Executive summary

Of Draft EIA report

Proposed Sugar plant expansion from 1250 TCD to 5000 TCD, Co-generation power plant 15 MW and 60 KLPD Distillery/Ethanol plant.

Village Devnandra, Tal. Pathri, Dist. Parbhani, Maharashtra

By

Shree Renuka Sugars Ltd.

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QCI-NABET, Lab NABL, MOEF & CC, OHSAS 18001:2007 approved

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Executive Summary

1.0 Introduction

Shree Renuka Sugars Limited (SRSL) started its operations from season 2008 -2009 of capacity 1250 TCD as per consent. Existing unit was previously operated by Godavari Dudhana SSK Ltd. and started its distillery establishment early in the year 1992. Distillery license and supporting documents are attached in Annexure with this EIA report.

Looking at the Sugarcane potential in the area and new ethanol policy by GoI. SRSL management is proposing expansion of existing sugar capacity from 1250 TCD to 5000 TCD, new cogeneration plant of capacity 15 MW and proposed 60 KLPD molasses based distillery.

The proposed sugar plant will employ Milling, Pan boiling, Evaporation, Centrifugation, Crystallization etc. and distillery plant of 60 KLPD capacity will employ fermentation, multi pressure distillation system, bio digester, evaporation & bio-composting. Sugar factory will be supplied molasses, while the Co-generation, boiler & turbine will supply steam & power to the proposed sugar and distillery plant.

2.0 Project Location

The project study area is located in at Survey no. 276, 277, 278, 279, 298 and 323 village Devnandra, Taluka Pathri, Parbhani District, Maharashtra. Site is geographically located at Latitude: 19°16'10.53"N, Longitude 76°26'13.60"E and 440 m above MSL.

