EXECUTIVE SUMMARY

ESTABLISHMENT OF 220 KLPD DISTILLERY UNIT BASED ON SUGARCANE JUICE/SYRUP/C/B HEVY MOLASSES/GRAINS AS A RAW MATERIAL TO PRODUCE RECTIFIED SPIRIT/EXTRA NEUTRAL ALCOHOL/ETHANOL ALONG WITH SUGARCANE CRUSHING CAPACITY OF 12000 TCD AND CO-GENERATION POWER PLANT OF 40 MW

AT

SY NO. 53, 54, 57, 58, 73, 75, 76, & 80 GUJARWADI AND GAT NO 980 A/P BICHUKLE, TAL. KOREGAON, DIST SATARA, MAHARASHTRA

BY

HARIPRIYA AGRO ENERGY LIMITED

PROPOSAL FOR

ENVIRONMENT CLEARANCE

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EXECUTIVE SUMMARY

1 INTRODUCTION

M/s Haripriyaa Agro Energy Limited (HAEL) is situated at gut no. 53, 54, 57, 58, 73, 75, 76, & 80 A/P-Gujarwadi and Gat no. 980 A/P - Bichukle, Tal- Koregoan, Dist. – Satara, Maharashtra. M/s Haripriyaa Agro Energy Limited (HAEL) is well established private sugar factory registered under the Company Act 1956.

The industry wants to establish 220 KLPD distillery unit based on "C"/"B" heavy molasses/sugarcane juice/syrup/grains to produce RS/ENA/Ethanol and along with of sugarcane crushing capacity of 12000 TCD and co-generation power plant 40 MW.

1*175 TPH sugar and co-generation boiler and 1*60 TPH distillery incineration boiler shall be used for steam and power requirements of industry. The effluent from the Sugar and Co-generation unit are treated based on primary, secondary and tertiary treatment and treated effluent are recycled back to the process. Sugar effluent is treated in Sugar ETP and recycled back in to the process. Distillery effluent (i.e. Spentwash) shall be treated based on anaerobic digester followed by MEE followed by incineration technology. Condensate from distillery shall be treated in CPU and recycled back in to the process to achieve Zero Liquid Discharge (ZLD).

The aggregated capital investment for the proposed project has been estimated as Rs. **275 Crores**.

The promoters have extensively and carefully analyzed the present and future scenario of centralGovt. policies for promotion of ethanol addition in the petroleum fuels. They have also studied the present and future irrigation facilities.

1.1 PROJECT LOCATION

The salient features of the project site are

Table 1-1 Salient features of the project site

Sr. No.	Features	Description	Directions w.r.t. site
1.	latitude	17°49'41.11"N	
2.	Longitude	74° 8'43.99"E	
3.	Elevation above MSL	812 m	
4.	Nearest highway	NH-48 (18 KM)	S
5.	Nearest railway station	Palashi (3 km)	
6.	Nearest air port	Lohegaon Airport (113 Km)	SW
7.	Nearest town	Satara Road (3.5 km)	N
8.	Nearest human settlement	Gujarwadi (1.3 km)	NNE
10.	Nearest water body	Gujarwadi Lake (1.7 km) Vasana River (3.5 km)	W
11.	Protected Area	None within 10 km	
12.	Reserved Forests	None within 10 km	
13.	Wildlife Sanctuary	None within 10 km	

Sr. No.	Features	Description	Directions w.r.t. site
14.	Archeological site	None within 10 km	
15.	State boundary	None within 10 km	
16.	Defense installations	None within 10 km	
17.	Average Rainfall	600 mm	

2 PROJECT DESCRIPTION

The details about the maufacturing capacity of the proposed establishment are given in table below

Table 2-1 Proposed Products manufacturing quantities

Sr. No.	Product Name	Capacity	Remark
1	Sugar Crushing Capacity in TCD	12000	--
2	Cogeneration power plant in MW	40	--
3	Distillery in KLPD	220	--
	RS in KLPD or	220	Only one product ata time
	ENA in KLPD or	220	
	Ethanol in KLPD from molasses/syrup/ grains	220	
4	DDGS (TPD)	110	Shall be sold as cattle feed
5	CO2 (TPD)	150	Shall be collected and sold in openmarket
6	Fusel oil (Liters/Day)	550	--

Table 2.2 Raw material Requirement of the proposed project

Sr.no	Raw material	Source	Quantity (TPD)	Method of transport
1	DAP	Local area/market	2400 Kg/M	Road
2	Urea	Local area/market	2400 Kg/M	Road
3	Formaline	Local area/market	200 lit	Road
4	Bleaching powder	Local area/market	120 Kg/M	Road
5	Sulphuric acid	Local area/market	6000 Kg/M	Road
6	Caustic Soda	Local area/market	400 Kg/M	Road
7	‘C’ Molasses Or ‘B’ Heavy Molasses Or Sugar Juice Or Sugar Syrup Or Broken rice/	Local area/market and syrup/juice from own sugar unit	815 Or 710 Or 3667 Or 667 Or 478/	Through Closed Pipeline/Tanker/ Conveyer

	Corn/Maize/ Bajra/ Sorghum/Wheat		524/ 571/ 237	
8	Fuel for Boiler			
	Bagasse for 175 TPH boiler	Own sugar unit	1680	Conveyor
	Bagasse and Spentwash for 60 TPH incineration boiler		Bagasse:256 Spentwash: 475	

2.1 RESOURCE REQUIREMENT AND INFRASTURE FACILITIES

A) Land use Details

The total area available with the factory is **36.35 Hectares** Out of which, **15.01 Hectares will be** utilized for green belt development. A detailed area breakup is given below

Table 2-2 Landuse breakup

Sr. No.	Description	Ha	Sq.m.	%
1	Roof Top Area	4.32	43193	12
2	Greenery	15.01	150078.4	41.71
3	Parking Area	0.74	7381.22	2.05
4	Open Area	10.61	106104.5	29.49
5	Road Area	5.30	53016.52	14.73
Total		**36**	**359773.90**	**100**

Traffic Management and Parking details

Total Plot area for the project is 598421.69 Sq.mt, out of which area required for Parking is 89842.17 sq.mt.

