

EXECUTIVE SUMMARY OF ENVIRONMENT IMPACT ASSESSMENT REPORT

PROPOSED 60 KLPD MOLASSES/SUGARCANE JUICE
DISTILLERY PLANT

Post Jawala Bazar, Tal. Aundha Nagnath, Dist. Hingoli, Maharashtra



PROPOSED BY



SUGAR

Kapeeshwar Sugars & Chemicals Ltd.

| Environment Consultant

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Environment Management and Engineering Division

QCI-NABET Accredited Consultant Accreditation No. NABET/EIA/1821/SA 0115

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EXECUTIVE SUMMARY

1.0 INTRODUCTION

Kapeeshwar Sugars and Chemicals Ltd. (KS&CL) Dist. Hingoli, Maharashtra currently operating a 2500 TCD Sugar factory. KS&CL now proposes to install a new 60 KLPD Molasses/Sugarcane Juice Distillery Plant to produce Rectified Spirit/ Ethanol and, which will operate for 300 days in a year on own C- molasses/B-heavy and Sugar cane juice. Plant is scheduled to be operated for 300 days in a year. The proposed 60 KLPD capacity distillery plant will employ fermentation, multi pressure distillation system, bio-digester followed by evaporation followed by drier.

2.0 PROJECT LOCATION

The proposed distillery will be located at village Asola, Barashiv Hanuman Nagar, at post Jwala Bazar, Tal. AundhaNaganath, Dist. Hingoli, Maharashtra. Proposed distillery graphically located at Lat 19°28'14.73"N & Long 77° 0'49.78"E, at a maximum elevation of 420 m above MSL.

The land requirement for proposed industry unit is already under possession. Proposed project will be within existing factory premises. Project site is adjacent to Parbhani –Hingoli road. The factory is also connected to Nanded- Jintur road at 3.5 km towards the NE and National highway 222 at 15 km in south. There are no Eco-sensitive zones like Tropical Forest, Biosphere Reserve, National Park, Wild Life Sanctuary, and Coral Formation Reserves within 10 km Influence Zone. Environmental setting of the project site is given in Table 1 as below

Table 1: Environmental Setting of the Project Site

Site location	Name	Distance & Directions
Nearest Village	Asola	2.0 km in NW
	Purjal	1.82 km SE
	Jawala Bazar	2.65 Km towards SW
Nearest Town/Taluka	AundhaNagnath	6.85 Km towards NE
District Headquarters	Hingoli	28.5 Km towards NE
Nearest road	Parbhani – Hingoli Road	Project lies on
	Nanded – Jintur Road	2.97 Km towards NE
Nearest highway	NH 222	15 km in south
Nearest Railway Station	Basmat railway station	35.4 km in SE
Nearest Airport	Nanded Guru Gobind Singh Airpo	45 Km towards SE
Nearest Water Source	River Purna	6.0 km in NW
	Purijal Lake	1.48 Km towards SE

