SIA/MH/IND2/63973/2021, Category 'B1'

EXECUTIVE SUMMARY
of
Environmental Impact Assessment Report
Expansion of Sugar Unit from 5,500 to 8,000 TCD, Cogeneration 18 to 36 MW and Molasses Based Distillery 30 to 90 KLPD

M/s. SHRI SOMESHWAR SAHAKARI SAKHAR KARKHANA LIMITED

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Dist.:Pune, Maharashtra

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Environmental Monitoring period: Jan-Mar 2021

Laboratory Involved: Aavanira Biotech Pvt. Ltd. (NABL & MoEF&CC approved)

OCTOBER 2021

VSI/EIA/SSSSKL/DR-01/20211011

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EXECUTIVE SUMMARY

1.0 INTRODUCTION

M/s Shri Someshwar Sahakari Sakhar Karkhana Ltd., (SSSSKL) Someshwarnagar, Tal. Baramati, Dist. Pune was registered under the Maharashtra Co-Operative Society Act, 1960 vide registration no. G-281, dated 20/06/1960. The industry is very progressive and has achieved best technical performance & expanded its capacity time-to-time.

The first crushing season of the sugar mill was conducted in the year 1962-63 with the initial installed crushing capacity was 1016 TCD and. The sugar mill carried out expansion from 3500 TCD to 5,500 TCD with 18 MW Co-generation plant in 2010-11. The existing 30 KLPD distillery was established in 2007.

As a result of increase in sugar cane availability in its command area, the management of SSSKL has decided to enhance the existing sugar crushing capacity from 5,500 to 8,000 TCD. Due to this expansion, the availability of bagasse and molasses will also increase. Considering all these aspects and to gain more benefits from this industrial complex the management also decided to enhance the capacity of the existing cogeneration unit from 18 to 36 MW and the existing distillery from 30 to 90 KLPD

The existing sugar ETP will be modified to treat the additional effluent generated after expansion. Zero liquid discharge (ZLD) of spent wash for total 90 KLPD is planned through concentration of spent wash followed by incineration

1.1 Features of the site

The total land allocated for industrial activity (such as sugar and cogeneration unit and distillery project is around 27.0 Ha of land. The proposed expansion will take place in the existing industrial plot. No additional land need to be procured. Available open land is adequate to accommodate proposed expansion.The existing site meets the industrial sitting guidelines of the Ministry of Environment, Forest and Climate Change (MoEFCC). This site location map is enclosed as Annexure I in the main EIA report. The other important aspects are highlighted in the following table.

Table 1: Highlights of the project

<table>
<tr><td>1.</td><td>Project Proponent</td><td colspan="4">M/s Shri Someshwar Sahakari Sakhar Karkhana Ltd.,</td></tr>
<tr><td>2.</td><td>Project</td><td colspan="4">Expansion of Sugar unit from 5500 to 8000 TCD, Cogeneration from18 to 36 MW and Molasses Based Distillery from 30 to 90 KLPD</td></tr>
<tr><td>3.</td><td>Location of the project</td><td colspan="4">Survey no: 53, 61, 100, 101, 102, 104, 124, at Someshwarnagar, Tal. Baramati, District Pune, Maharashtra.</td></tr>
<tr><td>4.</td><td>Working days</td><td colspan="4">Sugar: Average 160 days (Max. 200 days); Cogeneration unit Season + 60 days; Distillery unit: year around</td></tr>
<tr><td rowspan="11">5.</td><td rowspan="11">Product</td><td colspan="4">A. Sugar and cogeneration</td></tr>
<tr><td>Product</td><td>Existing</td><td>Proposed</td><td>Total</td></tr>
<tr><td>Cane crushing (TPD)</td><td>5500</td><td>2500</td><td>8000</td></tr>
<tr><td>Sugar (Recovery@12%) (TPD)</td><td>660</td><td>300</td><td>960</td></tr>
<tr><td>Cogeneration (MW)</td><td>18</td><td>18</td><td>36</td></tr>
<tr><td colspan="4">Byproducts</td></tr>
<tr><td>Bagasse @ 28.0%, TPD</td><td>1540</td><td>700</td><td>2240</td></tr>
<tr><td rowspan="2">Molasses ‘C’ @4.32 %, TPD OR
Molasses ‘B’ @6%, TPD</td><td>237.6</td><td>108</td><td>345.6</td></tr>
<tr><td>330</td><td>150</td><td>480</td></tr>
<tr><td>Press mud @4 %, TPD</td><td>220</td><td>100</td><td>320</td></tr>
<tr><td colspan="4">B. Distillery</td></tr>
<tr><td>Rectified spirit / ENA / Anhydrous Alcohol (KLPD)</td><td>30</td><td>60</td><td>90</td></tr>
<tr><td>Fusel oil (L/day)</td><td>120</td><td>240</td><td>360</td></tr>
<tr><td rowspan="2">6.</td><td rowspan="2">Effluent Treatment System</td><td colspan="4">For sugar mill effluent and spray pond overflow: ETP (Existing ETP will be upgraded)
For Sewage: New STP will be installed</td></tr>
<tr><td colspan="4">For spent wash: Evaporation followed by incineration (for full 90 KLPD capacity)
For spent lees, condensate and other effluent: Two stage biological treatment followed by tertiary treatment</td></tr>
<tr><td>7.</td><td>Air Pollution Control- flue</td><td colspan="4">Existing scenario:
• 1 no. 100 TPH Boiler with stack of height72 m and ESP as air</td></tr>
</table>

<table>
<tr><td></td><td>gases CO_2 from fermentation</td><td>pollution control device
• 2 nos 20 TPH boiler with stack height of 32 m and wet scrubber as air pollution control device
• 1 no 40 TPH boiler with stack height of 35 m and wet scrubber as air pollution control device
Proposed scenario:
• Existing 2nos 20 TPH and 1 no 40 TPH boiler will be discarded and new 100 TPH boiler with stack height of 70 m and ESP as air pollution control device will be installed for sugar unit
• New 30 TPH incineration boiler with stack height of 60 m and ESP as air pollution control device will be installed for distillery unit
• Bottling plant for process CO2emissions will be installed</td></tr>
<tr><td colspan="3">INFRASTRUCTURE</td></tr>
<tr><td>8.</td><td>Land</td><td>Plot allocated for industrial activity 27 ha; proposed expansion will take place within the same.
Greenbelt area = 8.91 ha (89,100 sq.m.)
Land details are given in following table:
<table>
<tr><th>Description</th><th>Existing (sq.m)</th><th>Proposed (sq.m)</th><th>Total (sq.m)</th></tr>
<tr><td>Sugar &cogeneration</td><td>180,400</td><td rowspan="2">Modification will be done in existing area</td><td>180,400</td></tr>
<tr><td>Distillery Unit</td><td>26,800</td><td>26,800</td></tr>
<tr><td colspan="4">Expansion will be done in the existing area proposed for sugar and distillery unit, Available land is under the possession of the project proponent. No need of acquisition of new land.</td></tr>
</table></td></tr>
<tr><td>9.</td><td>Main Raw Material required</td><td>A. Sugar unit
<table>
<tr><td>Raw Material</td><td>Existing</td><td>Proposed</td><td>Total</td></tr>
<tr><td>Sugar cane (TPD)</td><td>5500</td><td>2500</td><td>8000</td></tr>
<tr><td>Lime (TPD)</td><td>8.09</td><td>3.67</td><td>11.76</td></tr>
<tr><td>Sulphur (TPD)</td><td>2.75</td><td>1.25</td><td>4.00</td></tr>
</table></td></tr>
</table>