Parking details

Sr. No.	Tanker No.	Truck Nos.	2 Wheeler	4 Wheeler
1	50-60 Nos./day	300-350 Nos./day	50-60 Nos./day	30-40 Nos/.day

Raw material required for the project shall be obtained mainly from nearby farmers/ traders and other chemicals shall be obtained from nearby area. All the vehicles containing Raw material and final product shall be entered to the unit from existing Road. Loading and unloading of the vehicles shall be done in day time only.

B) Power requirement

The power requirement for proposed sugar unit, co-generation and distillery unit shall be 12 MW which will be met from own co-generation power unit.

C) Water Consumption details

Industrial Purpose:

Source- The industry is having water lifting permission of 670000 m^3/year from Satara irrigation department which is adequate

Sugar Division - Due to excess condensate available from Sugar unit net water saved during season shall be 905 KLD which shall be treated in sugar CPU and stored in water tank and used for distillery operation during off season. Detailed water budget of the Sugar division is shown in below table

Distillery Division – During season distillery shall work on zero water requirement due to excess condensate available from sugar unit.

During off season fresh water requirement for distillery will be 330 m^3/day based on C molasses. Based on grain, water requirement will be 795 m^3/day Detailed water budget of the distillery unit is shown in below table

Domestic Purpose:

The water requirement for domestic purpose shall be 50 m3/day.

Thus, the net fresh water requirement of the industry is 845 KLD (Industrial 795 KLD, Domestic 50KLD).

Water balance calculations:

Sugar Division

Table 2-3 **Water budget for Sugarcane crushing of 12000TCD and 40 MW Co-generation unit**

Sr. No.	Details	Water Consumption (m3/day)	Consumption/Losses	Reuse/recovery	Waste generation
Domestic Purpose					
1	Domestic	50	10	--	35
Industrial Purpose					
1	Boiler 175 TPH	4025	205	3740	80
2	DM Plant	250	200	0	30
3	Cooling tower	1000	200	700	100
4	Process water	400	30	0	370
5	Washing of equipment	50	0	0	50
6	Condenser water	0	0	2400	All condenser water shall be treated in CPU and recycled as process water
7	Spray pond water	2400	1200	0	1200
8	Colony firefighting & Gardening	200	100	0	0
9	Air compressors & pumps	100	10	90	0
10	Recycling of Excess Condensate	0	0	2400	0
	Total	**8425**	**1945**	**9330**	**1830**

Note:

All wastewater generated shall be treated in ETP and recycled back in to process.

1*175 TPH boiler shall be installed for sugar and co-generation power plant

Net Water saving would be:

i) Industrial Purpose: 8425-9330= - 905 KLD. (905 KLD of water shall be saved)

Due to excess condensate available from Sugar unit, there is no water requirement for sugar and co-generation unit. After treatment, excess condensate is used for DM plant. The fresh water requirement is only for domestic purpose is 50 KLD.

905 KLD water shall be saved, which shall be used for gardening and distillery operation etc.

ii) Domestic Purpose: Domestic water requirement is 50 KLD

Effluent Generation:

i. Industrial - 1830 KLD out of which sugar effluent - 420 KLD, spray-pond effluent – 1200 KLD and co-generation power plant effluent 210 KLD (out of which 80 KLD boiler blow-down, 100 KLD cooling tower blow –down and 30 KLD of DM plant reject).

ii. Domestic –40 KLD.

Table 2-4 **Water Budget for Distillery Division (based on "C" Molasses)**

Sr. No.	Details	Water Consumption (m3/day)	Consumption/Losses (m3/day)	Reuse/recovery (m3/day)	Waste generation (m3/day)	To CPU
1	Boiler 60 TPH Incineration	1380	70	1285	25	25
2	DM plant	85	65	0	20	20
3	Process water	2200	0	Raw Spentwash	1760	
				Conc. Spentwash	352	To incineration
				MEE Condensate	1408	1408
				Spentlees	440	440
4	Cooling Tower Make-up Water	250	130	0	120	120
5	Fermenter Washing	65	0	0	65	65
6	Miscellaneous such as pump and gland cooling etc.	60	0	0	60	60
7	Excess condensate and treated effluent taken from sugar unit	0	0	287	0	0
8	Treated effluent from Distillery CPU	0	0	2138	0	0
	Total	**4040**	**265**	**3710**	**2490**	**2138**

Note:

The consumption/losses and final wastewater generated is amounting (265+2490-2138-287) = 330 KLD.

Industrial:

Net Water Requirement: 4040-3710 = 330 KLD.

Effluent Generation: 2490 KLD out of which conc. spentwash - 352 KLD, spentlees – 440 KLD, DM plant wastewater generation- 20 KLD, fermenter washing waste-65 KLD, boiler blow-down wastewater-25 KLD and cooling tower wastewater generation – 120KLD, MEE condensate-1408 KLD, Miscellaneous- 60 KLD

All the effluent except spentwash shall be treated in proposed CPU and treated effluent shall be recycled in process.