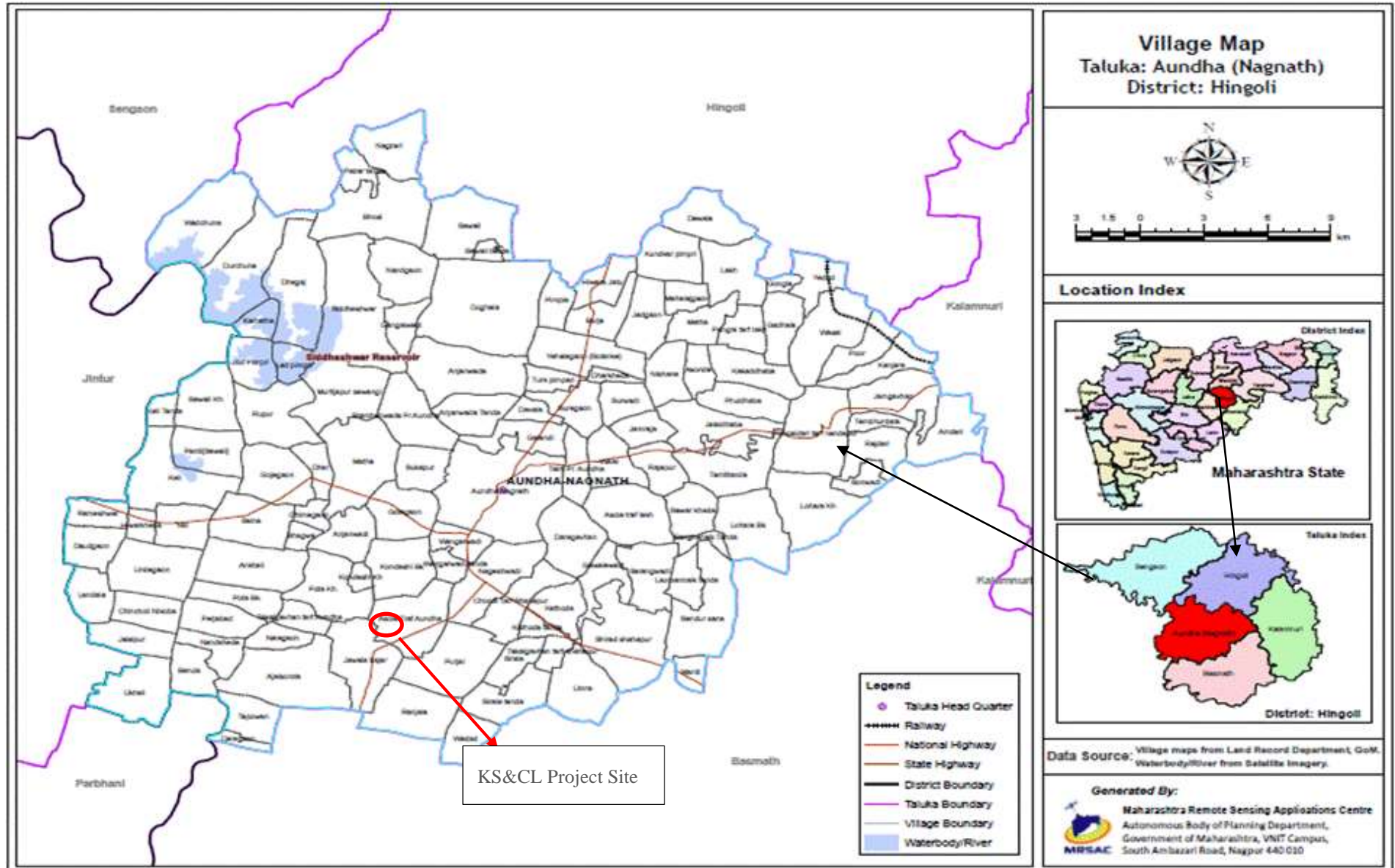


Figure 1: Map showing general location of the proposed project on MRSAC map

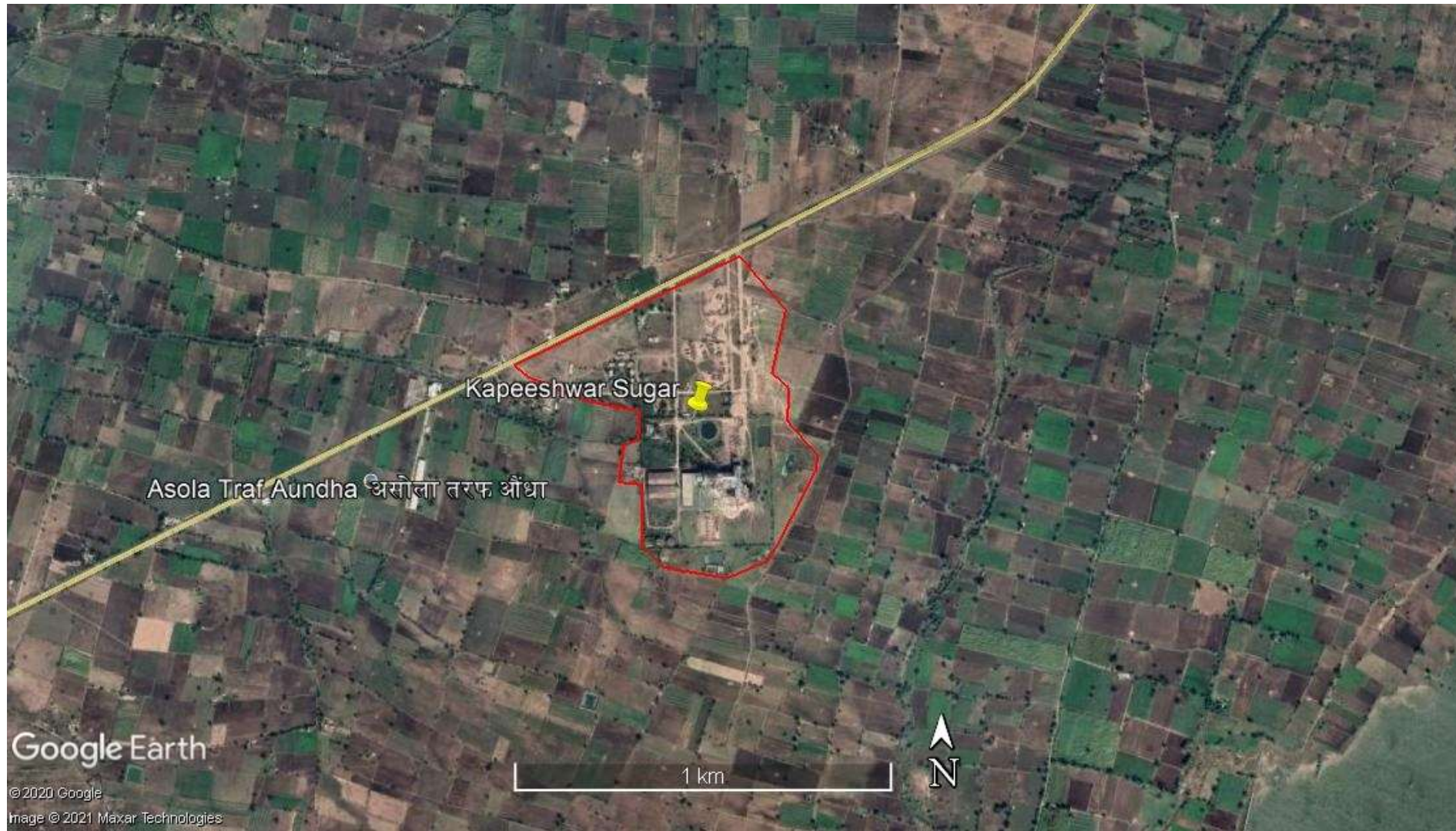


Figure 2: Google image of the Project Site

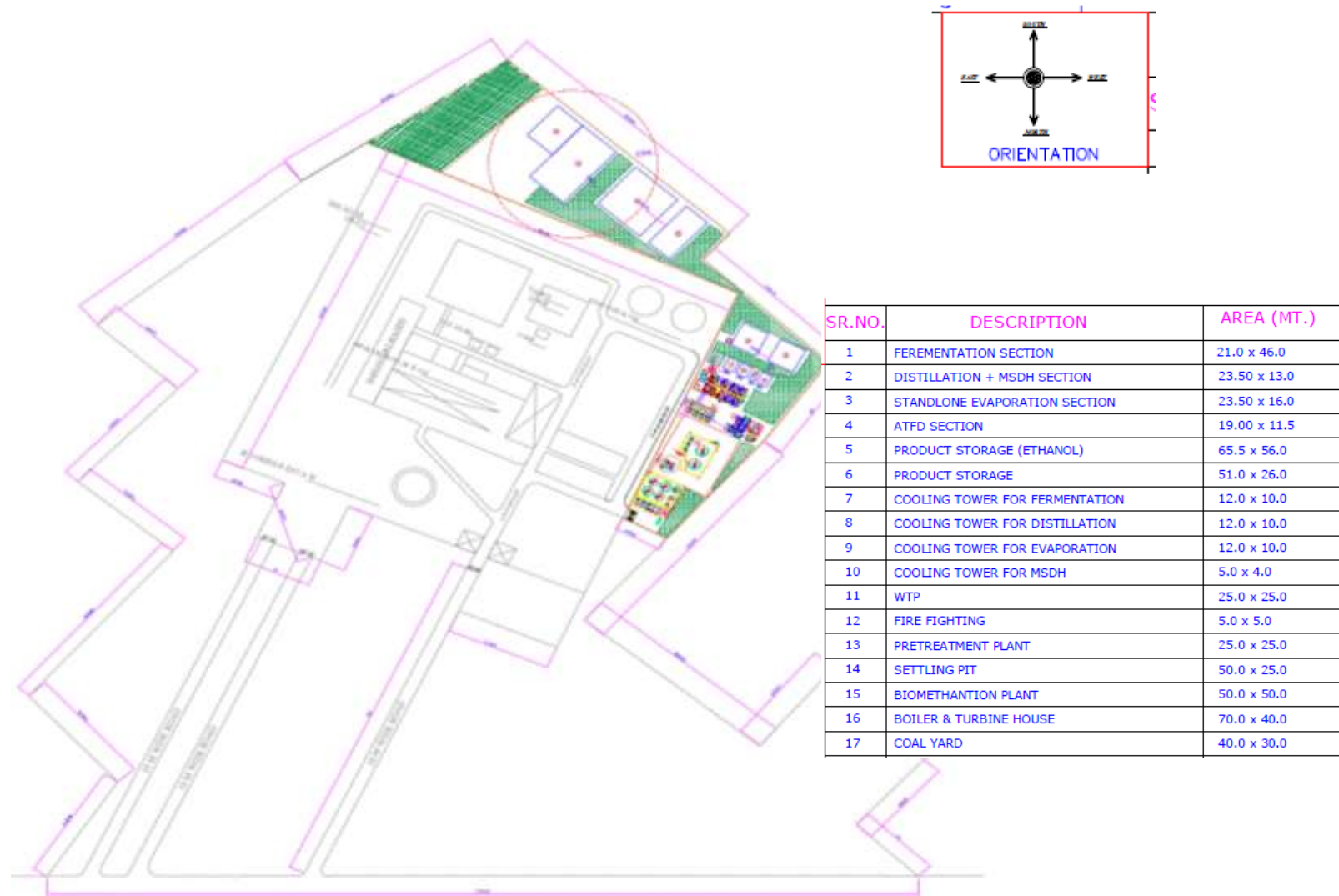


Figure 2.3: Plant layout

3.0 SALIENT FEATURES OF THE PROJECT

Table 2: Brief information of the project and environmental settings

Sr. No.	Particulars	Description	
1.	Name of the proponent & address	Kapeeshwar Sugars & Chemicals Ltd at Survey no. 180,181,182, 183, 184, 185, 186, 187,188, 189, 190, 223, 251 village Asola, Barashiv Hanuman Nagar, survey no. 237, 238,239,240 at village Purjal, survey no. 36 at village Wagarwadi at post Jwala Bazar, Tal. Aundha Naganath,Dist. Hingoli, Maharashtra	
