 μ mho/cm (At Site)

The texture of soil is observed to be mainly Sandy Loam in the study area based on analysis of the samples collected

Ecology

Total 7 nos. of phytoplankton genera was recorded in the all sampling locations in which the highest cell count of phytoplankton was observed at Dabhasa Village Pond where as lowest at Luna Village pond. Branchionus and Moina were dominant at almost all sampling locations.

Total 7 nos. of zooplankton genera was observed in the all sampling locations in which the highest population of zooplankton was recorded at Dabhasa village pond where as lowest at Umaraya village pond.

The highest diversity index of phytoplankton and zooplankton was recorded at Mahi River where as lowest at Umaraya Village Pond.

The plant species mostly used in social forestry activities are Syzgium cumini, Delonix regia, Peltophorum pterocarpum, Terminalia catappa, Samania saman, Bauhinia purpurea, Cassia siamea, Cassia fistula and Acacia nilotica etc.

Socio-Economic Demography

Analysis of the demographical statistics, based on 2001 census data (2011 Census data was unavailable at the time of writing this report) of the study area reveals the following points:

- The total population in the study area was 1,20,585 persons
- There were 63,632 males and 56,953 females
- There were 23,508 dwelling units in the study area

According to the Primary Census Abstract 2001, the study area has an average literacy of 60.60 percent of which male literacy is 70.93 percent and female literacy is 49.07 percent. On studying the Census Data 2001, it was found that entire Padra taluka had an average literacy rate of 77 percent; male literacy was 81 percent and female literacy was 72 percent. Luna, a part of Padra taluka, has a literacy rate of 81 percent.

1.5 Environment Impact Identification, Prediction and Mitigation

Ambient Air

As already mentioned, Ahan Add Chem Pvt Ltd operates one boiler. Emission estimate calculations for flue gas emissions are focused on emissions of Particulate Matter (PM), Sulphur-di-Oxides (SO₂) and Oxides of Nitrogen (NO_x). Chemical Plants emit particulate matter, sulphur-di-oxides and oxides of nitrogen into the atmosphere

besides limited amounts of other pollutants. Kadam undertook dispersion modeling using MoEF approved software (ISCST3) that indicated a marginal increase in air pollution due to the project; however the ambient air quality would continue to be comfortably within specified limits, mainly owing to the low baseline ambient air quality.

Table 1-10: Incremental Increase in Air Pollution due to the Greenfield Project

S. No	Name of Village/ Industry (Distance in km / Direction)	Pollutant	Average Monitored Baseline Concentration ($\mu\text{g}/\text{m}^3$)	Incremental GLC after APCM ³ ($\mu\text{g}/\text{m}^3$)	Total Predicted GLC for proposed project ($\mu\text{g}/\text{m}^3$)
1	At Site (0.00/Core)	SOx	9.2	<0.1	9.2
		NOx	12.0	<0.1	12.1
		PM	56	0.72	56.72
2	Dabhasa Village (1.76/E)	SOx	9.3	<0.1	9.3
		NOx	13.0	<0.1	13.0
		PM	91	4.3	95.3
3	Luna Village (3.54/NE)	SOx	9.6	0.1	9.7
		NOx	13.2	0.02	13.22
		PM	77	0.3	77.3
4	Valipura Village (1.21/NE)	SOx	9.0	<0.1	9.1
		NOx	15.1	0.1	15.2
		PM	78	1.5	79.5
5	Navapura Village (1.96/SW)	SOx	9.8	0.0	9.8
		NOx	14.3	0.0	14.3
		PM	79	<0.1	79.0
6	Mahuvad Village (1.54/W)	SOx	9.0	0.0	9.0
		NOx	13.2	0.0	13.2
		PM	78	0.1	78.1
7	Umaraya Village (2.74/NNE)	SOx	8.3	<0.1	8.309
		NOx	11.3	<0.1	11.30
		PM	88	0.14	88.14
8	Ekalbara(Mota) Village (2.10/NNW)	SOx	8.4	0.0	8.4
		NOx	12.1	0.0	12.1
		PM	80	<0.1	80.0

³ Air Pollution Control Measures

Water

Surface Water (Quality and Quantity)

For the proposed project total wastewater generation is 4.34 KLD. Cooling tower blow down with TDS < 2100 mg/lit will be used for gardening. The major contributing wastewater streams are the process & boiler. 4.34 KLD of effluent will be treated in ETP & then sent to the EICL, Umaraya for further treatment or evaporated in a Multi Effect Evaporator (MEE) till EICL permit for disposal.

The treated waste water will meet GPCB requirements for discharge, where applicable/ permitted.

Ground Water (Quality and Quantity)

Storage facility will not affect topography, land use and will not cause any changes in nearby water bodies. Occasional & minor fuel / chemicals spills may occur. These will not affect water or land because of appropriate flooring & presence of spill control measures.