<table>
<tr><td rowspan="5"></td><td rowspan="5"></td><td colspan="4">B. Co-generation unit: Bagasse @ 1768 TPD</td></tr>
<tr><td colspan="4">C. Distillery unit</td></tr>
<tr><td>Raw material</td><td>Exiting</td><td>Proposed</td><td>Quantity</td></tr>
<tr><td>Molasses (C-Type) OR
Molasses (B-Type) OR
Sugarcane (for juice)</td><td>111 TPD</td><td>222 TPD
300 TPD
1320TPD</td><td>333 TPD
300 TPD
1320TPD</td></tr>
<tr><td>Nutrient N,P</td><td>100 kg/d</td><td>200 kg/d</td><td>300 kg/d</td></tr>
<tr><td>Turkey Red Oil (TRO)</td><td>150 kg/d</td><td>300 kg/d</td><td>450 kg/d</td></tr>
<tr><td>10.</td><td>Technology for Product Manufacturing</td><td colspan="4">Sugar: Double sulphitation process to produce plantation white sugar
Cogeneration: DECC + Back pressure turbine (during crushing season) and only DECC turbine during off-season
Distillery: Continuous/Fed-batch fermentation &multi-pressure-vacuum distillation for the production of Rectified spirit or Extra Neutral Alcohol with Molecular Sieve De-Hydration (MSDH) plant for Anhydrous/Fuel ethanol</td></tr>
<tr><td>11.</td><td>Steam required</td><td colspan="4">Sugar and Cogeneration unit: 3,888 TPD (162TPH)
Source: 200 TPH boilers (proposed 100 TPH + existing 100 TPH boiler)
Distillery Unit: 648 TPD (27 TPH)
Source: Proposed 30 TPH incineration boiler</td></tr>
<tr><td>12.</td><td>Fuel utilization</td><td colspan="4">Cogeneration Unit: Bagasse: 1,768 TPD
Distillery Unit: Conc. Spent-wash 223.2 TPD + coal 64.35 TPD or bagasse 117 TPD</td></tr>
<tr><td>13.</td><td>Boiler</td><td colspan="4">as per point 11of the table</td></tr>
<tr><td>14.</td><td>Power required</td><td colspan="4">Sugar and cogeneration unit: 11.89 MW Source: Captive
Distillery unit: 2.47 MW (Source: Captive proposed incineration boiler)</td></tr>
<tr><td>15.</td><td>Total Water Requirement</td><td colspan="4">Sugar and cogeneration Unit: 351 m^3/day (During Season) and 480 m^3/day (During off season – for cogen unit)
Distillery Unit: 643 m^3/day
Source: Nira Left Canal</td></tr>
</table>

16.	Water Source	Nira river through Left Canal
17.	Manpower	Direct employment to 74 persons and about 30-35 seasonal employment
FINANCIAL ASPECTS		
18.	Total Project Cost	• Project cost for Expansion of Sugar unit: Rs. 7037.55 Lakh • Project cost for Expansion of Cogen unit: Rs. 7768.14 Lakh • Project cost for expansion of distillery unit: Rs.11885.28 lakh ➢ EMP cost for Sugar and cogeneration unit: Rs. 835 Lakh ➢ EMP cost for Distillery unit: Rs. 5490 Lakh ❖ CER cost @ 0.75% on total project cost i.e. Rs. 26,690.97 Lakh = Rs. 200.18 Lakh **Total Project cost including EMP and CER cost: Rs. 26891.15 Lakh**
19.	Capital expenses for EMP	• EMP cost for Sugar and cogeneration unit: Rs. 835 Lakh • EMP cost for Distillery unit: Rs. 5,490 Lakh

2.0 MATERIAL AND INFRASTRUCTURE

Table 2: Availability of raw materials, finished good product and mode of transport

Raw materials	**Estimated quantity**	**Source market**	**Final product By product**	**Estimated quantity**	**Transport mode**
Sugar unit					
Sugar Cane	8,000TPD	Local farms	White sugar Molasses 'C ' or B Press mud Bagasse	960 TPD 345.6 TPD 480 TPD 320 TPD 2240 TPD	Truck Tractor
Lime	11.76 TPD	Mumbai, Pune			Truck Tractor
Sulfur	4.0 TPD				
Co-generation unit					
For season* Bagasse	1768 TPD	Own factory	Power	35.43 MW	Transmission
Distillery unit					

Molasses 'C' heavy or 'B' heavy or Sugarcane	333 TPD 300 TPD 1,320 TPD	Own factory &supplementary from nearby sugar mill.	Rectified spirit + Impure spirit (5%) OR ENA +IS (6 %) OR Fuel Alcohol (Anhydrous alcohol) + IS (5%)	90 KLPD	Finished product transport - By Road- through
Nutrients N, P	300 Kg/d	Local Market			By Road- Truck Tempo
Turkey Red Oil (TRO)	450 Kg/d	Pune, Mumbai			
Coal or Bagasse	64.3 TPD 117 TPD	Market Own sugar unit			By rail/Road-Truck
Spent Wash	223.2 TPD = 180 m3	Own Distillery unit			HDPE pipeline

2.1 Water

Fresh Water requirement for the sugar and cogeneration unit will be 351 m^3/day considering recycling of process condensate and reuse of water. Whereas the fresh water requirement for off-seasonal operation of the cogeneration unit will be 480m^3/day. Daily fresh water requirement for the proposed expansion activity is given in table no. 3 & 4

Table 3: Water Balance 8000 TCD Sugar unit and 36 MW Cogeneration Unit

#	Particulars	Quantity
1) Boiler section		
i. Water Input		
1	Maximum boiler input (100 TPH + 100 TPH = 200TPH)	4,800
2	Water input in boiler (Steam Generation + 2% Blow Down against steam generation + 5% loss) (162+ 3.24 + 8.10= 173.34 say 174 TPH	4,176
3	Actual steam generation 162 TPH @ 90% Efficiency	3,888
ii. Water and waste water output		
1	Condensate recycled to boiler (162 TPH) (140 TPH –process , Deaerator 3 TPH, 9 TPH HP Heater, 10 TPH Condenser)	3,888
2	Boiler blow down @2 % on steam generation = 3.24 say 4 TPH	96.0
3	Over all steam loss 5% on steam generation @ 8.0 TPH	192.0
	Total	**4,176**

	iii. Net water requirement for boiler	
1	Net water requirement 96 + 192 = 288	288
2	Effluent generation from boiler house	96.0
	2) Cogeneration unit	
	Water Input	
1	For cooling tower capacity 1000	2,400
2	Water recycle back	23,520
3	Water loss	480
4	**Net fresh water requirement for CT makeup**	**480**
	3) Sugar process	
	A. Water input sugar process	
1	Mill imbibition's @ 35 % on cane crushing As RE8(C)	2,880
2	Steam exhaust from boiler 42 % on cane	3,360
3	Water from cane 70% on cane	5,600
4	condenser/boiler parts cooling, Vacuum Pump & Others @ 8 %	640
	Total	**12,480**
	B. Output from process	
1	Steam condensate	3,168
2	Water from cane @ 70.0 % on cane crush	5,600
3	condenser/boiler parts cooling, Vacuum Pump & Others @ 8 %	640
	Total	**9,408**
	C. Overall process loss	
	Over all process loss	86.0
	D. Water loss product and by product	
1	Water losses in bagasse @ 50% Moisture	1,120
2	Water loss in Pressmud @ 70% on pressmud	224
3	Water loss in molasses @13% water	42
	Total	**1,386**
	E. Water loss as effluent and other waste water	
1	Effluent from process@100 lit/T of cane crush	800
2	Spray pond over flow @100 lit/T of cane crush	800