2.	Project	Proposed 60 KLPD Molasses/Sugarcane Juice Distillery Plant	
3.	Land	Total available land with sugar industry 112 acres For proposed Distillery provision made for 10 acres	
4.	Product	Total Spirit/ Rectified Spirit (RS)/ Extra Neutral Alcohol (ENA)/ Absolute Alcohol/Ethanol 60 KLPD (One at a time or in combination)	
5.	Operation days	Total Operation days = 300 days/annum	
6.	Raw materials	Raw Material	Qty
		B-heavy Molasses (TPA)	19579.82
		C Molasses (TPA)	6042.0
		Cane juice (TPA)	46524.4
		Nutrient (kg/D)	65
		TRO (kg/D)	1230
7.	Water	Total fresh water requirement for proposed distillery will be 400 (395 Industrial + 5 domestic). Source : Purna canal	
8.	Electricity	1.5 MW	
9.	Steam	16.7 TPH	
10.	Fuel for boiler	Bagasse : 149 TPD Biogas: 750 m ³ /hr	
11.	Boiler	Boiler 18 TPH with 1.5 MWTG	
12.	Effluent treatment system (capacity)	Existing sugar effluent 250 CMD Concentrated spent wash will be treated through Bio-methanation followed by evaporation and spent wash dryer. Spent lees and process condensate will be treated in CPU united and recycled back in to process.	
13.	Man power	During Construction: 30-40 Nos. During Operation: 70-80 (skilled and unskilled)	
14.	Air pollution control measures	Existing stack height 60 m with wet scrubber Proposed stack height 42 m with Wet scrubber	
15.	Total project cost	Rs.76.0 Cr	
16.	Total EMP cost	Rs. 2.0 Cr.	

4.0 PROCESS DESCRIPTION

Distillery

Proposed Distillery is molasses/sugarcane juice/grain based 60 KLPD distillery.