Spentwash shall be treated based on anaerobic digester followed by MEE followed by incineration

Table 2-5 Water Budget for Distillery Division (based on "B" heavy molasses)

Sr. No.	Details	Water Consumption (m3/day)	Consumption/Losses (m3/day)	Reuse/recovery (m3/day)	Waste generation (m3/day)	To CPU
1	Boiler 60 TPH Incineration	1380	70	1285	25	25
2	DM plant	85	65	0	20	20
3	Process water	1760	0	Raw Spentwash	1320	
				Conc. Spentwash	220	To incineration
				MEE Condensate	1100	1100
				Spentlees	440	440
4	Cooling Tower Make-up Water	250	130	0	120	120
5	Fermenter Washing	65	0	0	65	65
6	Miscellaneous such as pump and gland cooling etc.	60	0	0	60	60
7	Excess condensate and treated effluent taken from sugar unit	0	0	287	0	0
8	Treated effluent from Distillery CPU	0	0	1830	0	0
	Total	**3600**	**265**	**3402**	**2050**	**1830**

Note:

The consumption/losses and final wastewater generated is amounting (265+2050-1830-287) = 198 KLD.

Industrial:

Net Water Requirement: 3600-3402 = 198 KLD.

Effluent Generation: 2050 KLD out of which conc. spentwash - 220 KLD, spentlees – 440 KLD, DM plant wastewater generation- 20 KLD, fermenter washing waste-65 KLD, boiler blow-down wastewater-25 KLD and cooling tower wastewater generation – 120KLD, MEE condensate-1100 KLD, Miscellaneous- 60 KLD

All the effluent except spentwash shall be treated in proposed CPU and treated effluent shall be recycled in process.

Spentwash shall be treated based on anaerobic digester followed by MEE followed by incineration

Table 2-6 Water Budget for Distillery Division (based on sugarcane juice/syrup)

Sr. No.	Details	Water Consumption (m3/day)	Consumption/Losses (m3/day)	Reuse/recovery (m3/day)	Waste generation (m3/day)	To CPU
1	Boiler 60 TPH Incineration	1380	70	1285	25	25
2	DM plant	85	65	0	20	20
3	Process water	1320	0	Raw Spentwash	990	
				Conc. Spentwash	132	To incineration
				MEE Condensate	858	858
				Spentlees	330	440
4	Cooling Tower Make-up Water	250	130	0	120	120
5	Fermenter Washing	65	0	0	65	65
6	Miscellaneous such as pump and gland cooling etc.	60	0	0	60	60
7	Excess condensate and treated effluent taken from sugar unit	0	0	287	0	0
8	Treated effluent from Distillery CPU	0	0	1588	0	0
	Total	**3160**	**265**	**3160**	**1610**	**1588**

Note:

The consumption/losses and final wastewater generated is amounting (265+1610-1588-287) = 0 KLD.

Industrial:

Net Water Requirement: 3160-3160 = 0 KLD.

Effluent Generation: 1610 KLD out of which conc. spentwash - 132 KLD, spentlees – 330 KLD, DM plant wastewater generation- 20 KLD, fermenter washing waste-65 KLD, boiler blow-down wastewater-25 KLD and cooling tower wastewater generation – 120KLD, MEE condensate-858 KLD, Miscellaneous- 60 KLD

All the effluent except spentwash shall be treated in proposed CPU and treated effluent shall be recycled in process.

Spentwash shall be treated based on anaerobic digester followed by MEE followed by incineration

Table 2-7 Proposed 220 KLPD Grain based distillery

Sr. No.	Details	Water Requirement (KLD)	Consumption/Losses (KLD)	Reuse / Recovery (KLD)	Waste Water Generation and treatment		
					Waste water Generation	Wastewater treated in CPU/MEE	Wastewater
1	Boiler 60 TPH Incineration	1380	70	1285	25	25	
2	DM plant	85	65	0	20	20	
3	Process & Dilute Water	1650	220	**In MEE**	**1100**	**Decanter where 210 MT/day Wet cake & 890 m3/day thin slops to MEE**	210
					330	**330 to MEE**	--
4	Cooling water	220	130	--	90	90	0
5	Washing Requirement	50	--	--	50	50	--
6	Miscellaneous - pump and gland cooling etc.	50	--		50	--	--
7	Evaporator Condensate		35	1170	65	--	65
8	Condensate Polishing Unit			185	--	--	--
Total		**3435**	**520**	**2640**	**1850**	**185**	**275**

Note-

Total- 220 KLPD Ethanol production capacity

1850 m^3/day out of which process and dilute wastewater – 1100 m^3/day [Decanter where 210 MT/day Wet cake &890 m3/day thin slops to MEE and 110 TPD DDGS], DM plant wastewater generation-20 m^3/day, fermenter washing waste-50 m^3/day, boiler blow-down wastewater-25 m^3/day, cooling tower wastewater generation – 90 m^3/day and miscellaneous- 50 m^3/day, spentlees-450 m^3/day, evaporator condensate-65 m^3/day

Net water requirement:

Industrial: 3435-1640 = 795 m^3/day

Table 2-8 Water Requirement and wastewater generation of the factory

Sr. No.	Water Requirement m^3/day	Wastewater generation m^3/day	
1.	Sugar Division		
	Zero water requirement for sugar division and Co-Generation unit. **Water Saved** – 905 (due to excess condensate from sugar unit)	1830	
		Sugar effluent	420
		Spray-pond effluent	1200
		Co-generation power plant effluent	210
2.	Distillery Division		
A.	Based on "C" Molasses		
	330	2490	
		Spentlees	440
		Conc. Spentwash	352
		MEE Condensate	1408
		Other dilute effluent	290
	OR		
B.	Based on "B" Heavy Molasses		
	198	2050	
		Spentlees	440
		Conc. Spentwash	220
		MEE Condensate	1100
		Other dilute effluent	295
	OR		
C.	Based on "Sugarcane Syrup"		
	0	1610	
		Spentlees	330
		Conc. Spentwash	132
		MEE Condensate	858
		Other dilute effluent	290
D	Based on "Grains"		
	795	1850	
		Process and diluted wastewater	1100
		Other diluted effluent	750

Note:

A. Other diluted effluent consist of DM plant wastewater, fermenter washing waste, boiler blow-down wastewater, cooling tower wastewater generation and MEE condensate

B. Spentwash Storage Ponds:

-Raw Spentwash (1760 m^3/day) - 7 days storage capacity i. e. 1760*7 = 12320 m^3.