	Total	**1,600**
	F. Hot water generation from process	
	Steam condensate	3,168
	Process condensate	5,600
	Total	**8,768**
	G. Hot water (Condensate) consumption	**7,568**
	H. Excess condensate generation	
Hot water generation – hot water consumption/recycle (8768 – 7568 = 1200)		**1,200**
Excess condensate should be treated through Condensing Polishing Unit. CPU will have equalizing tank, anoxic tank, aeration tank, clarifier, duel media filter and activated carbon filter are used. CPU will deliver industrial utilizable water such as sugar factory cleaning washing, cooling water make up and distillery process etc. 100% excess condensate can be utilized by the industry		
	I. Fresh water requirement for seasonal operation is 288 m^3/day	
	J. Domestic water requirement	
Total manpower (existing 571 + Proposed 00 = 571) @110 liter per person per day		say 63
	K. Net fresh water requirement during seasonal operation is 288 + 63 = 351 m^3/day	
	L. Total water requirement in operational season @ 160 days = 56,160 m^3	
	M. For off seasonal operation only cooling tower makeup water will required i.e. 480.0 m^3/day for	

Table 4: Water Balance 90 KLPD Distillery Unit

#	Particulars	Consumption
	A. Fresh Water Requirement	
1	Process Water for Fermentation section and CO_2 scrubber	999
2	Boiler feed water @22.0 TPH	528
3	Soft Water For Vacuum Pump & Others	100
4	Soft Water Makeup For Cooling Towers	383

5	Other Domestic Usage	10
	Total Water Input at start-up	**2,020**
B. Water output from process		
1	Spent Lees (PR & Rect.)	180
2	Soft Water For Vacuum Pump & Others	100
3	Boiler waste water as blow down & steam loss	15
4	Exhaust condensate	513
5	Process condensate	576
6	Water loss in RS	5
7	Water loss in concentrated spent wash	48
	Total Water Output	**1,437**
C. Water loss from process		
1	CT Evaporation & Drift Losses	383
2	Domestic Consumption loss	10
3	Water loss in concentrated Spent wash 60% Solids = 57.6 say 58	58
	Over all process loss	132
	Total	**583**
	Total output from process = Water output + water loss (1437 + 583 = 2020)	2020
D. Recycle streams after treated through CPU unit		
1	Lees Recycle For molasses dilution 180 (after CPU) + B. blowdown15 =195	195
2	Process Condensate (after CPU)	576
3	Steam condensate recycled to boiler	513
4	Soft Water For Vacuum Pump & Others cooling water	100
	Total Recycling /Re-utilizations of water per day	**1,384**
	Total Daily Water requirement/Input = (2020 – 1384 = 636)	636
	The fresh water requirements per lit of Alcohol including domestic water	7.0 lit/lit of RS
E. Net fresh water requirement		
	Daily net fresh water requirement for the distillery unit	**636 M^3/day**

2.2 Fuel

For existing 100 TPH and proposed 100 TPH boiler of sugar and cogeneration unit bagasse will be used as a fuel! 1768 TPD. Concentrated spent wash of >55^{O} brix up to 60^{O} brix will be incinerated along with coal or bagasse for distillery project. Spent wash available for incineration will be 180 m^3/day or 223.2 TPD. This quantity of spent wash will produce 16.27 TPH steam (GCV 1750K.cal). Along with spent wash, coal or bagasse will be used as supplementary fuel in 70:30 ratio and remaining

2.3 Steam

Steam required for the proposed Sugar & Co-generation unit will be the max. 162 TPH which will be fulfilled through existing and proposed boilers of total capacity 200 TPH. Steam requirement for existing 30 KLPD distillery and proposed 60 KLPD will be 27.00 TPH. Required steam will be fulfilled from proposed independent incineration boiler of 30 TPH Bagasse or coal will be used as supplementary fuel with concentrated spent wash.

It will be utilized for distillation, boiler units, and standalone multi-effect evaporation plant. Exhaust steam from STG will be used for distillery.

2.4 Power

The total power generation after the proposed expansion of cogeneration unit will be 35.43 MW out of which 11.89 MW will be the captive power consumption and remaining 23.52 MW will export during the season. During off season, cogeneration plant will be running on double extraction cum condensing (DECC) route and total power generation through the same will be 18 MW out of which 2.35 MW will be the captive power consumption and remaining 15.65 MW will be exported. Total power requirement for distillery unit will be 2.47 MW it will be fulfilled from proposed independent 2.5 MW steam turbine generators. In case of shut down, power will be generated from DG set or purchased from state electricity grid. Existing two DG set of 320 KVA and 500 KVA will be in use.

2.5 Boiler

In existing scenario, 4 boilers are available, of which

1. 100 TPH boiler with stack of height 72 m and ESP as air pollution control device,
2. 40 TPH boiler with stack height of 35 m and wet scrubber as air pollution control device and

3. Two 20 TPH boiler with stack height of 32 m and wet scrubber as air pollution control device

For proposed project, Existing two 20 TPH and one 40 TPH boiler will be discarded and new 100 TPH boiler with stack height of 70 m and Electro Static Precipitator (ESP) as air pollution control device will be installed for sugar unit and New 30 TPH incineration boiler with stack height of 60 m and Electro Static Precipitator (ESP) as air pollution control device will be installed for distillery unit.

2.6 Fuel Handling System

Bagasse generated is used as fuel in boiler of sugar plant, suitable bagasse handling slat conveyor is provided for the boiler plant. Provision is made for conveying excess bagasse (not used in the boiler) to a storage area by belt conveyor.

Entire coal storage area/ yard will be covered with permanent weather shed roofing and walls on three sides. Mechanized fuel handling system as well as dust suppression system will be installed for this area. Coal handling will have a capacity of max. 5 TPH the conveyors will be suitably covered with hood or enclosures. Crushed coal will be used, mainly of 3 to 8 mm size. In case of bagasse, the in-house bagasse will be used and it will be transport from bagasse yard to boiler section through conveyer belt or in covered trucks.

2.7 Ash handling system

The ash handling system envisages wet extraction of bottom ash & dry extraction for fly ash. The fly ash will be extracted in dry form from the electrostatic precipitator hoppers, economizer, air heater hoppers, stack hopper, and transported to storage silo as a measure for promoting ash utilization. For collecting fly ash in dry form, the system will be designed such that, the fly ash and conveying air mixture will be conveyed to storage silo with bag filters. Once in eight hours shift, the fly ash will be sequentially extracted from these hoppers. The fly ash handling system will be designed to collect ash in dry form in fly ash silos through pneumatic pressure conveying system.

2.8 Land

The total land allocated for proposed expansion is 27Ha of which only approx. 5.68 is existing built-up area and about 1.60 Ha will be proposed built-up area and 8.91 Ha will be greenbelt area and remaining area is mainly open plots and partially

covered by internal roads. The detailed break-up of land for different units of the sugar, cogeneration and distillery (both existing and proposed) are already given in chapter II of main EIA report.

2.9 Manpower

Proposed Sugar, co-generation & distillery project will provide direct employment to 74 persons and about 30-35 seasonal employment. However, it has a great potential to generate large indirect employment mainly through transportation of Sugar, coal and ethanol.

3.0 PROCESS DESCRIPTION

A. Sugar

The double sulphitation process for manufacturing plantation white sugar will be used in this expansion. The process consists of the following steps. A flowchart of the process is given in figure1.