Modified technology

In the proposed modification, grain (mainly maize) will be used as alternative raw material to molasses. Grain is used by partial switching over to grain the dependence on molasses is reduced. Grains contain about 65-70% starch, which is converted to fermentable sugars i.e. glucose, sucrose etc., by liquefaction and saccharification process using amylase and amyl glucosidase enzymes respectively. This results in high sugar content in raw material. Saccharification and fermentation of starch to alcohol take place simultaneously, which enable to feed high sugar content liquid for fermentation. This results in higher release of alcohol in fermented broth (12-14% v/v) in grain based fermentation as compare to 7-8% v/v alcohol for molasses based fermentation. The content of residual sugar at the end of fermentation in the spent wash is about 1.8 -2.2% for molasses based fermentation and it is about 0.2-0.3% in grain based fermentation. This leads to reduce organic content in the spent wash from grain based fermentation. The BOD value is reduced about 19% and COD value is reduced about 30% in grain based fermentation when compared to molasses based fermentation. Also, as the grains do not contain caramelize sugars, it does not impart color to spent wash when compare to molasses based spent wash. In grain based distillery the effluent will be subjected to evaporation to get grain soluble which is further dried in drier to get Distillery Dried Grain with Soluble. The condensate generated during evaporation is recycled back to fermenter. This results in no effluent generation and reduction in fresh water requirement.

Alcohol manufacturing mainly involved below given steps

- Feed preparation and weighing
- Dilution: Preparation of molasses for fermentation by appropriate dilution with water
- Fermentation: Production of alcohol from fermentable sugars in molasses solution with the help of yeast
- Distillation: Product recovery through distillation processes