D) Air Emission Management

Bagasse will be used as fuel in 1*175TPH and concentration spentwash along with bagasse as a fuel for 1*60 TPH boiler. The bagasse requirement of the unit will be1955 MT/D during season. During off season bagasse requirement shall be 256 MT/day only

Table 2-9 Details of boilers and its APC equipment for proposed unit

Sr. No.	Stack attached to		Types of Fuel	Height in meter	APC System	Remark
1	1*175 TPH Boiler	Sugar & Cogeneration Division	Bagasse	65	ESP	Stack as well as ESP shall be provided for both boilers.
2	Incineration Boiler 60 TPH	Distillery Division	Conc. Spentwash and Bagasse as supplementary fuel	72	ESP	

E) Solid waste Management

a) Non Hazardous solid wastes details

Table 2-10 Details of non-hazardous waste generated and its disposal

Sr. No.	Description of waste	Quantity	Mode of Collection and Disposal
	Bagasse as fuel for 1*175 TPH Co-generation boiler		
1.	Fly/ Boiler Ash	1*175 TPH Boilers- 605 MT/M	Co-generation boiler Ash generated shall be sold to brick manufacturer.
	Bottom Ash	1*175 TPH Boilers – 151 MT/M	
	Conc. spentwash and Bagasse as fuel for 1*60 TPH Incineration boiler		
2	Fly/ Boiler Ash	1*60 TPH Boiler- 2029 MT/M	Incineration boiler Ash Mixed with Pressmud and sold as manure.
	Bottom Ash	1*60 TPH Boiler- 508 MT/M	
3.	ETP Sludge	300 MT/A	ETP Sludge and Pressmud shall be sold as manure.
4.	Pressmud	480 MT/D	
	Other Solid Wastes		
1.	Paper waste	0.01 MT/M	Manually collected and stored in a designated area and sold to scrap vendors
2.	Plastic waste	0.01 MT/M	
3.	Municipal Solid waste		
	Non-Biodegradable	1.5 MT/M	Manually collected and sold to scrap vendors
	Bio-degradable	2.5 MT/M	Used as manure.

b. Hazardous Waste

Table 2-11 hazardous waste generated and its disposal

Sr. No.	Category	Description of waste	Quantity	Mode of Collection and Disposal
1.	5.1	Used Oil	1.01 KL/A	Shall be collected in Leak Proof Containers and utilized as lubricant for bullock carts

3 BASELINE ENVIRONMENTAL STATUS

3.1 AIR ENVIRONMENT

Ambient air monitoring was carried out at 8 locations for 24 hours a day, twice a week at each location over/for a period of three months (March 2022 to May 2022) to determine background concentrations. The Maximum concentrations of each pollutant observed are considered as a background concentration of the respective location, the summary of the results is given below.

1. Particulate Matter (PM_{10})

The maximum, minimum, average and 98th percentile concentrations for PM_{10} were recorded in the study area in the range of 68.2 to 74.6 µg/ m^3. The maximum 98th Percentile concentration is 74.46 µg/ m^3 were recorded at Project Site (location -1). The concentrations of PM_{10} are well below the CPCB standard of 100µg/ m^3.

2.Particulate Matter ($PM_{2.5}$)

The maximum, minimum, average and 98th percentile concentrations for Particulate Matter ($PM_{2.5}$) monitored in the study area were 30.2-40 µg/m^3. Highest 98th percentile value is 39.72 µg/m^3 which was observed at Project Site (location -1). The concentration of $PM_{2.5}$ is well below the prescribed limit of 60µg/m^3.

3. Sulfur Dioxide (SO_2)

The Minimum, maximum, average and 98th percentile value of Sulphur dioxide in the study area from the monitored data was in the range of 20.3-27 µg/ m^3. Maximum 98th Percentile value of Sulfur dioxide is 26.77 µg/ m^3obtained at Project Site (location -1).). The concentration of SO_2 is well below the prescribed limit of 80µg/m3.

4.Oxides of Nitrogen (NOx)

The Minimum, maximum, average and 98th percentile value of Oxides of Nitrogen (NOx) in the study area from the monitored data was in the range of 25.4-32.8 µg/ m^3. Maximum 98th Percentile value of Oxides of Nitrogen (NOx) is 32.75 µg/ m^3obtained at Project Site (location -1). The concentration of NOx is well below the prescribed limit of 80µg/m^3.

5. Carbon Monoxide (CO)

The Minimum, maximum, average and 98th percentile value of Carbon Monoxide (CO) in the study area from the monitored data was in the range of 0.01-1 mg/ m^3. Maximum 98th Percentile value of Carbon Monoxide (CO) is 1 µg/ m^3 .The concentration of CO is well below the prescribed limit of 4.0 mg/m^3

The ambient air quality monitoring results indicates that the overall air quality in the study area is within permissible standards prescribed by NAAQ Standards.