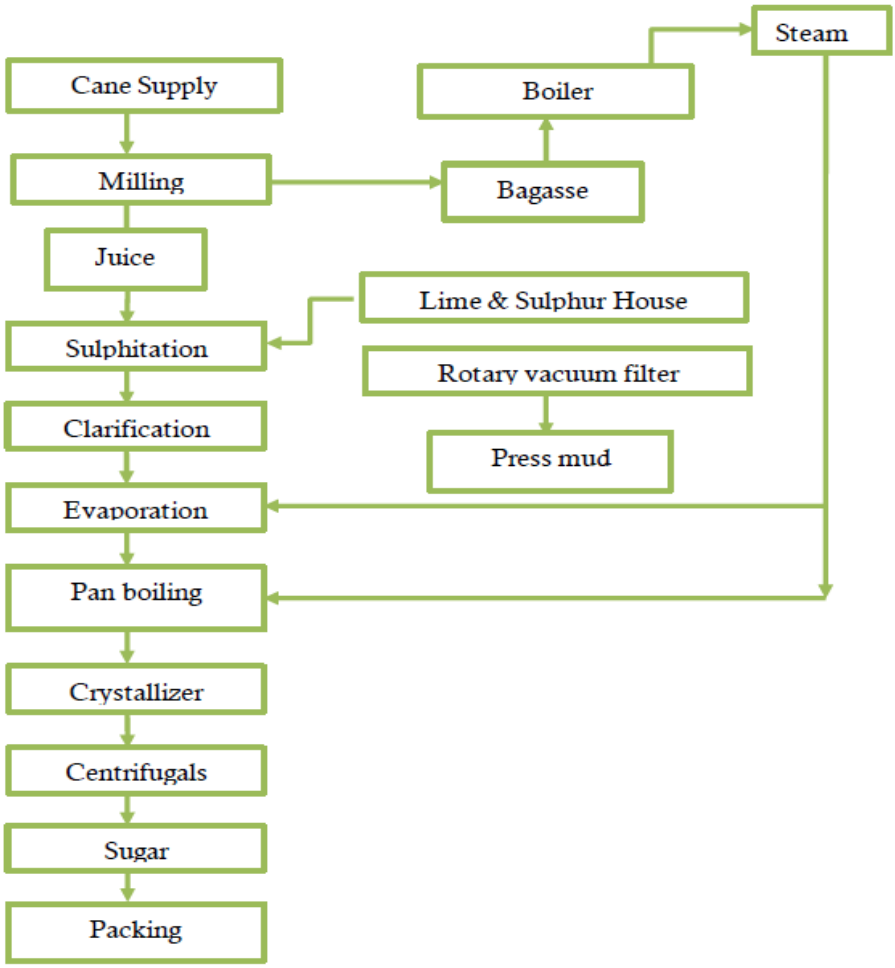

Figure 1: Flowchart Sugar Manufacturing Process

B. Co-generation

The proposed cogeneration, aims at improving the energy efficiency of the sugar factory significantly and enabling the plant to generate surplus power from its cane crushing operation. This surplus power will be exported to the state electricity grid. Energy efficiency and the export of power to the grid are made feasible due to the availability of high pressure and high temperature steam and by the utilization of the available bagasse. The flow chart for generation of the power in cogeneration as shown in following figure.

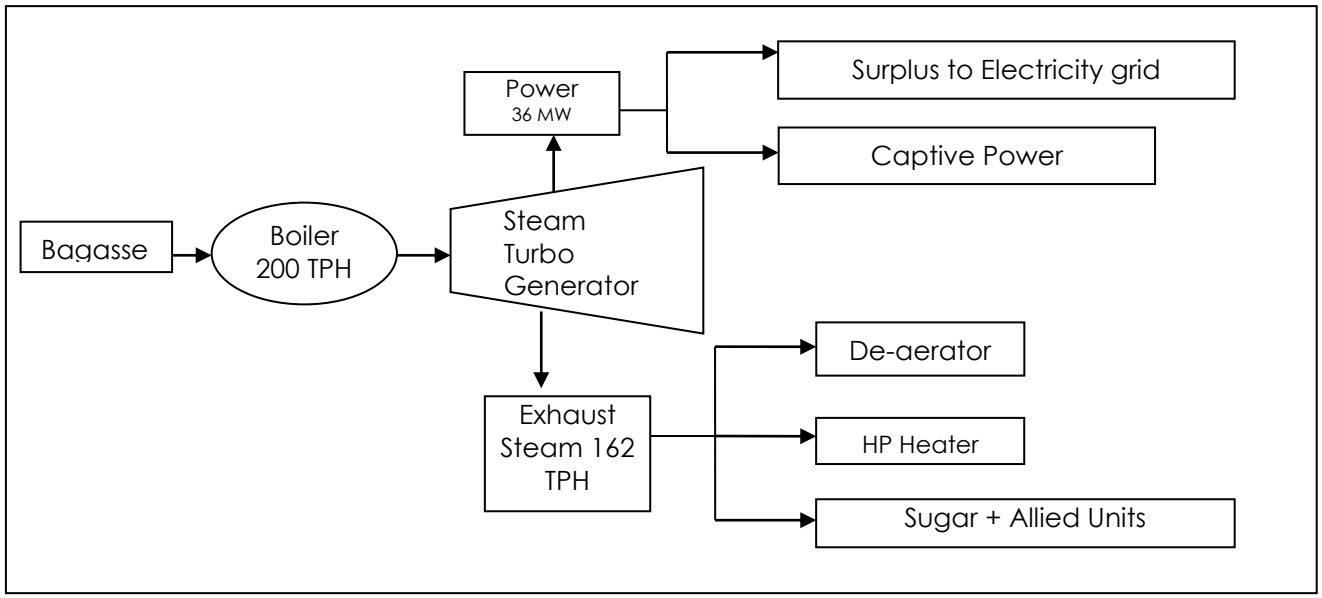

Figure 2: Schematic of Cogeneration process (for season)

C) Distillery

For the proposed project, the management has planned to adopt the latest technology for process as well as for effluent disposal. Overall objective of this is to achieve high efficiency of operations, save energy and water and achieve Zero Liquid Discharge (ZLD).

