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EXECUTIVE SUMMARY
Of
Environmental Impact Assessment Report
New 30 KLPD Molasses Based Distillery

M/s. SHRI VITTHALSAI SAHAKARI SAKHAR KARKHANA LIMITED

Rajiv Gandhi Nagar, Murum, Tal. Umarga, Dist. Osmanabad,
Maharashtra – 413 605

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EXECUTIVE SUMMARY

1. INTRODUCTION

This project is proposed by **M/s. Shri Vitthalsai Sahakari Sakhar Karkhana Ltd. (SVSSKL)** located at Murum village in Omerga taluka of Osmanabad district in Maharashtra. SVSSKL is a cooperative sugar mill registered under the Maharashtra Cooperative society act, 1960 vide registration no. OSM/(UGA)/PRG/A5-57 dated April 21, 1994. The establishment of this sugar factory was in the interest of local sugarcane growers. Its crushing capacity is 2500 TCD. Considering the availability of by-product such as molasses, pressmud, bagasse, etc. and also to attain financial stability, the management of SVSSKL has decided to install a new 30 KLPD distillery plant.

1.1 Features of the site

The project proponent has planned to set up the proposed distillery within its existing distillery premises. The sugar factory is holding 56,200 sq. mtr of barren land which will be allocated for distillery unit and ancillary activities. This includes Distillery, evaporation unit (MEE), incineration boiler and storage lagoon; and Green belt development. This land is owned by SVSSKL. The proposed site is open and adequate for installation of proposed distillery along with its allied units including storage of raw material, finished products and waste material. The 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.1

Table 1: Features of the Project site

Geographical Location	17°49'24.20"N, 76°28'25.97"E, Elevation 615 MSL
Road Connectivity	National Highway No. 65 (Hyderabad- Solapur) is approx. 4 km from the site.
Nearest City/Town	Murum is approx. 4 km (aerial distance) in South direction from the project site.
Railway Station	Solapur railway station (of central railway) is approx. 73 km from the project site.
Air Port	Hyderabad airport is approx. 253 km from the site.
River (nearest)	Benitura river is approx. 3.7 Km in South-west direction from project site.

Table 2: Highlights of the Project

1.	**Project Proponent**	M/s. Shri VitthalsaiSahakariSakharKarkhana Ltd.
2.	**Project**	New 30 KLPD molasses based distillery unit
3.	**Location of the project**	At village Rajiv Gandhi nagar, Murum, Tal. Omerga, Dist.-Osmanabad, Maharashtra- 413605
4.	**Working days**	330
5.	**Product**	Rectified Spirit OR ENA OR Ethanol: 30 KLPD; Impure spirit = ~5%
6.	**By-product/s**	Fusel oil: 120 L/day
7.	**Wastewater Treatment System (ZLD scheme)**	For spent wash: Multi-effect evaporation (MEE) followed by incineration. For spent lees, condensate of MEE and other effluent – Condensate polishing unit – treated water will be reused for molasses dilution and/or cooling tower make and remaining for watering greenbelt plants
8.	**Air Pollution Control Systems**	Electrostatic Precipitator
	INFRASTRUCTURE	
9.	**Land**	Total land allocated for distillery, evaporation unit (MEE), storage lagoon: 56200 sq. m including 33% greenbelt No need of acquisition of new land as, it is already under the possession of the project proponent (industrial land use) and open plot near the sugar mill will be developed into distillery
10.	**Main Raw Material**	Molasses:**111 TPD (C type)** OR **100 TPD (B heavy type) OR Sugarcane juice: 455 m3 /day**
11.	**Manufacturing technology**	Continuous /Fed-batch fermentation & Multi-pressure-vacuum distillation for the production of Rectified spirit or Extra Neutral Alcohol and Molecular Sieve De-Hydration (MSDH) plant for Anhydrous/Fuel ethanol
12.	**Steam**	**Total: Maximum 257 TPD** **Source:** Through proposed 12 TPH boiler **Steam utilization:** Distillery, MEE
13.	**Fuel**	Concentrated spentwash 74.4 TPD Indian coal 35.52 TPD
14.	**Boiler**	New boiler of 12 TPH with a pressure of 45 kg/cm^2
15.	**Stack**	Stack of 60 m height with an inner diameter of 3.5 m will be

		used
16.	**Power**	**Requirement:** 0.89 MW **Source:** Captive through proposed 1.0 MW steam turbine generator Alternate source: state electricity board.
17.	**Day-to-day Water Requirement**	260 m^3/day Source: Benitura Reservoir
18.	**Manpower**	117 (90 skilled 27 unskilled)
	FINANCIAL ASPECTS	
19.	**Proposed Project Cost**	Rs. 6457.39 Lakhs (including Rs. 64 lakhs for CER)
20.	**Capital expenses for Environment management**	Rs. 2085.00 Lakhs