3.1.1 IMPACT ON AIR QUALITY DUE TO PROPOSED ACTIVITY

For proposed establishment 1*175TPH sugar and co-generation and 1*60TPH incineration boiler shall be installed. Considered the boilers working at full load conditions to estimate the GLC of PM_{10}, $PM_{2.5}$, SO_2 and NO_x due to the proposed establishment of the industry under the prevailing conditions of meteorology and emission data set, air quality modeling is performed for Haripriyaa Agro Energy Limited, Gujarwadi, Tal. Koregaon, Dist. Satara. Incremental concentrations are worked out for 8 receptor locations, at which

ambient air quality monitoring was carried out. Total concentrations are computed considering background (Ambient Air Monitoring) concentrations and incremental concentrations (AERMOD) due to the proposed establishment. Results are compared with the Ambient Air Quality Standards (AAQS).

Table 3-1 Stack Inventory

Sr. No.	Particulars	Description
A. Point Source (Stack attached to boiler)		
1	Stack attached to	
2	Capacity	
3	Fuel type	
4	Total fuel quantity requirement	
5	Stack height	
6	Stack diameter	
7	Flue gas temp.	
8	Flue gas velocity	
9	Controlling equipment	
10	Emission rate	
	i. TPM	
Based on Observed Conc.& Fuel		
	ii. NOx	
	iii. SO_2	
11	Ash content	
12	Ash below grate	
13	Remaining Ash	
14	Ash going to stack, QPM (with ESP removal efficiency of 99%)	
15	Ambient temperature	
B. Line Source (Vehicular emission)		
	Average time of movement of vehicle inside the premises	
	Distance travelled by the vehicles inside premises	
	Q_{PM} (g/sec)	
	Q_{NOx} (g/sec)	
	Q_{CO} (g/sec)	

3.1.1.1 Results of the AERMOD software for air quality predictions for proposed establishment of the factory

The AERMOD software was developed by US-EPA and American Meteorological Society (AMS) to compute dispersion of air pollutants in the ambient air due to the various sources. In this study, emissions

from proposed stack are coupled with the subsequent meteorological data by using AERMOD 8.0.5 air quality model. Also, dispersion patterns are studied by the output of concentration isopleths plotted by the software. Incremental concentration values for selected receptors are added in the background concentration values.

From the results, it can say that,

- At the selected 8 receptor locations, surrounded in 10 km radius around Haripriyaa Agro Energy Limited, Gujarwadi, Tal. Koregaon, Dist. Satara, GLCs are well within the limits of AAQS. Results of the Ambient Air monitoring are enclosed in the **Annexure II.**
- Under the working conditions of 1*175 TPH boiler and 1*60 TPH incineration boiler, PM_{10}GLCs at all the 8 receptor locations are in the range of **46.45 µg/m3** to **50.44 µg/m3** which are within the limits of AAQS.
- Similarly, $PM_{2.5}$ GLCs for those receptors are in the range of **29.26 µg/m3** to **32.19 µg/m3** which is within the limits of AAQS.
- For SO_2, GLCs are in the range of **18.35 µg/m3** to **19.21 µg/m3**which is within the limits of AAQS.
- NO_x GLCs are in the range of **22.03 µg/m3** to **25.8 µg/m3**which is within the limits of AAQS.

3.2 WATER ENVIRONMENT

Water sampling and subsequent analysis was carried out to determine both the groundwater and surface water quality of the study area. Ground water & Surface water samples were collected at 8 locations & 7 locations respectively within study area. These samples were analyzed for physical and chemical parameters to ascertain the Baseline status in the existing surface water and ground water bodies.

Table 3-2 Water Analysis Results

Sr. No	Parameters	Ground water		Surface water	
		Min	Max	Min	Max
1.	pH				
2.	Dissolved Solids (mg/l)				
3.	Total Hardness (mg/l)				
4.	Chlorides (mg/l)				
5.	Fluoride (mg/l)				
6.	Sulphates (mg/l)				

Ground water and surface water samples were collected and analyzed as per the Standard methods and the water quality of the study area is found within the permissible limits of IS: 10500- 2012. Except Fluoride concentrations observed are lower than the required concentration.

Groundwater quality is found to be good, which can be directly used for irrigation purpose. However, ground water used for drinking purpose after the appropriate treatment.

Surface water quality is found to be good, which can be directly used for irrigation purpose. However, for drinking purpose, conventional treatment suggested.

3.3 SOIL ENVIRONMENT

The soil monitoring was carried out at 8 locations in the study area, and analyzed for chemical and physical characteristics; the summary of the results is as under

- Soil in the area is mainly clayey in nature hence good water holding capacity.
- The finding of the study reveals that pH of soil in the range of 7.30 to 7.50,which is an indicative of the **neutral** to **slightly alkaline** soil.
- The values for Nitrogen at all locations varied between 224.30 to 324.60 mg/kg. Maximum concentration of nitrogen was observed at location S-3.
- It is important to note that the concentration of potassium was found to be at all locations ranging between **52.4** to **98.3 mg/kg**..

Based on the above findings it can be concluded that the soil samples can be classified as per soil classification given by Tondon H.L.S. (2005). The samples fall under **medium to high** fertile soils.

3.4 NOISE ENVIRONMENT

In order to assess the noise levels in the study area, monitoring was carried out at eight different locations within 10 km radius of the study area.

Daytime Noise Levels $(Leq)_{day}$

Residential Zone: The daytime noise levels in all the locations were observed to be in the range of 50.14 dB (A) to 51.34 dB (A), which is well below the permissible limit of 55 dB (A).