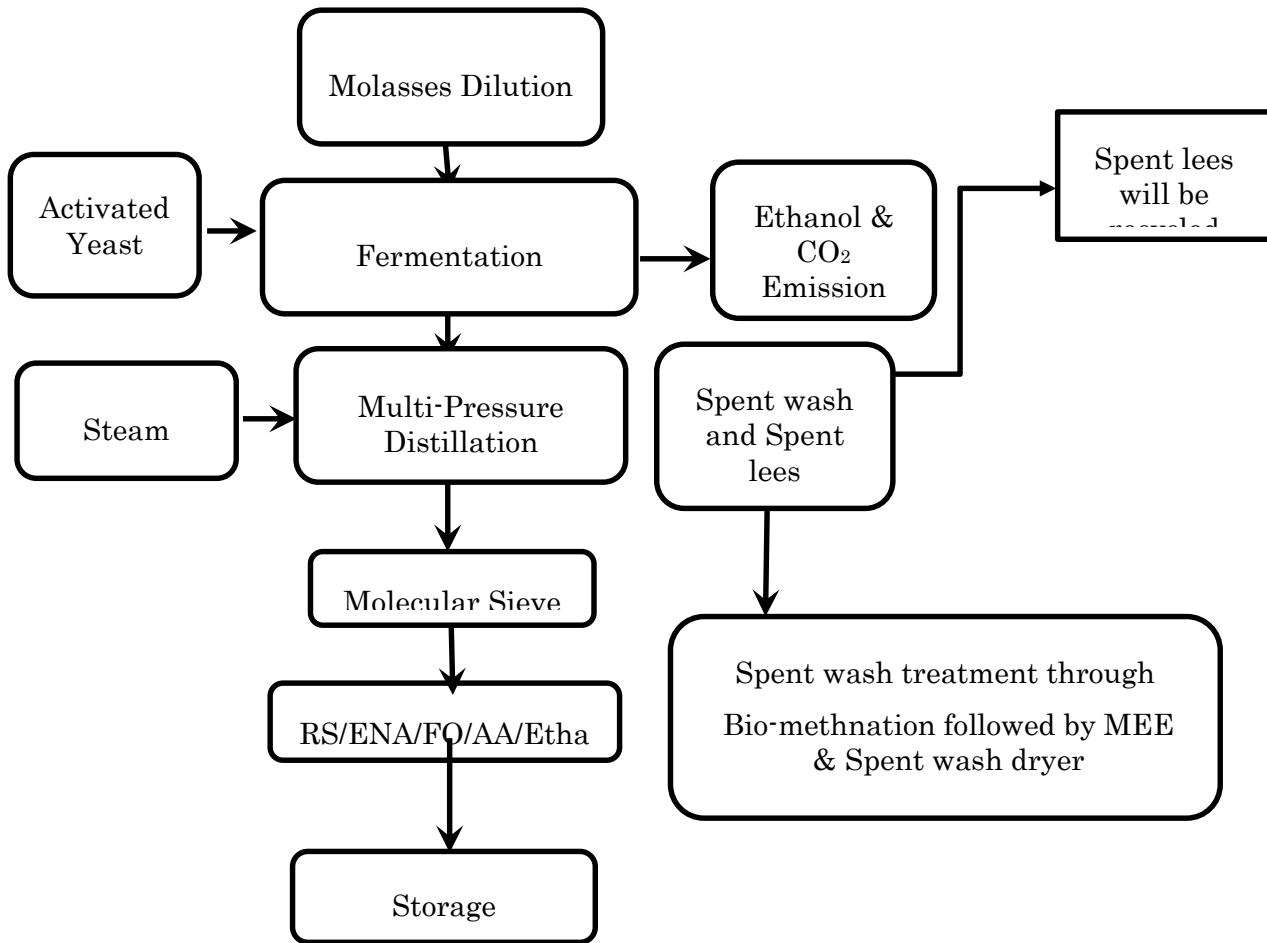


Figure 4: Distillery process flow chart

5.0 DESCRIPTION OF THE ENVIRONMENT

The study area as per awarded model TOR, 2015 is earmarked to be 10 km from the project site. The baseline survey was conducted from November 2020 to January 2021. The guiding factors for the present baseline study are the requirements prescribed by the guidelines given in the EIA Manual of the MoEFCC and methodologies mentioned in Technical EIA Guidelines Manual for Distilleries by IL&FS Ecosmart Ltd., approved by MoEFCC.

Table 3: Observation of Environmental monitoring

Environmental Attributes	Frequency of monitoring	Parameters	Observed Results		
Meteorology	Microprocessor based Weather Monitoring Station Continuous hourly recording	Wind direction	North west, west and south west		
		Max. Temp.	44.1 °C		
		Mini. Temp.	8.8 °C		
		Relative Humidity	22-81 %		
		Precipitation	Monthly total annual avg. 924.8 mm		
Ambient Air Quality	8 Locations 24 hourly samples Twice a week for 3 months (in µg/m ³)	PM ₁₀ µg/m ³	PM 10:52.5 -66.4		
		PM _{2.5} µg/m ³	PM 2.5: 17.427.7		
		SO ₂ µg/m ³	SO ₂ :7.2 to 16.3		
		NO _x µg/m ³	NO _x :13.1-22.9		
Water Quality (Ground & Surface)	Once in season at 10 locations (Physical, chemical and biological parameters)	Parameter	Ground water	Surface water	
		pH	7.1-7.5	7.39-7.66	
		DO	-	3.6 -5.5	
		TDS	590-1480	490-608	
		Hardness	255.2-714.5	224.5-265.4	
Soil Quality	Once in season at 10 locations	COD	-		
		Soil type and texture, Physico-chemical properties, NPK	Clay loam and followed by black soil. Soil is medium in fertility, good water holding capacity, heavy metal contamination signs not seen.		
		Noise Level	Day	48.4-68.1	
			Night	38.1-60.3	
			Land use Pattern	One time visit of the study area	Identification & classification of land use
Geology and hydrogeology	Based on secondary data	Geology and hydrogeology of the study area	Basaltic lava flows, the ground water in Deccan trap basalt occurs mostly in the upper weathered and fractured parts down to 20-25 m depth, alluvium occurs in small areas.		
		Ecology	General in 10 km radial study area and	Flora	The most abundant species in the study areas are, Acasia Sp.

	data collected around the project site through field visits		<i>Azadirachta indica Linn., Euphorbia Species, Albizia, Jatropha curcas, Melia sp., Lantanta camara etc.</i>
		Fauna	Plain tiger, Common Mormon, Lemon pansy, Green Bee-eater, Drongo etc.
Socioeconomic Data	General in 10 km radial study area and data collected around the project site through field visits	Socio-economic characteristics of the affected area	Sanitation facilities are satisfactory, Power supply facility is available in almost villages and town, Drinking water sources is mostly from ground water. Medical facilities in terms of primary health centre and primary health sub centres in the rural areas are good.