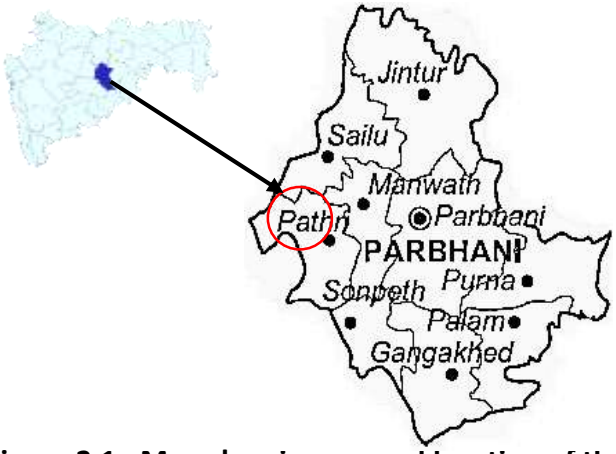

Figure 2.1: Map showing general location of the proposed project

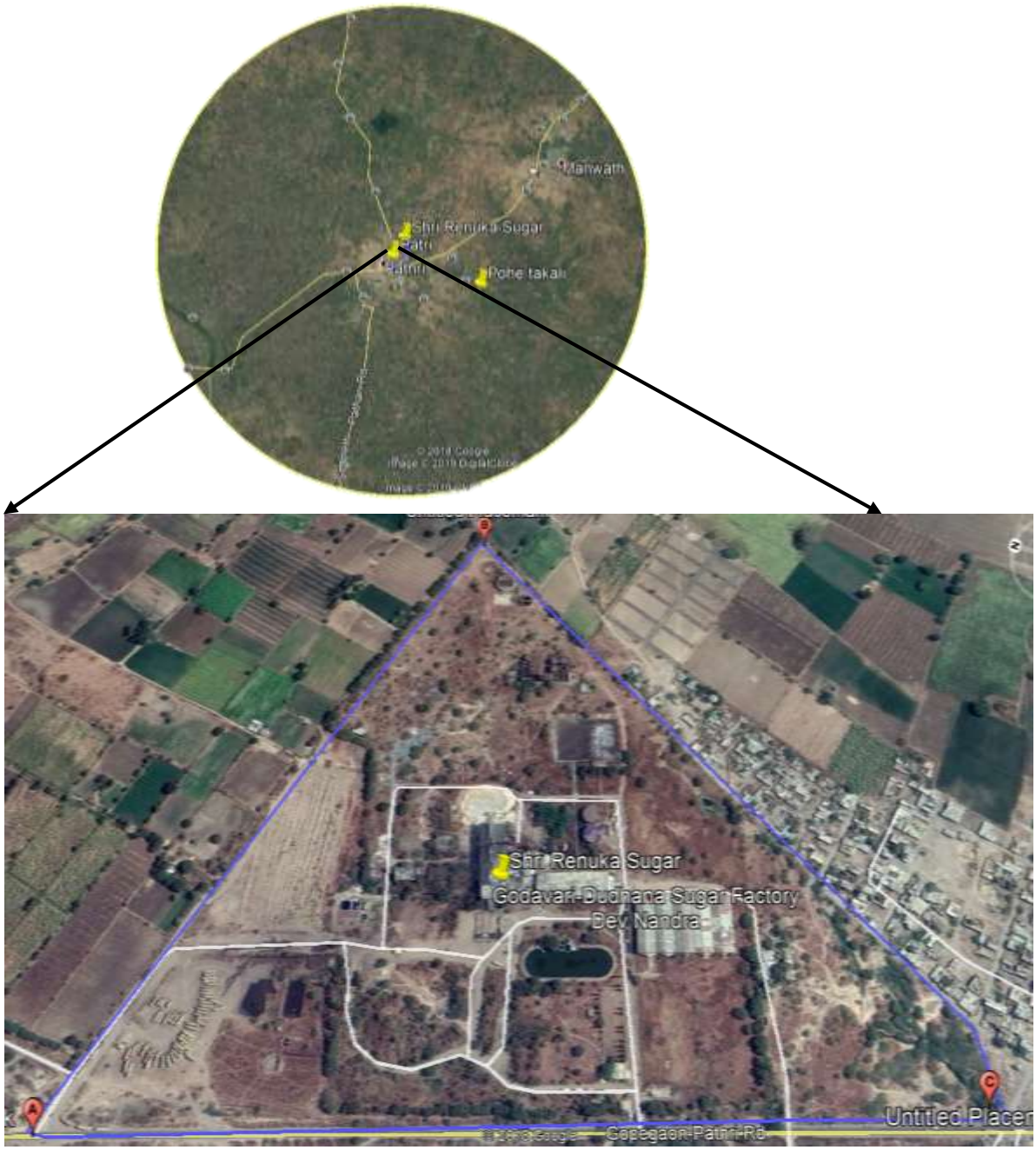

Figure 2.2: Map showing general location of the proposed project

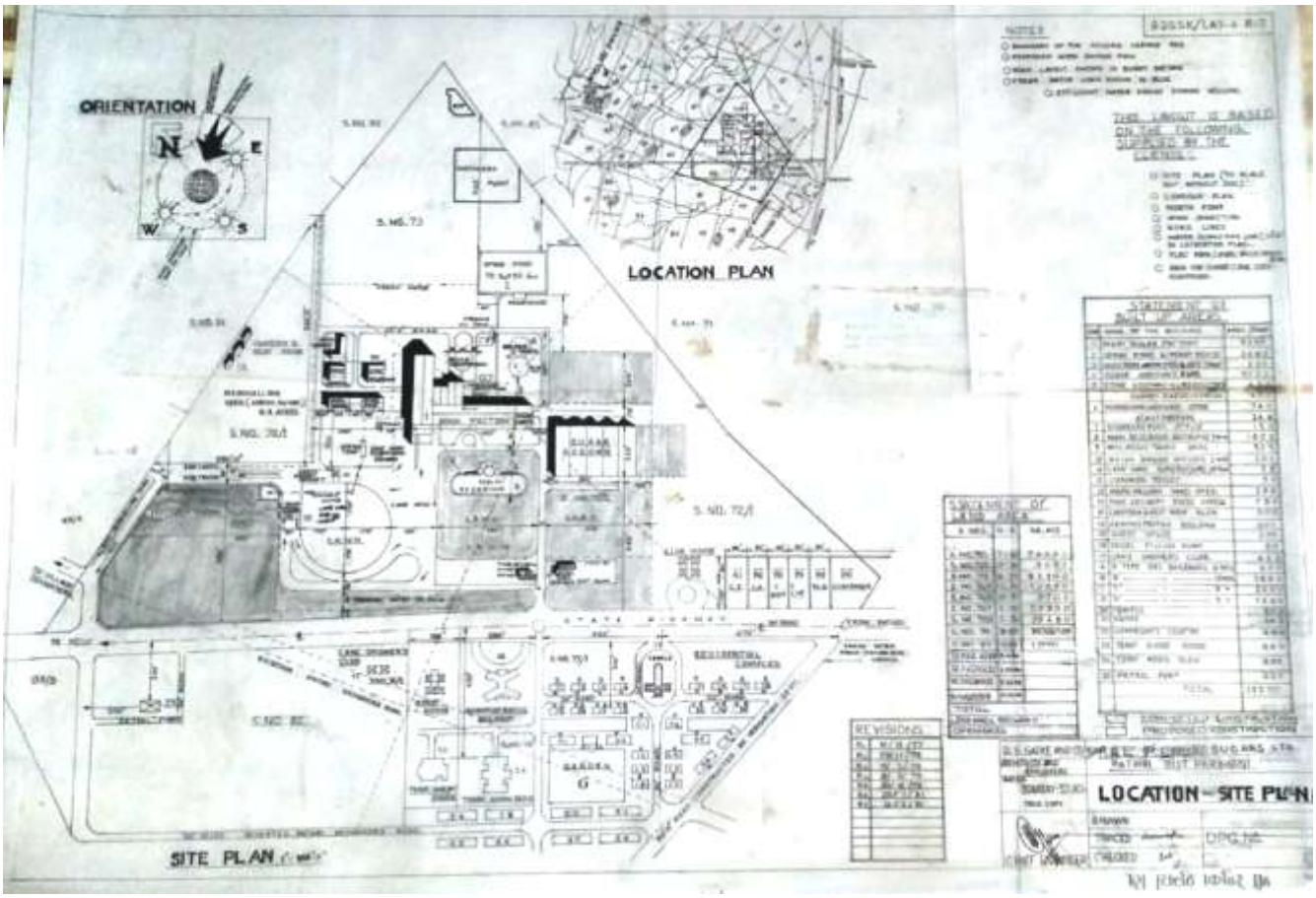

Figure 2.3: Plant Layout

3.0 Salient features of integrated project

Table 1: Brief information of the project and environmental settings

#	Particulate	Description
1.	Project	Proposed sugar plant expansion from 1250 TCD to 5000 TCD, Co-generation power plant 15 MW and 60 KLPD Distillery/ethanol plant.
2.	Product	Crushing capacity existing: 1250 TCD, Proposed: 5000 TCD Cogeneration: Proposed 15 MW Distillery: ENA/RS/AA/Ethanol of 60 KLPD (One at a time)
3.	For 5000 TCD Sugar (TPD) (13% on cane)	520

	Bagasse (TPD) (30%)	1400
	Press mud (TPD) (4.0%)	200
	Molasses (TPD) (5.5%)	275
	B heavy molasses (6.5%) (TPD)	325
4.	Operation days	Sugar factory season: 160 days Cogeneration : 160 days, Distillery: Total 270 days
5.	Molasses requirement	Molasses generation(B-heavy) 325 TPD Molasses requirement for distillery Season : Sugarcane juice 1000 MTD/ final molasses 240 TPD/ B-heavy molasses- 180 TPD Off season: Final molasses 240 TPD/ B-heavy molasses- 180 TPD