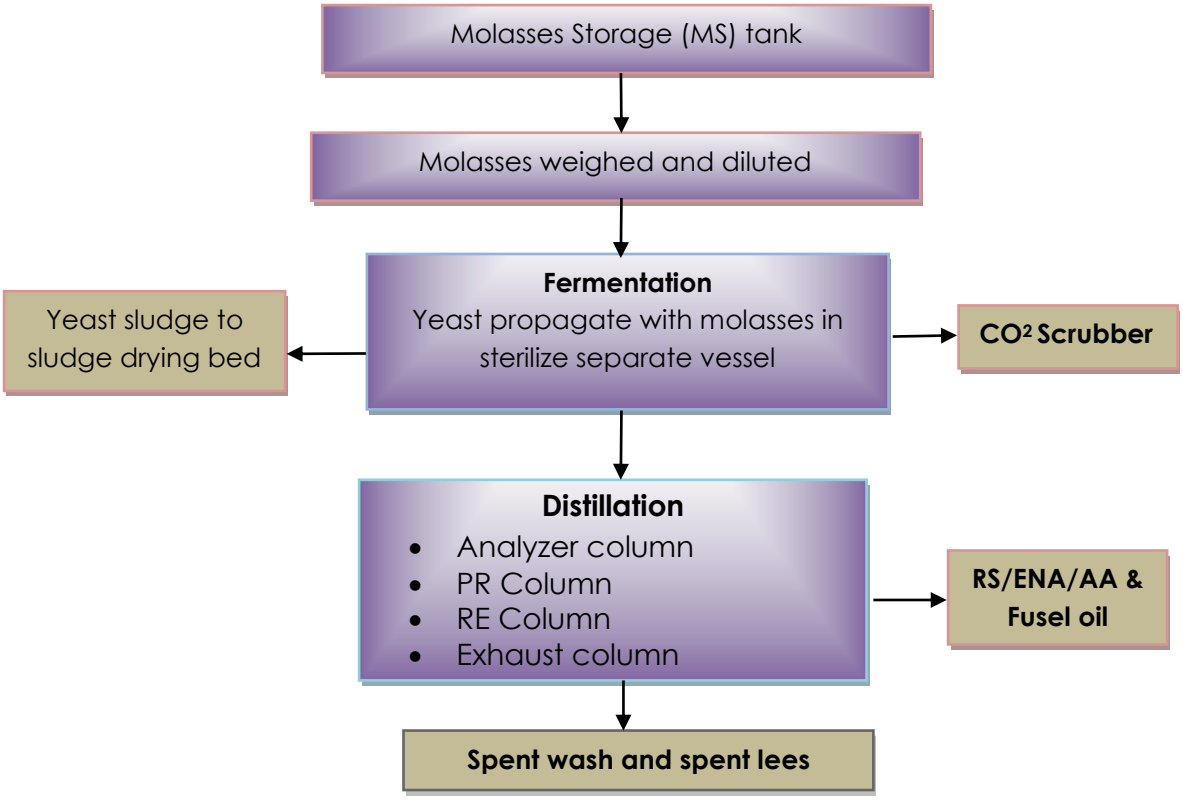

Figure 3: Schematic of Manufacturing Process

Details of molasses and product storage tanks are given in Table 5a & 5b

Table 5a: Details of existing Storage Tanks

Specifications For Receivers & Storage Tanks – Thickness As Per Is-803-1976:			
#	**Particulars**	**Existing Quantity**	**Existing Capacity (in m^3)**
1	Rectified spirit receivers	03	114
2	Impure spirit receivers	03	15
3	* Rectified spirit storage tanks	02	1800
4	* Impure spirit storage tank	02	300
5	Fusel oil storage tank	01	10
6	Molasses storage at distillery (Tons)	01	5000 (MT)

Table 5b: Details of proposed Storage Tanks

Specifications For Receivers & Storage Tanks – Thickness As Per Is-803-1976:			
#	**Particulars**	**Existing Quantity**	**Existing Capacity (in m^3)**
1	Rectified spirit receivers	03	210
2	Impure spirit receivers	03	30
3	* Rectified spirit storage tanks	03	2700
4	* Impure spirit storage tank	01	1000
5	ENA receiver	03	210
6	ENA Storage	02	1800
7	Ethanol receiver	03	210
8	Ethanol storage	04	34000
9	Fusel oil storage tank	01	10
10	Molasses storage at distillery (Ton)	01	10000 (MT)

4.0 BASELINE ENVIRONMENTAL CONDITIONS

The guiding factors for the present baseline study are the requirements prescribed by the Ministry of Environment, Forestry and Climate Change (MoEFCC) for conducting Environmental Impact Assessment study published in the EIA notification 2006 and its subsequent amendments. Apart from this, the terms of reference for the EIA were also considered while planning and executing the monitoring. For baseline data collection sampling of air, water and soil was carried out from December 2020 to March 2021.

Table 6: Summary of Environmental features of study area

#	Facet	In brief
1	General characteristics	Hot and dry
2	Rainfall	The normal rainfall over the district is about 490 mm. Rains are received mainly during June-September months
3	Temperature	The maximum temperature in summer is around 40°C and minimum temperature in winter is around 20°C
4	Humidity	The maximum humidity in the study area ranges between 60 to 80 percent in the month of August and minimum

		humidity ranges from 30-40 percent in the month of March and April.
5	Wind	Predominant wind direction was East followed by Northwest and the average wind speed was 2.02 m/s during the study period
6	Land use	Crop land area 69.77%, scrub land 25.17%, forest 1.93%, Habitation area 0.65%, canal 0.33 and river 2.15%
7	Air Quality	Complies NAAQ standards of Nov. 2009 at all monitored locations.
8	Noise	Complies the standard
9	Groundwater	As per Central Ground Water Board report 2013, the groundwater quality in the district is affected because of high NO_3 concentrations
10	Soil	Very shallow (soil depth less than 10 cm) to deep black alluvial soils
11	Nearest sanctuary	Mayureshwar Wildlife Sanctuary 28 km from the site

4.1 Land-use/ Land cover classes details

The break-up of land use/land cover is shown in Fig. 4

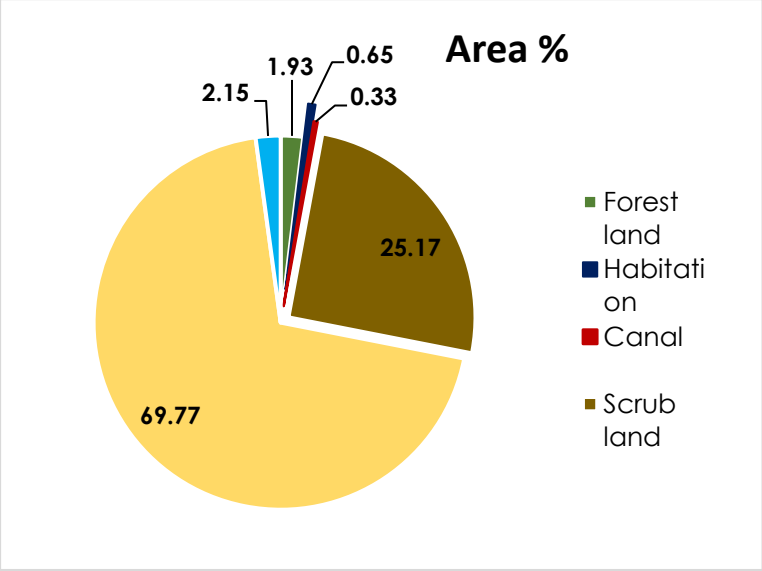

Figure 4: Details of Land use

5.0 IMPACTASSESSMENT

5.1 Air Environment

Ambient air quality of the study area was assessed through a network of eight air monitoring stations, considering the wind pattern for the study area. Methods used for AAQ analysis: PM 2.5 & PM10: CPCB, NOx: IS- 5182 (Part vi) 2006, SO_2: IS- 5182 (Part ii) 2001.

The values for PM10, PM 2.5, SO_2 and NOx for all monitored locations were well within National Ambient Air Quality (NAAQ) Standard limits.

5.1.1 Impact causing factors

1) Emissions from process: It will be due to incineration of spentwash along with coal.

2) Transportation: Vehicular pollution due to transportation activity, dust from roads, loading unloading of material and transportation of material will involve mainly transportation of coal, molasses to some extent and ethanol/spirit. Hence, this could cause minor increase mainly in NOx, particulate matter and HC.

3) Fugitive Emissions and Other sources of air pollution: Fugitive emissions from handling and storage of coal and ash transportation activities and odour are also anticipated to cause significant negative impact. System for suppression of dust from handling of coal and ash will be installed. It includes mainly, use of pulse jet bag filters for coal loading-unloading on conveyors, foggers/dust suppressors in coal and ash storage yard, wind breakers for ash storage area.

5.1.2 Impact Assessment: Estimated incremental concentrations of PM and SOx in the downwind direction of the site are minor, considering the baseline value. The baseline concentrations of these pollutants are well within the NAAQS. Therefore, after adding the incremental concentration to the baseline value at nearest downwind site will not exceed the NAAQS. So, it is anticipated that, the increase in the concentration of these air pollutants due to the burning of fuel, likely to cause minor negative impact on air environment.