6.0 ANTICIPATED ENVIRONMENTAL IMPACTS

Table 4: Anticipated Impacts

Environmental Facets	Anticipated Impacts
Air Environment	Probable increase in concentration of air pollutants due to process, fugitive and utility emissions.
Water Environment	Generation of industrial & domestic wastewater.
Land Environment	Impacts on land due to improper disposal of hazardous/ solid waste.
Ecological Environment	Positive as greenbelt of appropriate width will be developed and maintained by the company in the area. No impacts are envisaged on aquatic flora & fauna as there will be zero effluent discharge outside the plant premises.
Social Environment	Overall development of the area in respect of the infrastructure development, educational growth, health facilities etc.
Economic Environment	Positive impacts on economy of the region and the country as the Alcohol will be exported and revenue generation.
Noise Environment	Minor increase in noise level within the project area.
Occupational Health & Safety	Major health hazards are identified in worst case scenario.

7.0 ENVIRONMENTAL MONITORING PROGRAM

Table 5: Environmental monitoring schedule

Particulate	Parameters	Number of location	Frequency
Ambient air quality	PM ₁₀ , PM _{2.5} , SO ₂ , NO _x etc.	Ambient air quality at minimum 3 locations. Two samples downwind direction at 500 m and 1000 m respectively. One sample upwind direction at 500m.	Monthly
Stack emission	PM, SO ₂ and NO _x	All stacks	Monthly
		Online stack monitoring will be installed	-
Work place	PM _{2.5} , SO ₂ , NO _x , CO, O ₃	Process emission in workplace area/plants (for each area/plant minimum 2 locations and 1 location outside plant area near vent)	Monthly
Waste water	pH, EC, SS, TDS, O&G, Ammonical Nitrogen, COD, BOD, Chloride, Sulphides etc.	Wastewater from all sources. Inlet & outlet of ETP, spent wash, Condensate treatment plant	Monthly
		Online Monitoring machine is already installed at existing ETP. Camera at spent wash tank will be installed.	
Surface water and ground water	pH, Salinity, Conductivity, TDS, Turbidity, DO, BOD, Phosphate, Nitrates, Sulphates, Chlorides, Total Coliforms (TC) & <i>E.Coli</i>	3-5 location Ground as well as Surface water. Within 1 km radius from spent wash tank and compost yard. 2 locations downward 1 location upward additional three locations within 10 km radius from the site. River sample One each at upstream and downstream	Half yearly
Solid waste	Ash	<ul style="list-style-type: none"> Process dust generated sludge and ash. Before used as manure if used manure 	Monthly
Soil Organic and Inorganic matter	N, P, K, moisture, EC, heavy metals etc.	At lands utilizing compost manure and treated effluent, 3 locations	Pre – monsoon and Post monsoon
Noise	Equivalent noise level - dB (A) at min. Noise Levels	5 location	Monthly

	measurement at high noise generating places as well as sensitive receptors in the vicinity	At all source and outside the Plant area.	
Green belt	Number of plantation (units), number of survived plants/ trees, number of poor plant/ trees.	In and around the plant site	Monthly
Soil	Texture, pH, electrical conductivity, cation exchange capacity, alkali metals, Sodium Absorption Ratio (SAR), permeability, porosity.	2-3 near Solid/ hazardous waste storage. At least five locations from Greenbelt and area where manure of biological waste is applied. Near spent wash storage lagoon	Quarterly
Occupational health	Health and fitness check-up of employees getting exposed to various hazards and all other staff	All worker	Yearly/ twice a year
Emergency preparedness, such as fire fighting	Fire protection and safety measures to take care of fire and explosion hazards, to be assessed and steps taken for their prevention.	Mock drill records, on site emergency plan, evacuation plan	Monthly during operation phase

8.0 ADDITIONAL STUDIES

Additional studies such as risk assessment for storage and handling of alcohol and mitigation measure due to fire and explosion and handling area has been carried out.

9.0 ENVIRONMENTAL MANAGEMENT PLAN

Following mitigation measures shall be adopted by factory to minimize the impact of project on the surrounding environment.