6.	Grain	160 MT/day
7.	Sugarcane juice (MTD) from Sugar cane 1000 TCD to Ethanol production in season	1000
8.	Water requirement	Total fresh water for sugar 300 CMD Total fresh water for 60 KLPD molasses mode 475 CMD Or grain based mode 661 CMD
9.	Source of water	(Godavari river at 8.2 km in West. Water drawl permission application is in process)
10.	Boiler	Exiting sugar boiler: 40 TPH and one new proposed 100 TPH (During season 100 TPH Boiler is in Operation and in Off season 40 TPH Boiler is in Operation)
11.	TG	TG : 15 MW
12.	DG	1 No. D.G. Set Of 500 kVA Exist. &proposed 1 Nos. Set Of 1000 KVA Prop.
13.	Fuel	Bagasse: 1150 TPD Coal: **745 MTD** Biogas: 979 m^3/hr
14.	Steam	Sugar: 82 TPH Distillery 15TPH Boiler de-aerator- 3 TPH
15.	Total effluent generation	Sugar: 430 m^3/d Molasses based distillery: 1190 m^3/d (spent wash, spent lees, condensate). Or Grain based distillery: 1040 m^3/d (Thin slope, spent lees, condensate)
16.	Ash	• Existing bagasse ash generation: 4.2 TPD