Industrial Zone: The daytime noise level 67.53 dB (A) is observed at project site

Night time Noise Levels $(Leq)_{night}$

Residential Zone: The night time noise levels in all the residential locations were observed to be in the range of 42.12 dB (A) –44.04 dB (A), which is well below the permissible limit of 45 dB (A).

Industrial Zone: The night time noise level 57.68 dB (A) is observed at project site

The industry is making all efforts to control the noise levels within the limits by providing acoustic measures and silencer pads etc. all the employees in these work places **shall be** provided with ear plugs / muffs.

3.5 LAND USE/LAND COVER OF THE STUDY AREA

Table 3-3 Change in General Land use/ Land cover of Study Area (2008 to 2019)

Land use	Area in km2		% of Study Area	
	2008	2019	2008	2019
Agriculture land	231.15	288.37	57.49	71.72
Barren Land	132.77	76.72	33.02	19.08
Open Scrub	22.07	17.16	5.49	4.27
Settlement	15.08	18.43	3.75	4.58
Water Bodies	0.99	1.38	0.25	0.34
Total	**402.06**	**402.06**	**100.00**	**100.00**

- In the year 2008 Water body area is about 0.99km^2, whereas in the year 2019 it is increased and is 1.38 km^2.
- It can be inferred that there is an increase in 15.16 % of land under settlement, water bodies and agricultural land whereas a decrease in area under forest land and Barren Land is 15.16 %.
- Increase in settlement due to an increase in industrial growth and migration of the people.
- Increase in agricultural land due to improved irrigation facilities like drip/trickle irrigation instead of surface and subsurface irrigation techniques. Therefore barren land is converted into agricultural land.
- Increase in settlement due to an increase in industrial growth and migration of the people.

3.6 ECOLOGY AND BIODIVERSITY

The existing biodiversity in the study area was observed to be very low mainly due to the rural and agrarian setting of the location. The project doesn‘t involve any clearance of trees as the project is on barren land and well connected to major and minor roads. The project involves the plantation of native avenue trees and their maintenance to improve the landscape which would have a positive impact on the environment. All waste management practices should be identified and implemented right from the construction phase of the project and should be upgraded during the operational phase. During implementation monitoring of the existing diversity and its improvement or degradation with respect to project activities should be monitored periodically. The project activities should be carried out only after considering all possible secondary and tertiary impacts on the environment and mitigation measures should be incorporated such as to reduce any possibility of impact on the existing environment

3.7 DEMOGRAPHIC OR SOCIO-ECONOMIC PROFILE

The proposed project has a positive response from the public. The willingness to pay and the willingness to accept the project has positive outcome. The losses due to the polluting agents can be diluted through various methods. The unit has recycled waste water after treatment. The social and cultural vulnerability index responds a very less and level of resilience is at the higher side. The families dwelling around could get more facilities due to the industry during the corresponding period.

4 IDENTIFICATION, PREDICTION AND MITIGATION MEASURES

Approx. 200 nos. of labors shall be employed during installation phase for the project which includes installing new machinery and units of the plant.

Table 4-1 Anticipated environment impacts its effect and mitigation measures during construction phase

Sr. No.	Impacts	Effects	Mitigation Measures
1	Dust	Respiratory diseases	All the internal Roads are tar felted Dust separation sprinkling water, use machinery meeting
2	Noise	Impairing, Hearing, Fatigue related Health issues	Provide acoustic measures and silencer pads to reduce noise level. Provide personal protective equipment to the workers.
3	Land	Reduction of vacant land	Utilize the existing infrastructures and adopt vertical expansion and maximize the operation schedules.
4	Top soil	Loss of fertility	Utilize for Green belt development.
5	Water	Additional water is required for construction activities and Drinking	Minimize the water requirements by adopting mechanical mixing and Drinking water in Bottles instead of Taps.
6	Wastewater	Improper disposal of waste water leads to contamination of water sources and soil	Domestic wastewater shall be treated in aeration tank of proposed distillery CPU and treated wastewater shall be used for gardening.

Anticipated environment impacts its effect and mitigation measures during operational phase is given in chapter 4.

5 ANALYSIS OF ALTERNATIVE (TECHNOLOGY AND SITE)

It is a Greenfield project of establishment of 220 KLPD distillery unit along with sugarcane crushing capacity of 12000 TCD and co-generation unit of 40 MW

Required land is available at the project site and is owned by HAEL

The Project Site is conveniently located for development of the Project.

- Satara Road, at a distance of 3.5 km
- Palashi Railway station is nearest Railway station 3 km away from the factory site
- Lohagon is nearest airport 113 km away from the factory site in NNW Direction

- Environmental Setting-
  - Location – 17°49'41.11"N and 74° 8'43.99"E
  - Nearest Village – Gujarwadi- 1.3 km
  - Nearest City – Satara - 20 km
  - Nearest National Highway – Satara Road Station 15 km
  - Nearest Railway Station – Palashi Railway station 3 km
  - Nearest Airport – Solapur – Lohagon is nearest airport 113 Km
  - Nearest River –Vasana River – 3.5 Km in from plot boundary
  - Seismicity – Seismic Zone III

The industry has sufficient land for proposed establishment. The minimum quantity of water is required, which can be obtained from the irrigation department. There are no negative impacts due the proposed establishment. Thus, the existing site is suitable for the proposed establishment.