TPD = Tons Per Day

2. MATERIAL AND INFRASTRUCTURE

2.1 Molasses

Molasses, a byproduct of the sugar industry, is a raw material in the proposed unit. Estimated C-heavy type molasses production of the sugar unit is about 19,800 tons per annum. However, requirement of molasses is about 33,300 tons per annum. The remaining molasses is about 13,500 MT will be procured from nearby sugar mills/market. However, in case of B-heavy type molasses, the estimated requirement will be 30,000 tons per annum which will be sufficient for the requirement of distillery for 264 days and balance will have to be purchased.

Table 3: Availability of raw materials, finished good product and mode of transport

Particulars	Estimated quantity	Source market	Final product	Estimated quantity	Transport mode
Raw Material					
Molasses	C-heavy: 33300 TPA B-heavy: 30000 TPA	Own mill – up to 26,400 MT molasses and remaining quantity of molasses will be purchased from market/nearby	Rectified spirit + Impure spirit (5%) or ENA +IS (5 %) Or Fuel Alcohol + IS (5%)	30 KLPD	Product transport By Road-through Tanker
Sugarcane Juice	455 m3 /day				

		sugar mills.			
Chemicals					
Nutrients N, P	100 Kg/day	Osmanabad, Solapur or any suitable place	-	-	By Road-Truck
Turkey Red Oil (TRO)	150 Kg/day		-	-	By Road-Truck
Utilities					
Conc. SW Coal	74.4 TPD 35.52 TPD	Own Sugar Mill As per availbility	-	-	By road
Water (daily)	300 m^3/d	Benitura Dam	-	-	By Pipeline
Steam	Maximum 245 TPD	Captive - boiler	-	-	-
Power	0.710 MW	Captive from new 1.0 MW STG set	-	-	-

2.2 Water

Estimated daily requirement of fresh water for the proposed project is 260 m^3 and will be met from the Benitura reservoir. The fresh water requirement is kept as low by considering all options of recycling and reuse of available water. Detailed water budget is given in following table.4

Table 4: Water Balance: Distillery of 30 KLPD

A. WATER INPUT	m^3/day
For molasses dilution	260
For cooling tower makeup	210
Fermenter washing	5
For vacuum pump	10
For air blower	10
For fusel oil decanter & Alcohol scrubber	15
Boiler feed water (@12TPH)	288
DM water for ENA production for dilution of RS	60
Others (Domestic & laboratory)	10
Total Water Input at start-up	**868**
B. WATER OUTPUT	

Spent Lees (PR &Rect)	60
CT Evaporation & Drift Losses	210
Domestic & laboratory Consumption loss	10
Process condensate	192
All pump Sealing / Purge/blower	20
Steam condensate	288
Fermenter washing loss and alcohol scrubber	20
Concentrated spent wash sent to incineration boiler @ 60% solids	20
Over all process loss as DM plant, Air blower and other	48
Total Water Output	**868**
C. Recycle streams after treatment through CPU unit	
Evaporation Process Condensate	192
Spent lees	60
All pump Sealing / Purge/blower	20
DM plant reject and other to CPU	48
Steam condensate water return to boiler	288
Total	**608**
Net fresh water requirement = A – C (868 – 608 = 260)	**260**
Total Daily Water requirement/Input	260
Water requirement per liter of RS	**8.66**

2.3 Fuel

Concentrated spent wash of $>55^0$ brix up to 60^0 brix (Solids) will be incinerated along with coal. Spent wash available for incineration will be 60 m^3/day and its specific gravity usually observed 1.24. Thus, estimated spent wash availability per day will be 74.4 TPD. Alongwith spentwash, coal 35.52 TPD will be used as supplementary fuel for 12 TPH boiler.