		• Proposed bagasse ash generation: 15.7 TPD
17.	ETP sludge	The sludge from primary clarifies, settling tank and secondary clarifier will be sent to sludge drying beds. Sludge will be dried in natural heat of sunlight. The dried cakes will be can be utilized for as manure or in composting.
18.	Air pollution control measures	Proposed: Electrostatic precipitator for 100 TPH Proposed Stack height: 65 M AGL for 100 TPH Existing stack height: 33 M AGL with Wet Scrubber
19.	Man-power	Existing manpower sugar 80 skilled and unskilled 400 For proposed project Skilled 100 and unskilled 150
20.	Total project cost	Rs. 227.71 Cr
21.	EMP capital cost	Total 24.46 cr.
Environment Sensitivity		
22.	Nearest Village	Devnanadra 1.0 km in NE
23.	Nearest Town / City	Pathri 0.7 km
24.	Nearest National Highway	NH- 222 Ambad- Manwath Road 0.8 km in S.
25.	Nearest Railway station	Railway Station Parbhani 35 km in E , Manwath 15 km
26.	Nearest Airport	**Shri Guru Gobind Singh Ji Airport** 95.0 km in SE
27.	National Parks, Reserved Forests (RF) / Protected Forests (PF), Wildlife Sanctuaries, Biosphere Reserves, Tiger/ Elephant Reserves, Wildlife Corridors etc. within 10 km radius	No any in within 10 km of project area
28.	River / Water Body (within 10 km radius)	Godavari : 8.2 km in West

4.0 Process description

Sugar

Technology- Most of the sugar factories in India follow Double Sulphitation Process and produce plantation white sugar.

The major unit operations are given below**.** These are

1. Extraction of Juice
2. Clarification
3. Evaporation
4. Crystallization
5. Centrifugation

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

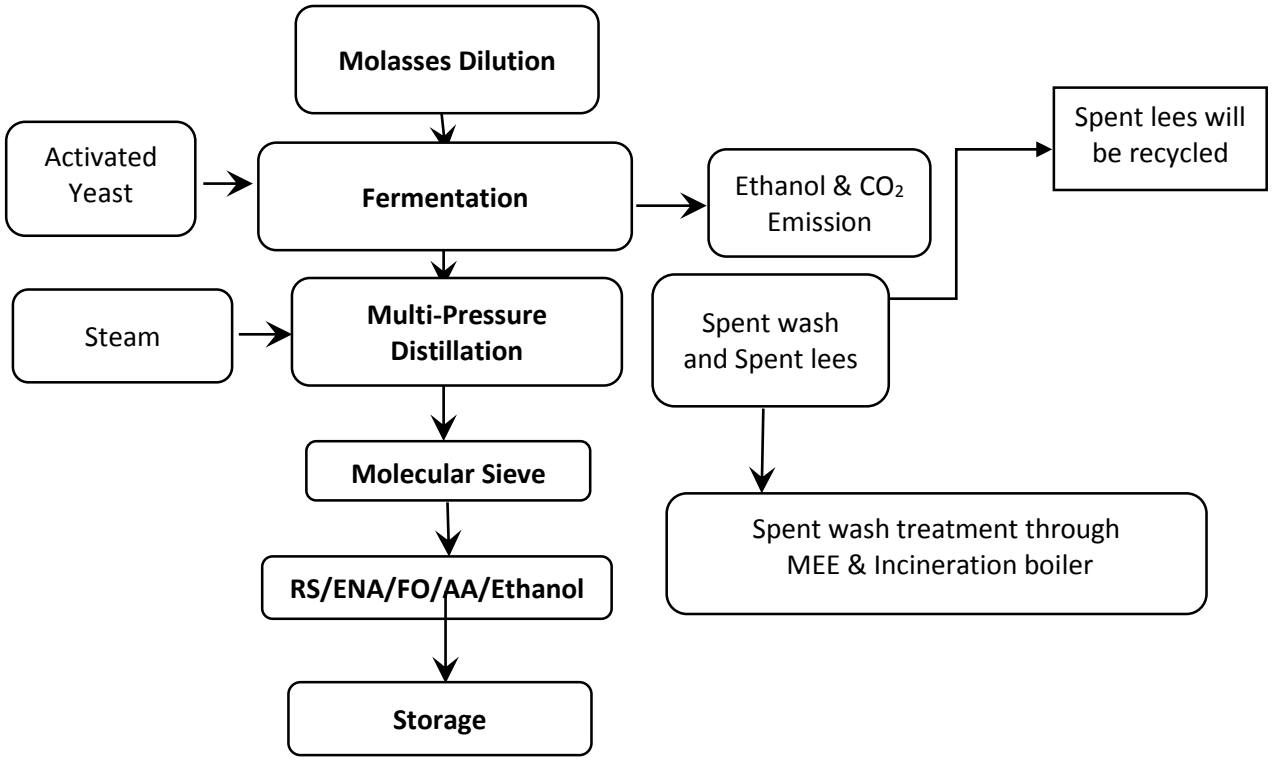

Figure 4: Distillery process flow chart

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 March 2019 to May 2019. 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	Wind direction	North west, west and south west
		Max. Temp.	44.3 ^{0}C
		Mini. Temp.	9.6 ^{0}C