5.1.3 Preventive, control and mitigation measures

- Mechanized handling of coal and ash
- Green belt development on 8.9Ha area for the proposed unit
- Plantation of 13350 trees is proposed for greenbelt
- Wind breaks will be developed to control PM generation from ash storage yard

- PPE will be provided to workers, working in dust prone areas
- The carbon dioxide emissions from fermentation process will be controlled by bottling the generated gas in a bottling plant
- Job rotation for workers, working in dust prone areas
- Use of economically affordable techniques for suppression of dust from handling and storage area
- Ash will be transported in closed/covered vehicles to the brick manufacturing unit
- Construction of permanent roads

5.1.3.1 Air Pollutant Dispersion Modeling

Prediction of impacts on air environment has been carried out employing mathematical model -AERMOD view dispersion model 9.2 software developed by Lakes Environment Software, Canada.

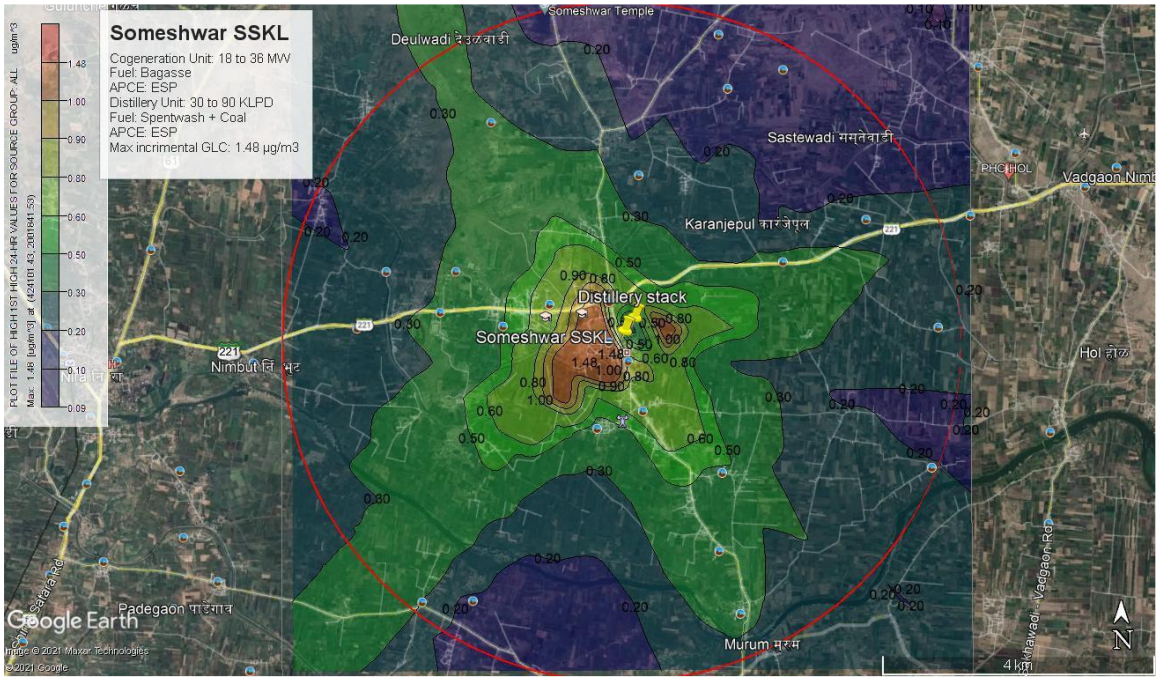

Figure 5: Isopleths showing GLC location and distance for PM (Short term 24 hourly)

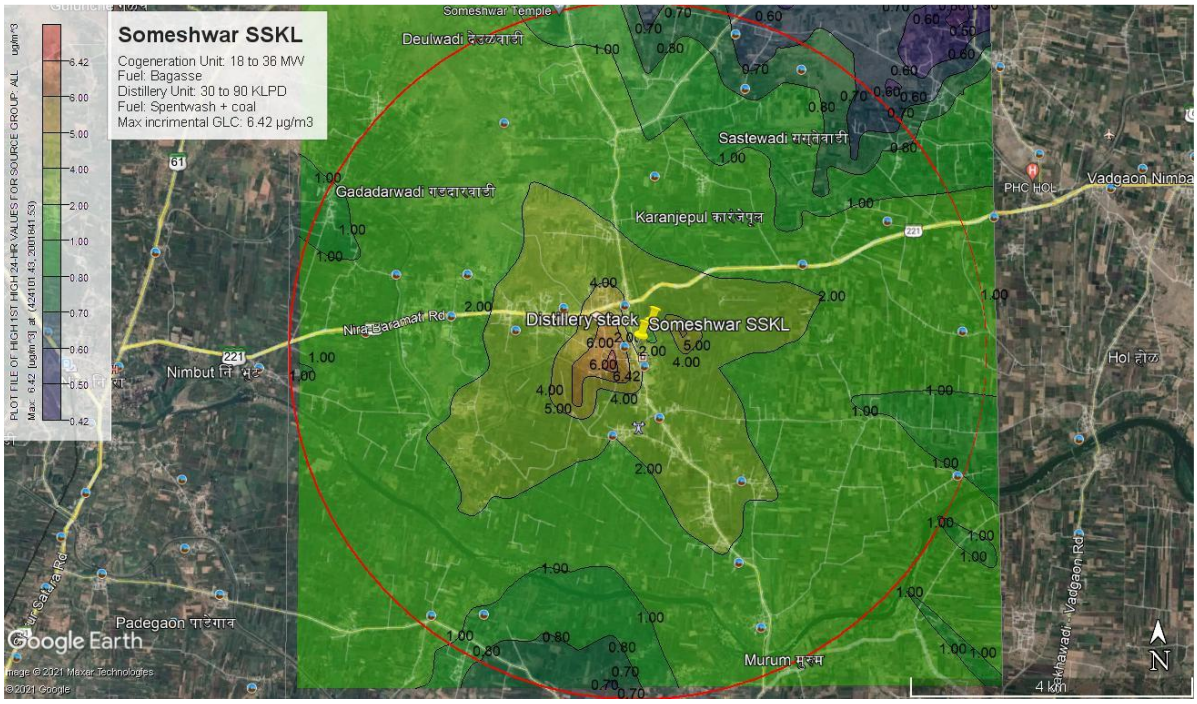

Figure 6: Isopleths showing GLC location and distance for SO2 (Short term 24 hourly)

From the mathematical modeling of air pollutant dispersion study, it is observed that

Table 7: Summary of Maximum 24-hour GLC due to proposed project

Locations	Project Site	karanje	Karan jepul	Waghal wadi	Wane wadi	Sortew asti	Malshi	Potew asti
Direction	-	N	NE	NW	SE	NW	W	E
PM- Avg. Baseline value (µg/m3)	**71.0**	**66.6**	**69.7**	**74.0**	**62.2**	**65.7**	**65.2**	**64.4**
Maximum GLC (1.48 µg/m3) at 18°6'14.47"N & 74°16'57.5"E								
Incremental Conc. (µg/m3)	0.50	0.2	0.2	0.6	0.6	0.3	0.3	0.2
Post Project Scenario (µg/m3)	71.5	66.8	69.9	74.6	62.8	66.0	65.5	64.6
SO2- Avg. Baseline value (µg/m3)	**21.6**	**24.5**	**23.7**	**23.3**	**24.9**	**20.4**	**20.9**	**23.9**
Maximum GLC (6.42 µg/m3) at 18°6'14.47"N & 74°16'57.5"E								
Increment	4.0	1.0	1.0	2.0	2.0	2.0	2.0	1.0

al Conc. (µg/m3)								
Post Project Scenario (µg/m3)	25.6	25.5	24.7	25.3	26.9	22.4	22.9	24.9