2.4 Steam & Power

The steam requirement for the proposed 30 KLPD distillery, multi effect evaporation system, boiler including pipe line losses will be 10.65 TPH at 3.5 Kg/cm2 (g) pressure It is therefore planned to install a new 12 TPH boiler of 45 Kg/cm2 (g) pressure and this new boiler will supply steam to proposed 1 MW turbo-alternator. Therefore, required steam and power will be made available for distillery plant from proposed boiler and T. G. set.

Exhaust steam from the turbo alternator at the pressure of 3.5 kg/cm2(g) will be made available to the distillery unit. Necessary arrangement (as per requirement) for reducing the

pressure & de-superheating of steam will be made in the distillery. The boiler will able to use bagasse as a main fuel and biogas as a supplementary.

The estimated power requirement for proposed 30 KLPD distillery, boiler and ETP will be 0.89 MW/hr. The cost of electricity has been assumed @ Rs. 0.50/unit during working days and the electricity for idle days will be purchased from MSEDCL.

2.5 Boiler

One new fluidized bed boiler of 12 TPH capacity, having 45 kg/cm² (g) pressure& 400±5°C temperature, proposed for the project.

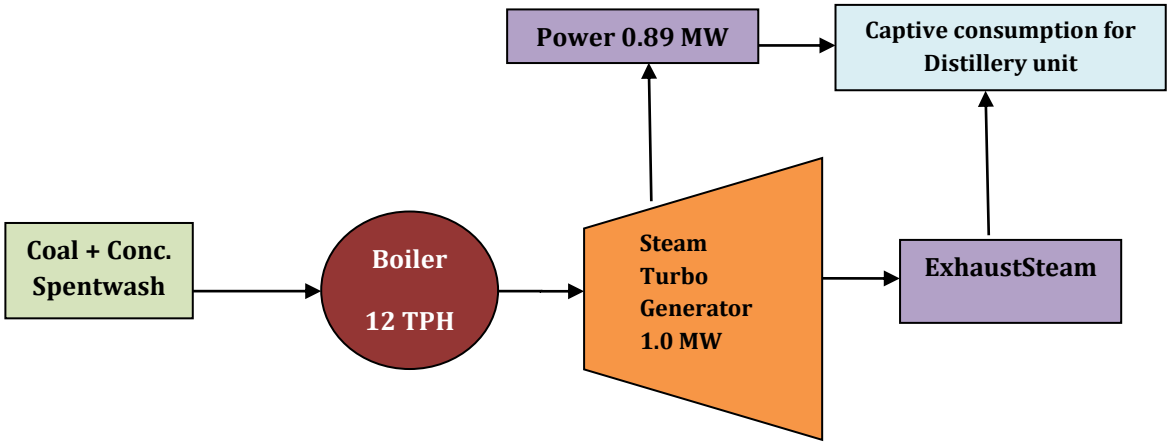

Figure 1: Schematic of steam and power generation

2.6 Fuel Handling System

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.Enclosure will be provided for belt conveyors and transfer points of belt conveyors. The enclosures will be rigid and permanent and fitted with self-closing doors and close fitting entrances and exits, where conveyors pass through the enclosures. Flexible covers will be installed at entry and exit of the conveyor to the enclosures, minimizing the gaps around the conveyors.

2.7 Ash handling

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 area as a measure for promoting ash utilization.

- The fly ash generated will be collected and sent to storage area
- It will be transported in tractor trollies or dumpers (properly covered) from generation point to the final disposal point.

2.8 Land

Total land allocated for distillery, evaporation unit (MEE), storage lagoon is 56,200 sq. m including 33% greenbelt. No need of acquisition of new land as, it is already under the possession of the project proponent (industrial land use) and openplot near the sugar mill will be developed into distillery.

2.9 Manpower

The project will be generating direct employment to 117 persons out of which 90 will be skilled/highly skilled and others will be semi-skilled and unskilled. Apart from this, anticipated indirect employment opportunities will be from transportation, local service providers, shopkeeper and various facility providers such as schools, medical facilities, etc.