Moreover all of the Hazardous wastes will be disposed off as per guidance of GPCB.

No impact on quantity of Ground Water is envisaged due to the project activities. Since there will be no disposal of any untreated wastewater on land, no impact on quality of Ground Water is envisaged.

Land / Soil

There will be no disposal of untreated effluent or sewage on land. Generated hazardous wastes during project operation will be transported to an authorized Treatment, Storage and Disposal Facility (TSDF) site. Storage areas will be impervious to water and will be designed to prevent leachate penetration.

Consequently impacts on land / soil will be negligible.

Noise

All Machinery Equipment shall be such that noise levels are within permissible limits. However DG set will be operated as and when required. D.G. with facility of acoustic enclosures will be purchased to reduce the noise levels

Acoustic Enclosures on all major equipments in the plant is provided for noise attenuation & Workers is also be provided with suitable personnel protective equipment (PPE) such as ear muffs and ear plugs.

Ecology: Possible Biological Impact of Greenfield Project

Based on study conducted for ecology in the study area, no rare or endangered terrestrial and aquatic flora/ fauna were noted in the study area. Consequently damage to terrestrial ecology is ruled out.

1. Construction caused minor disturbance due to noise and vibration for Terrestrial Fauna.
2. Construction activity followed by trees cutting activity
3. During construction activity may increase deposition of dust and dust settling on the vegetation may alter or limit plants' abilities to photosynthesize and/or reproduce
4. Brominated compound can easily mix with surface water which may have negative impact on daphnia, fishes and algae.

5. Dioxin is the main culprit in chlorinated compound which is mainly responsible for attacking immune system of lower phyla.

Mitigation Measures

1. D.G. set will provide acoustic enclosure to reduce the noise intensity during the construction phase.
2. The construction work will be for short period so the impact during construction on trees will be negligible.
3. Green belt plantation will be done after construction.
4. Collect and safely dispose of unwanted and deregistered chemical.
5. There is no direct discharge of wastewater in nearby water bodies. A well designed Effluent Treatment Plant is available for the treatment of liquid effluents for proposed products.
6. There is no ecological important area (e.g. National Park, Sanctuary) in the study area so impact on that area will be ruled out.

Socio-Economic Impacts

There will be direct and indirect job opportunities created by the project during both, the operation as well as the construction phases. The local economy will receive a stimulus in the form of greater economic growth and avenues for income generation with the arrival of the project. Consequently, the project will have a beneficial impact on socio-economic indicators.

Positive Impacts

- The local people will get better employment opportunities.
- The children of the nearby villages will have better educational facilities.

Negative Impacts

- The people already have problem of availability of drinking water due to the contamination of ground level water resources which results into colored and impure water.
- Many water-borne diseases are spread affecting the health of the people in the study area.
- The pet animals are subjected to various diseases and infections due to the consumption of the impure water.

1.6 Environment Monitoring Program

An environment monitoring program has been suggested based on the project characteristics, the receiving environment and the likely interactions between these as also legal requirements. The key elements of this program are provided in **Table 1-11**

Table 1-11: Environment Monitoring Program

S. No.	Activity	Category
Air Pollution Monitoring		
1	Ambient air monitoring of parameters specified by GPCB in their air consents from time to time within the Ahan Add Chem's premises	Once every Quarter
2	Stack monitoring of all process / flue stacks sets as given in air consent from time to time	Once every

S. No.	Activity	Category
		Quarter
3	Work place monitoring to control the secondary fugitive emission in the work place	Once in a year
Water Pollution Monitoring		
4	Monitoring of wastewater inlet and outlet at ETP plant for the parameters specified by GPCB in their water consent from time to time	Alternative day
5	Monitoring of one sample of ground water at plant / nearby location. Parameters are essential parameters as per IS: 10500:1991.	Once every season
Solid Waste Generation Monitoring / Record Keeping		
6	Records of generation of used drums, bags and records of their dispatch to suppliers for refilling	Daily
7	Records of generation of waste oils and their treatment	Monthly
8	Records of generation, handling, storage, transportation and disposal of other solid, aqueous and organic hazardous wastes as required by hazardous waste authorization	To be updated Monthly
Environmental Audit		
9	Environmental statement under the EP (Act) 1986	Once in a year

1.7 Risk assessment and Disaster Management Plan

Emergencies involving containment failure have been modeled for their consequence distances using the software 'PHAST Professional' (v6.7), prepared by DNV Technica, UK, and licensed to Kadam.

Following points are considered while selecting the release scenarios:

1.7.1 The Main Hazards

Consequence analysis of toxic and flammable chemicals like EDC, MDC, Bromine, CL₂ gas and Hydrogen gas has been carried out for the proposed project.

1.7.2 Identification of Key Containments Loss Scenarios

Consequence analysis of credible / worst case scenarios like 10 mm Leak, 50 mm leak, tank rupture, line rupture, catastrophic rupture and BLEVE scenario were carried out and based on these, detailed recommendations have been provided in the chapter 8, which will be implemented.