- Maximum increase in the concentration of PM and SO_2 is predicted at approx 0.66 km i.e. roughly 600 m towards west from the stack
- Sugar factory own land is observed at this distance
- Village Waghalwadi is the nearest ambient air quality (AAQ) monitored location to incremental GLC towards west and village Wanewadi towards east.
- Maximum concentration of PM10 recorded at village Waghalwadi (74µg/m^3) and Maximum concentration of SO2 was recorded at village Wanewadi (24.9µg/m^3)during monitoring period.
- Considering this incremental load, predicted GLC of PM 10 and SO2 for the said villages will be 74.6µg/m^3 and 26.9µg/m^3
- Considering the incremental load of operation phase of the project, the resulting concentration for PM10 and SO2 predicted to be well within national ambient air quality standards (NAAQS)
- Village Wanewadi is the nearest AAQ monitored place located at east of the site. The maximum incremental load predicted at this point is 0.6 µg/m^3 for particulate matter (PM10) and 2.00 µg/m^3 for SO_2.
- From the mathematical modeling study, it is observed that resultant concentration of air pollutant PM 10 and SO2 in downwind directions will be well within the national ambient air quality standards prescribed by CPCB in Nov. 2009.
- Fly ash emitted through flue gasses likely to settle mainly in 1-2 km distance from stack. Thus, agricultural vegetation and flora/plants in this area likely to get affected due to dust/fly ash (particulate matter). Minor negative impact anticipated on vegetation in surrounding areas upto 2 km

5.2 Water Environment

5.2.1 Impact causing factors: Drawl of fresh water in large quantity and its usage, water pollution, disposal of polluted water into nearby waterbodies.

5.2.2 Impact Assessment: No negative impact on water environment and aquatic ecosystem is envisaged due to the proposed project. Minor negative impact is envisaged on soil within the premises. The project proponent has water drawl permission from Irrigation Department to lift the water from Nir left canal. Thus, water used in the project will be exclusively allocated for industrial activities.

5.2.3 Environment management plan: In order to reduce the fresh water intake, the management has planned to reuse of waste water after proper treatment (Thro' ETP and CPU). Wastewater from various sources will be collected and properly treated so as to reutilize it and thus conserve the fresh water resource. The treated water shall be mainly reused in the sugar unit for auxiliary requirements and/or for gardening activity. The sanitary wastewater will be treated by STP unit. Thus, zero liquid discharge will be achieved. Boiler blow down and water from cooling tower will be stored in ponds and recycled thereafter. The management also proposed to install rainwater harvesting system to recharge the aquifer and partly fulfill the requirement during startup.

5.3 Land Environment

a) Impact of effluent discharge

As discussed earlier, highly polluted wastewater i.e. spent wash will be disposed by incineration process. It will be stored in impervious lagoons as per CPCB guidelines. Other polluted water will be treated in CPU and reused.

b) Solid waste

Table 8: Solid Waste and its Management

#	Waste	Quantity, TPD	Treatment	Disposal	Remark
Sugar Unit					
1	Sugar ETP sludge (TPD)	2.4	Land Application	Land Application	Organic + Inorganic
2	Ash (TPD)	Bagasse ash 35.34 TPD	Used as a soil enriching material or sold to brick	Used as a soil enriching material or sold to brick	Inorganic

			manufacturers.	manufacturers.	
3	Spent oil from DG and process	20 to 25 KL/A	Will be given to the authorized recycler	Will be given to the authorized recycler	Oily
Distillery					
1	Yeast sludge (wet weight)	1.2 to 1.5	Drying in SDB	Used as a soil enriching material	Organic
2	Incineration Boiler Ash				
	Concentrated spent wash (@18%)	40.17	-	Sold to brick manufacturing unit	Inorganic
	Coal ash (@35%) OR	22.52	-		
	Bagasse ash (@ 2%)	2.34	-		
3	CPU sludge (wet weight) TPD	0.7 to 0.8	Drying in SDB	Used as a soil enriching material	Organic

5.3.1 Impact causing factors: Disposal of solid and hazardous waste, disposal of effluent, change intopography

5.3.2 Impact Assessment: The project is not going to generate any hazardous waste. The only hazardous waste likely to be generated will be scrap oil from DG set, automobiles, gears etc. Since the DG set will run only in case of failure of regular power supply. The quantity of used or scrap oil will be low. Since, the solid waste is non-toxic andnon-hazardous, it is anticipated that the solid waste will have no negative impact on land but very negligible negative impact on air environment due to emissions from stack. Minor negative impact is also envisaging on the land environment of the site due to construction of the proposed unit.

5.3.3 Environmental management plan: The solid waste viz. ash will be generated due to burning of spent wash along with coal in the boiler and burning of bagasse in cogeneration boiler. Ash is estimated to be about 35.34 TPD from sugar & cogeneration boiler and 40.17 TPD from Incineration boiler. Sludge from CPU this sludge is usually bio-degradable, organic and nearly neutral in nature. It doesn't contain any toxic or hazardous elements. Therefore, this will be safely disposed by mixing into soil as manure. As an option, ash may be sold to the local bricks manufacturer.

5.4 Ecology

5.4.1 Impact causing factors: Discharge of air and water pollutants into environment, solid waste, change in land use, removal of vegetation cover, reclamation of wetland/water bodies etc.

5.4.2 Impact Assessment: In general, it is observed that, Impact of an industrial activity on ecology and biodiversity mainly due to a) Habitat destruction and/or, alteration and/or fragmentation, b). Disturbance to wild life from project or linked activities, c) Pollution related impact on ecosystem d). Threat to rare, endangered flora and fauna from the project related activities.

Considering this, the present project examined for its impact in the abovementioned categories. In the later part of the assessment, likelihood score estimated to determine the actual ecological sensitivity by considering project specific data

5.4.3 Environmental management plan: Presence of chinkara and carnivores such as gray wolf and hyena reported for the study area. However, since the establishment of the unit up till now there were no incidences of man-animal conflict observed in and around the factory area. But, considering such minor probability the environment management plan has been proposed in the main report. It mainly comprises of proper fencing of the unit, monitoring the changes takes place in the surrounding habitat and immigration or emigration of wild animals wrt such change, accordingly a plan need to be reviewed on annual basis for the management. Greenbelt development - for mitigation of air and noise pollution. Solid waste is organic and safely gets disposed-off by applying into soil.

5.5 Socio- economic environment

5.5.1 Impact Causing Factors: issues of rehabilitation; restoration; population flux; pressure on available resources andinfrastructure.

5.5.2 Impact Assessment: Considering the long term benefits to the locals, the project will have positive impact on socio-economicenvironment.

5.5.3 Environment Management Plan: Project is agro-based – therefore, indirectly beneficial to local farmers; no issues of rehabilitation or restoration; local candidates will be employed – thus, migration of population to the site surrounding area and pressure on infrastructure and resources is anticipated to be negligible.

6.0 FIRE PROTECTIONSYSTEM

Fire protection system shall be provided in accordance to PESO, OISD-117 and LPA regulations. The fire- fighting system will consist of a hydrant network, piping etc. Fire protection system will also include one electric driven pump, one diesel engine driven pump, one jockey pump, piping, basin etc. Water hydrants will be provided at all strategic points. A suitable Fire ring system as per the guidelines of TAC will be incorporated.

Automatic fire Sprinkler System (Water Hydrant) – Electro-magnetic dehydration system uses an electric fire detection system installed in the area as open sprinklers /spray nozzles. Upon sensing a hazard, the Electromagnetic valveopens.

6.1 Safety Aspects through Design andEngineering

- All design will be as per ISI standard specification and drawings are to be approved by factory/electrical inspectorate/safety inspectorate weights & measurement inspectorates.
- All distillation columns accessed from flooring(grating)
- The roof of the structures (fermentation, distillation, receivers) must be covered totally by pre- coated sheets (Pre-painted galvano loom sheet i.e. PPGL sheets) of 0.5 mmthickness.
- The layout will take into account the working space & safety requirement ofFactory Inspectorate, Govt. of Maharashtra State.