Table 6: EMP for various environmental attributes

Environmental Attributes	Mitigation Measures
Air Quality Management	<p>Process Emission</p> <ul style="list-style-type: none"> • . • The whole process will be carried out in closed condition so as to avoid any chances of VOC emissions. <p>Utility Emission</p> <ul style="list-style-type: none"> • All the D.G. sets shall be standby arrangement and will only be used during power failure. • Adequate stack height shall be provided to Boiler and D.G. sets. • Wet scrubber shall be provided as an air pollution control device to the stack to capture maximum boiler fly ash. <p>Fugitive Emission</p> <ul style="list-style-type: none"> • The main raw material and product shall be brought in and dispatched by road in covered enclosures. • Dust suppression on haul roads shall be done at regular intervals.
Water & Wastewater Management	<ul style="list-style-type: none"> • The distillery would be based on ‘Zero Liquid Discharge’ technology. • Spent wash will be through Biogas followed by MEE and then sent to spent wash dryer • The Process condensate, spent lees will be cooled and will be treated in Condensate Polishing Unit, after treatment of which it will be recycled back to the process again. • The treated water will be used for gardening. • Proper storm water drainage will be provided during rainy season to avoid mixing of storm water with effluent. • Rain water harvesting
Noise Management	<ul style="list-style-type: none"> • Closed room shall be provided for all the utilities so as to attenuate the noise pollution. • Acoustic enclosure shall be provided to D.G sets. • Free flow of traffic movement shall be maintained. Earmuffs shall be used while running equipment’s of the plant. • Proper maintenance, oiling and greasing of machines at regular intervals shall be done to reduce generation of noise. • Greenbelt shall be developed around the periphery of the plant to reduce noise levels.
Odour Management	<ul style="list-style-type: none"> • Odour shall be primarily controlled at source by good operational practices, including physical and management control measures. • Better housekeeping will maintain good hygiene condition by regular steaming of all fermentation equipment. • Use of efficient biocides to control bacterial contamination.

	<ul style="list-style-type: none"> Control of temperature during fermentation to avoid in-activation/ killing of yeast. Avoid staling of fermented wash.
Solid & Hazardous Waste Management	<ul style="list-style-type: none"> The hazardous waste i.e. spent oil generated shall be very minor and shall be burnt in boiler along with fuel or given to authorize recyclers. Boiler ash shall be sold to farmers as a manure ETP & yeast sludge can be used in greenbelt development
Traffic Management	<ul style="list-style-type: none"> Culverts shall be maintained. The trucks carrying raw material & fuel shall be covered to reduce any fugitive dust generation. Good traffic management system shall be developed and implemented for the incoming and outgoing vehicles so as to avoid congestion on the public road.
Green Belt Development / Plantation	<ul style="list-style-type: none"> Plantation shall be done as per Central Pollution Control Board (CPCB) Norms. The plantation in and around the plant site helps/will help to attenuate the pollution level. Native species shall be given priority for Avenue plantation.
Occupational Health & Safety	<ul style="list-style-type: none"> Factory shall monitor the health of its worker before placement and periodically examine during the employment Health effects of various activities and health hazard if any observed shall be recorded and discussed with the health experts for corrective and preventive actions need to be taken by the industry All safety gear shall be provided to workers and care shall be taken by EMC that these are used properly by them. All safety norms shall be followed

10.0 ENVIRONMENT MANAGEMENT COST

Table 7: Environment Management Cost

Sr. No	Construction phase (with Break-up)	Capital Cost (Amount in lakhs)	O & M (Amount in lakhs)
1.	Environmental monitoring	–	1.5
2.	Air Environment	–	0.5
3.	Health Check Up	–	1.5
4.	Occupational Health	–	2.5
	Total		6
Sr. No	Operation Phase (with Break-up)	Capital Cost (Amount in lakhs)	O & M (Amount in lakhs)
1.	Air pollution - Electrostatic precipitator	90.00	2.5

2.	CPU	70.0	
3.	Environmental Monitoring (Air, water, waste water, Soil, Solid waste, Noise)		3
4.	Occupation health	3.0	10
5.	Green belt	20.0	10
6.	Solid waste	3.0	1
7.	Rain water	20.0	1
	Total	206	28

11.0 PROJECT BENEFITS

1. Readily available infrastructure, fuel, & water for renewable energy power generation project.
2. Provides an initiative to sugar mill to concentrate more on conservation of energy & reduction of operating cost, thereby improving their profitability of operation.
3. Saves the expenditure on safe storage and disposal of bagasse.
4. Benefits of quick return on biomass power capital investment and generation of additional revenue.
5. The economic benefits available to the sugar factories from sale of exportable surplus and improvement in the operations
6. Entire integrated project is proposed to be set up based on the stand-alone commercial viability of each component of the project.

12. CONCLUSION

- Zero liquid discharged is proposed with efficient mitigation measures implemented.
- Air emissions through stack will be controlled by Wet scrubber or Electrostatic precipitator
- Loss of vegetation and habitat will not be attributed.
- Personal protective equipment's, safety precautions, emergency plan & disaster management plan shall be in place to avoid the environment hazards.