1.7.3 Consequence Distances

Consequence is a magnitude or size of the damage or loss. In terms of health and safety, it is the degree of harm that could be caused to the people exposed to hazard, the potential severity of injuries or ill health, and/or the number of people who could be potentially affected. Consequence of hazard need not only be in terms of human safety criteria, but could also be in terms of a financial loss due to production and incurred costs due to repairs/replacement, environmental impacts as well as public outrage.

1.7.4 Control Measures

- Provide leak arrest kit for the Chloride tonners and train the people in its use.
- Use the dragger tubes to check the level of pollutants and to detect the leakages

- All volatile solvents will be stored under restricted premises in underground storage tanks, with breather valves away from source of ignition
- A separate storage facility should be created for storage of diesel, HSD, LDO and drums.
- Provision of wind sock to know the direction of wind in case there is a leak.
- Dyke of sufficient capacity to be constructed for the liquid bromine tanks and other volatile solvents.
- Procure and train the persons in use of air breather mask and self contained air breather escape mask.
- All pumps will be double mechanical seal to avoid any leakage chances.
- The pumps with mechanical seals are to be used as far as possible to reduce air pollution due to VOC's.
- All sections in the plant will have fire escape routes (Emergency Exits) as per the Rules.
- The layout of the Plant has been done in such a way so as to keep away the Tank Farm from all possible sources of ignition.
- Some tanks will installed under the ground & some will be over the ground. The storage tanks to be installed over the ground will have a well ventilated shade. The sprinkler arrangement system coupled with the efficient cooling tower to be provided in order to reduce the solvent vapour emission.

1.7.5 Recommendations

Following Recommendations are suggested to minimize the risk in the facility:

- Ensure periodical checking of gaskets and monitoring of emergency response system
- Provide blinds end flanges, wherever there are flanges, blinds shall be provided
- Proper ventilation shall be ensured to prevent any build up of flammable vapors which may lead to Vapor cloud explosion
- No ignition source shall be located within 50 meter radius of the MDC, EDC, Hydrogen and Chlorine
- The SOPs' to be followed strictly for effective implementation of the system
- Ensure preventive maintenance of critical equipment and T & P elements
- Provide caution boards
- Earthing connection point should not be painted
- Anti-static footwear shall be used
- Static build-up on tires of tanker carrying flammable material is to be discharged
- Breath analyzer to be provided for testing of drunken state of the employees

1.8 EHS Management Plan

An Environment Management Cell will be organized and responsibilities will be assigned to concerned members. Management Plans have been prepared covering: wastes (ash, solid and hazardous wastes) management plan, water consumption and wastewater generation management plan, air emissions management plan, noise management plan and emergency preparedness & response management plan.

Environment monitoring plan will be prepared for air pollution, water pollution and hazardous solid waste generation.

1.8.1 Cost of Implementing Environmental Management Plan

Capital costs on environmental issues are estimated at ~INR 70.67 lacs and recurring costs are estimated at ~INR 40.30 lacs / Annum.

1.9 Corporate Social Responsibility

Although the project is of small scale and the investment is INR ~8.43 Crore, the project proponent has committed to contribute towards the social and economic development of the village Ekalbara.

The proponent has intended to support the following welfare activities of the gram Panchayat by way of donation and participation. Activities proposed to be carried out in study area are mentioned below:

- Arranging medical camps
- Augmenting local public health centre
- Particularly in rainy season so as to avoid spread of diseases like dysentery & other diseases linked with mosquito growth
- Vaccination programmes
- Providing scholarships to willing students for suitable vocational training
- Make suitable contribution towards plantation in surrounding bare lands
- Arrange celebrations of festivals and other social occasions
- Make suitable contribution towards cattle fodder in village Gaushala
- Arrangement of Veterinary Doctor visits every fortnightly in different villages

1.10 Project Benefits

M/s. Ahan Add Chem is planning to manufacture Synthetic Organic Chemicals facility at Ekalbara Village, Padra Taluka, Vadodara District, Gujarat. The Proposed project has indirect positive impact on surrounding area which is mentioned below:

- Substantial Socio-economic benefits
- Good Techno-commercial viability
- Electricity will be taken up from MGVCL, the local power utility
- In the project site having industrial activity, semi-skilled and unskilled workmen are expected to be available from local population in these areas to meet the manpower requirement.
- There will be employment opportunity for local people during construction and operation phase
- Infrastructural facilities will be improved due to the proposed project.
- The treated waste water will meet GPCB requirements for discharge, where applicable/ permitted. Treated wastewater will therefore not impact any existing surface water body

Thus a significant benefit to the socio-economic environment is likely to be created due to the project.

1.11 Conclusion

It can be concluded on a positive note that after the implementation of the mitigation measures and environmental management plan, the project activities during the construction and operation phase will have minimal impact on environment.