6.2 Plant Lighting

Plant building lighting will be as per norms & as per Electrical inspectorate/factory inspectorate norms.

7.0 ENVIRONMENTMANAGEMENTPLAN

Table 9: Summary of Environment Management Plan (not covered above)

Environmental Aspect	Impact causing factor	Control/Mitigation Measures
Air Environment	Generation of Particulate Matter (PM), SO_2, NO_x during cogeneration/ incineration	• ESP to control ash emission through stack with height 70 m for cogeneration boiler and 60 m for incineration boiler • CO_2 bottling plant after

Environmental Aspect	Impact causing factor	Control/Mitigation Measures
	Generation of Carbon dioxide from fermentation, Odour from spent wash storage Handling of bagasse, coal and ash	separation/scrubbing of the gas • Mechanized system for coal, bagasse and ash handling • • Wind breaks for ash storage area and Development of greenbelt Continuous online emission monitoring system as per the norms
Water Environment	Effluent generation from processes, cleaning, blow down water & condensate. Storage of spentwash, its treatment and disposal	Sugar effluent and spray pond overflow will be treated in upgraded ETP. Condensates will be treated in CPU and then recycled. 'Zero liquid discharge' through - stand-alone evaporation (using MEE) as a primary treatment to reduce the spentwash volume followed by Incineration of concentrated spentwash by burning with coal/bagasse in furnace • Spentlees, condensate of MEE and other effluents will be treated in condensate polishing unit (CPU) and treated water will be reused in distillery. • spentwash Lagoons will be made impervious as per CREP guidelines • Piezometric well, in downstream area of spentwash storage to monitor ground water quality • Continuous online effluent monitoring system – as per the norms
Soil Environment	Boiler Ash from coal	Given to the nearby brick

Environmental Aspect	Impact causing factor	Control/Mitigation Measures
	and spent wash	manufacturing unit
	Bagasse ashand sludge from Fermentation unit, spent wash tanks and CPU	It is organic in nature, degradable hence, mixed into soil
	Excavated fertile soil	• Stacked separately and reused for greenbelt development Stones and excess soil will be used for foundation or internal roads or leveling purpose within premises
Noise	Increase in noise level due to operation of machines, motors, vehicular movement, DG set etc.	• provisions of separate parking for goods and other vehicles • Provision of adequate personal protective equipment for workers • Job rotation for high noise level work places, if required • Regular health checkup for workers • Acoustic enclosure will be provided to DG set
Ecology and Biodiversity	Air, water, soil and noise pollution Tree cutting failing, disturbance to wildlife due to project	• Existing transmission line will be used for cogeneration unit • No tree cutting/ failing involved since project is on open land • Areas close to the industry should be strictly and effectively protected from fire. • Restricting vehicular activities during night time for the areas which are probable for the movement of carnivores (particularly northern, north-

Environmental Aspect	Impact causing factor	Control/Mitigation Measures
		western part of the site) • Domestic solid waste to be disposed in such a way that it will not attract wolf or hyena • Nigh time light arrangements in the unit, to be made non-intense, non-glary; it should not disturb the wild animals
Socio-economic Environment	Rehabilitation and Restoration (RR), pressure on available manmade infrastructure/resource due to population flux	• No rehabilitation and restoration issue involved since site is already under the possession of project proponent • Local candidates will be preferred for employment. Skilled work force is available at nearby towns and cities
Safety and Occupational health	Accidents, improper work practices	• Safety officer and safety committee will be formulated • Provision of adequate safety gears • Insurance policy for workers
Risk and disaster management	Fire, accidents, earthquake, etc.	• The entire premises will be declared as 'no smoking zone' • Lightening arresting system will be installed • Ethanol vapor condensing system will be installed at storage area • Proper storage of molasses, ethanol and coal

8.0 SAFETY, OCCUPATIONAL HEALTH MANAGEMENT

- Existing Firefighting system (of sugar & Cogeneration unit) will be modified suitably so as to make it suitable for proposed project (as per the statutory guidelines)
- Regular medical checkup of workers, contractual workers and employees

Facilities at existing sugar unit such as drinking water facility, canteen, toilet and bathrooms, petrol pump, first aid facility, safety gears and PPE will be made available to workers, as well as to the visitors and transporters.

Table 10: Financial provision for CER activities planned for next five year

CSR activity head	Year			TOTAL
	1st	2nd	3rd	
	Budgetary provision (Rs. in lakhs)			
Improvement in social infrastructure				
Provision of rooftop solar system in local schools	20	30	30	**80**
Provision for green belt development in nearby villages	10	10	10	**30**
Provision of clean drinking water facility in local schools	5	7.5	7.5	**20**
Provision for Man Human Conflict and Medical Emergency equipments	10	10	10	**30**
Infrastructure Development/Maintenance (Eg. Road, canal maintenance, etc)	10	10	10	**30**
Other activities for maintaining social and cultural harmony	2	4	4.18	**10.18**
TOTAL BUDGETARY ALLOCATION FOR NEXT FIVE YEARS (0.75% of the capital budget)				**200.18**

Table 11: **Estimated Capital & Recurring Expenses for Environment Management**

#	Particulars	Capital cost in Lakh
A. Sugar and Cogeneration unit		
1	Electrostatic precipitator and dump condenser for new 100 TPH boiler	100.00
2	Fuel handling system	80.00
3	Ash handling system	40.00
4	Stack	150.00
5	Sugar ETP Up-gradation	200.00

6	Condensate polishing unit	200.00
7.	STP (combined)	65.00
B. Distillery unit		
1	Multi Effect Evaporator (MEE)	900.00
2	Incineration boiler with electrostatic precipitator and dump condenser	3700.00
3	Fuel handling system	200.00
4	Ash handling system	100.00
5	Stack	120.00
6	Spent-wash storage lagoon	10.00
7	Condensate polishing unit	170.00
8	CO_2 Bottling	195.00
9	Environmental monitoring and management for Sugar, Cogeneration and distillery unit	25.00
10	Greenbelt development for Sugar, Cogeneration and distillery unit	40.00
11	Rainwater harvesting for Sugar, Cogeneration and distillery unit	30.00
	Total	**6325.00**
C. Recurring Expenses/ Annum for Environment Management		
1	Salaries and wages	75.00
2	Maintenance @2.5% on capital investment for EMP i.e. 6325.00	158.50
3	Fuel (Incineration activity) and Electricity (in case of diesel generator operation)	150.00
4	Miscellaneous/contingency	10.00
	Total	**393.50**
D. Additional Provision towards CER (0.75 % of capital investment)		**200.18**

9.0 CONCLUSION

The project proposed by a progressive cooperative sugar mill from Pune district of Maharashtra. The mill is having adequate capacity to produce >75% of required molasses in the form of B heavy type and remaining will get easily available from nearby sugar mills. The mill is having its own open land where the project will be developed. Hence, issues of rehabilitation and restoration of people is not involved in this case.

The potential environmental, social and economic impacts of the project have been assessed during the EIA study and given in EIA report. The proposed expansion of the sugar and cogeneration unit and establishment of new distillery unit will have certain levels of marginal impacts on the local environment. It has been endeavored to minimize the negative impacts by addressing them through environmental management plan. Necessary control measures have been suggested to meet with the norms and safeguard the environment. The implementation of this project will definitely improve the physical and social infrastructure of the surrounding area. Adequate financial provision is made by management of SSSKL for EMP and CER activities (i.e. for upliftment of the local people). The proposed project will contribute to economic growth of the region and also help in improving the power reliability and energy security.