6 ENVIRONMENT MONITORING PROGRAMME

Table 6-1 Environment management programme

SR.NO	ITEM	PARAMETERS	FREQUENCY OF MONITORING	LOCATION
1.	Ambient Air quality at appropriate location for PM_{10}, $PM_{2.5}$, SO_2,andNO_x,	PM_{10}, $PM_{2.5}$, SO_2,andNO_x	24 hourly, Quarterly	8 Locations 1 @ Upwind and 2@ downwind directions from stack @ 120^0 to each other Near entry and exit gates
2.	Stationary Emission from Stack PM, SO_2, NOx	PM, SO_2, NOx	Monthly	1 DG set Stack, 2 Boiler Stack
3.	Water	Water quality parameters as per 10500:2012	Monthly	Drinking water locations
	Waste water quality (treated and Untreated)	pH, BOD, COD, TSS, Flow, TDS etc.	Monthly	ETP inlet and Outlet
4.	Noise	Day and Night levels Equivalent noise level- dB (A)	Quarterly or as often as required	8 Locations Upwind and downwind directions Near boilers and near main gate and ETP.
5.	Soil (Qualitative and quantitative testing/analysis to check the soil fertility,)	pH, Cation Exchange Capacity, Total Nitrogen, Phosphorous, Potassium, moisture, Permeability, Conductivity, Texture & structure, Organic carbon	Quarterly or as often as required	1 near Greenbelt 1 near ETP Composite sample shall be taken at each location
6.	Solid waste generation monitoring / Record Keeping	Manual record keeping	To be updated daily	
7	Greenbelt and plantation monitoring	Type of species shall be decided based on soil & climatic conditions. The number of trees would be 2500 per hectare, however; the number of trees would	Six Monthly	

SR.NO	ITEM	PARAMETERS	FREQUENCY OF MONITORING	LOCATION
		vary depending on the typeof soil		
8	Carbon and Water foot Print Monitoring	Maintain the data of raw materials consumption, steam consumption, vehicle frequency for transport of raw materials, effluent generation, air emissions, hazardous waste generation, and raw material recovery	Daily and Monthly	

7 ADDITIONAL STUDIES

7.1 RISK ASSESSMENT

HAZOP and Quantitative Risk Assessment studies are carried out for each product, disasters management plan, onsite and offsite emergency plan are prepared and given in Chapter 7 of the EIA Report

Consequence analysis of ethanol due to storage facility

Scenario of Ethanol in different forms

a) Source Strength

When chemical will escape from storage unit as a liquid and form a burning puddle, source strength will be as given below

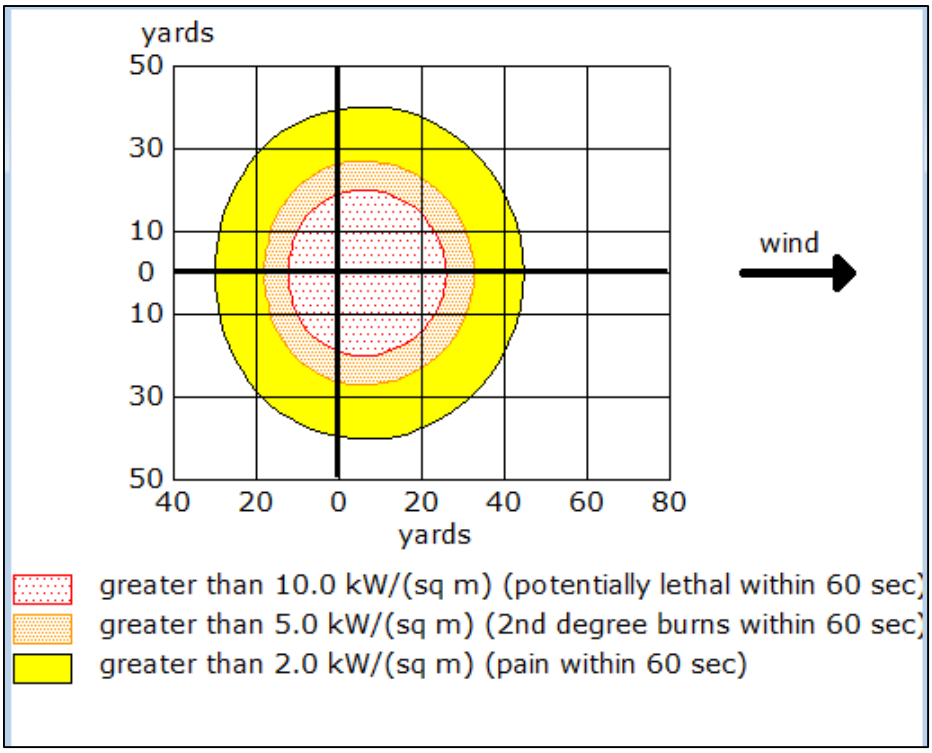
Details of Source		Model Outcome Particular	
Name of Chemical	Ethanol	Maximum Avg. Sustained Release Rate (kg/min)	176
Chemical storage	SS Tank	Release Duration (min)	60 min
Storage Capacity (m^3)	2200	Total Amount Released (kg)	6875
Chemical Mass Stored (tons)	950	Evaporating Puddle Diameter (yards)	76
Circular Opening Diameter (cm)	10		
Opening from bottom of tank (m)	1		
Internal Temperature (°C)	28		

b) Threat zone of thermal radiation from pool fire

Model output of the threat zone of thermal radiation from pool fire is given below

Flammable threat zone	LOC, kW/sq. m.	Model Outcome	
		Distance (m)	remarks
Red (Potentially Lethal within 60 sec.)	10	23	Maximum distance of thermal radiation @10kW/sq.m from pool

Orange (2nd Degree burn within 60 sec.)	5	30	fire is 23m, where the personnel expose to this radiation at 10 kW/sq.m within the distance of 10 m could be potential lethal.
Yellow (Pain within 60 sec.)	2	41	



The Thermal radiation from fireball of Ethanol having value of 5 kw/sqm is Vulnerable for second degree burns to all the plant personnel in the radius of 30 m.