Environmental Attributes	Frequency of monitoring	Parameters	Observed Results	
	Continuous hourly recording	Relative Humidity	24-83 %	
		Precipitation	Monthly total annual avg. 962.8 mm	
Ambient Air Quality	8 Locations 24 hourly samples Twice a week for 3 months (in µg/$m^{3)}$	PM_{10}	All parameters are within limit of NAAQ 2009	
		$PM_{2.5}$		
		SO_2		
		NO_x		
Water Quality (Ground & Surface)	Once in season at 10 locations (Physical, chemical and biological parameters)	Parameter	Ground water	Surface water
		pH	6.5-7.7	7.12-7.25
		TDS	704 to 976	388-411
		COD	-	26 to 32
Soil Quality	Once in season at 10 locations	Soil type and texture, Physico-chemical properties, NPK	Red sandy soil and followed by black soil. Soil is medium in fertility, good water holding capacity, heavy metal contamination signs not seen.	
Noise Level	Once in season at 9 Locations (Noise levels in dB(A)	Day	44.3- 55.2	
		Night	32.2 – 47.5	
Land use Pattern	One time visit of the study area	Identification & classification of land use	Most of the land is Agricultural land followed by Barren land	
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 data collected around the project site through field visits	Flora	The most abundant species in the study areas are, Acasia Sp. *Azadirachta indica Linn., Euphorbia* Species, *Albizia, Jatropha curcas*, *Melia spc.*, *Lantanta camara etc.*	
		Fauna	Plain tiger, Common Mormon, Lemon pansy, Green Bee-eater, Drongo etc.	
Socioeconomic Data	General in 10 km radial study area and data	Socio-economic	Sanitation facilities are satisfactory, Power supply	

Environmental Attributes	Frequency of monitoring	Parameters	Observed Results
	collected around the project site through field visits	characteristics of the affected area	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, NOx etc.	Ambient air quality at minimum 3 locations. Two samples downwind direction at 500 m and 1000 m respectively.	Monthly

Particulate	Parameters	Number of location	Frequency
		One sample upwind direction at 500m.	
Stack emission	PM, SO_2 and NOx	All stacks	Monthly
		Online stack monitoring will be installed	-
Work place	$PM_{2.5}$, SO_2, NOx, 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) & *E.Coli*	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	• 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 measurement at high noise generating places as well as sensitive receptors in the vicinity	5 location At all source and outside the Plant area.	Monthly

Particulate	Parameters	Number of location	Frequency
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

The following additional 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	**Process Emission** • ESPs shall be provided for PM emissions. • The whole process will be carried out in closed condition so as to avoid any chances of VOC emissions. **Utility Emission** • 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. • Electrostatic Precipitator shall be provided as an air pollution control device to the boiler with approximately 99.99 % efficiency to capture maximum boiler fly ash. **Fugitive Emission** • 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	• The distillery would be based on 'Zero Liquid Discharge' technology. • Spent wash will be through Biogas followed by MEE and then sent to bio-composting. • 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	• 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.

Environmental Attributes	Mitigation Measures
	• Greenbelt shall be developed around the periphery of the plant to reduce noise levels.
Odour Management	• 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. • Control of temperature during fermentation to avoid in-activation/ killing of yeast. • Avoid staling of fermented wash.
Solid & Hazardous Waste Management	• The hazardous waste i.e. spent oil generated shall be very minor and shall be burnt in boiler along with fuel. • Boiler coal ash shall be sold to brick manufacturer. • spent wash ash will be used as • ETP & yeast sludge can be used in greenbelt development
Traffic Management	• 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	• Plantation shall been 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.
Corporate Social Responsibility	• An amount of INR 3.4 Cr. (As CER OM dated 1.05.2018 Greenfield project. 2% of total project cost) will be allocated for CSR activities in the coming 3 years which will be utilized on the basis of requirement for weaker sections of the society for next 3 years.
Occupational Health & Safety	• Factory shall monitor the health of its worker before placement and periodically examine during the employment

Environmental Attributes	Mitigation Measures
	• 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	Description	Capital Cost (Rs. in lakhs)	Recurring Cost (Rs. in lakhs)
1.	Air Pollution Control	150	10
2.	Water Pollution Control	150	5
3.	Solid waste Management	_	7
4.	Environmental Monitoring and Management	40	3
5.	Rainwater Harvesting	25	4
6.	Occupational Health	20	4.8
7.	Green belt development	15	3.5
	Total	400	37.3

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 ESP.
- 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.