The fire due to leakage of Ethyl alcohol in the storage shed and its consequence considered as Major and its likelihood is unlikely

Significance = Likelihood X Consequence
=3*4=12
As defined in Risk Criteria and action requirements
The risk significance is Medium.
"Risk is tolerable" –
Mitigation measure: It is highly flammable liquid in presence of open flames and spark. Storage drums should be checked at regular intervals for any leaks for its safe storage. Check regularly earth pit resistance. At any point of time do not place any ignition source near by the storage drums.
In case of fire, use fire hydrant system and fire extinguisher -alcohol foam to extinguish the fire in order to minimize the risk level and avoid fire spread to other areas of the plant.
Inform plant head for emergency preparedness. Put water curtain on the storage shed to avoid heat radiation to the other areas.

Conclusions

The thermal radiation for the Ethanol tank confined to the maximum at 23 meter that means the thermal radiation intensity of 10kW/m^2 is potentially lethal within 60 seconds. Similarly, the other threat zone of 5.0 kW/m^2 causes 2nd degree burns within 60 seconds at 30 m and the rest is 2.0 kW/m^2 subjected to within the unit at 41 m, which causes pain within 60 seconds.

Project proponent will implement all preventive measures to tackle all type of emergencies arising out of operation or malfunction of individual unit's. The required resources for Onsite and Offsite emergency management plan will be properly planned and provided to implement the plan effectively. The factory shall give highest priority towards Health and safety of the employees and people residing nearby areas. Management shall conduct the training to the nearby villagers to appraise them about their role during emergency. All nearby people shall be given training on do's and don'ts during emergency situation.
Unfortunately, if there is any emergency onsite of offsite, it will be tackled effectively due to availability of required resources at the site. Similarly, all the concern staff and members of the Teams shall be trained appropriately to tackle the emergencies in the plant. By knowing the type of emergency situation that may arise during operation of the plant, appropriate control measures will be implemented to reduce the gravity of the emergencies. Similarly, to avoid the emergency situation, all required mitigation measures will be implemented as recommended.

8 BUDGETARY PROVISIONS TOWARDS ENVIRONMENTAL MANAGEMENT PLAN:

The costs involved in environmental monitoring and management to mitigate the adverse effects will be put on account for the proposed project. The capital cost for the EMP will be Rs.6950 Lakhs. And recurring cost will be Rs. 390 Lakhs. The detailed EMP budget is given in table below

Table 8-1EMP Budget

Sr. No.	COMPONENT	PARTICULARS		Capital Investment (In Lakhs)	Recurring Investment (In Lakhs)
1.	Air	Construction of new stack for boilers and ESP		800	70
2.	Water	• Sugar ETP • Sugar and distillery CPU • MEE & incineration boiler for Distillery Spentwash treatment		6000	250
3.	Noise	Acoustic enclosures, Silencer pads, ear plugs etc		20	5
4.	Environment monitoring and Management	Quarterly Environment Monitoring (Per Year)		--	20
		Ambient air monitoring	PM_{10}, $PM_{2.5}$, SO_2, NOx		
		Boiler & DG Set Monitoring	TPM, SO_2, NOx		
		Effluent (Treated &Untreated)	10		
5.	Occupational Health	Glares, Breathing Masks, Gloves, Boots, Helmets, Ear Plugs etc. & annual health-medical checkup of workers, Occupational Health (training, OH center)		50	10
6.	Greenbelt	Green belt development activity		30	5
		Maintenance of green belt		--	5
7.	Solid Waste Management	Solid Waste Management		30	10
8.	Rain water harvesting	Rain water harvesting		20	5
9.	Carbon and Water Foot Print	Maintain the data of raw materials consumption, steam consumption, vehicle frequency for transport of raw materials, effluent generation, air		--	10

Sr. No.	COMPONENT	PARTICULARS	Capital Investment (In Lakhs)	Recurring Investment (In Lakhs)
		emissions, hazardous waste generation, and raw material recovery		
		TOTAL COST (INR, LAKHS)	**6950**	**390**

9 CORPORATE ENVIRONMENT RESPONSIBILITY PLAN

The capital cost of the proposed establishment project is Rs. 275 Crores. The industry has reserved **Rs. 4.125 Crores** (1.5% of the cost of the project as per Office Memorandum Vide F. No. 22-65/2017-IA.III Dated 01.05.2018) which will be spent on the activities like sanitation and health, education, and educational facilities as a cost towards corporate environment responsibility (CER).

10 RAINWATER AND STORMWATER HARVESTING PLAN

The industry is making efforts to conserve natural resources by adopting green technologies and as such industry proposes to adopt rain water harvesting system. With the annual rainfall of 1025 mm there is good potential to harvest rainwater. The rainwater harvesting system is installed at various buildings and about XYZ m^3 per year water is harvested. This harvested water shall be utilized for greenbelt development/ irrigation facility.

Storm water management system is also adopted by the industry. Separate drains of minimum 0.45 m * 0.60 m are provided for the collection and disposal of storm water from the industry premises. The rainwater harvesting design details are given in Annexure-III of the EIA Report.

11 CONCLUSIONS

As the industry has provided all the necessary pollution control measures for water, Air and Solid and hazardous waste disposal, the negative impacts on the environment would be minimal/ negligible. The establishment programme would help the farmers to buy their grains produce in time which would help to minimize the loss of weight and yield maximum financial benefits.