3. PROCESS DESCRIPTION

For the proposed project, the Management has planned to adopt the latest technology for process. Overall objective of this is to achieve high efficiency of operations, save energy and water and economically achieve Zero Liquid Discharge (ZLD). The characteristic of manufacturing process is given below and a schematic is shown in **Fig.**

3.1 Manufacturing Process

The production process mainly involves fermentation and distillation process

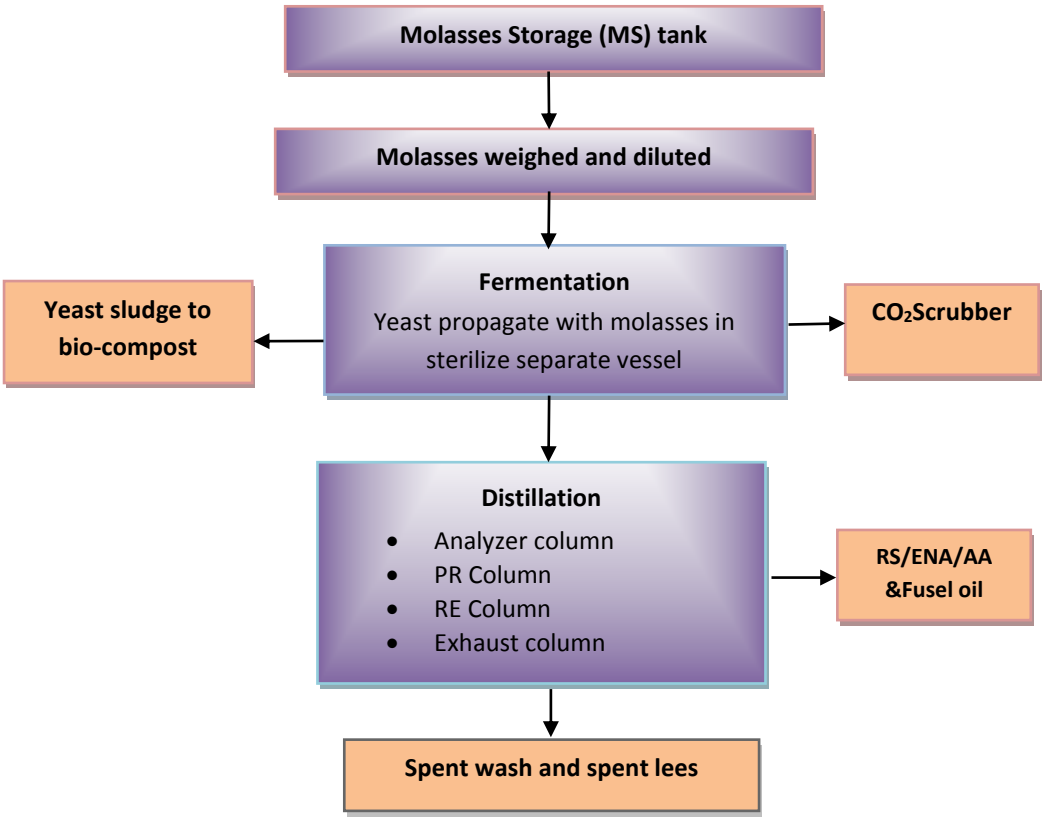

Figure 2: Schematic of Manufacturing Process

3.2 Fermentation

Molasses is the chief raw material used for production of alcohol. Molasses contains around 50% total sugars, of which 30 to 33 % are cane sugar and the rest are reducing sugar. During the fermentation, yeast strains of the species Saccharomyces cerevisiae, a living microorganism belonging to class fungi converts sugars such as sucrose or glucose present in the molasses in to alcohol. The continuous fermentation process involves addition of fresh nutrients medium either continuously or intermittent withdrawal of portion of nutrient for recovery of fermentation products. In the process, Fermenter is in constant usage with little shut down and after initial inoculation of yeast culture, further inoculation is not necessary.

It has many advantages like continuity of operation, higher efficiency and ease of operation. It also results into consistent performance over a long period as compared with batch fermentation. Most of modern ethanol production plants adopt continuous fermentation technology. Hence, the same will be adopted in the proposed project. The yield of alcohol is ~270 litres/ ton using C type molasses whereas using B-heavy type of molasses the yield ranges from 300 to 330 litres per ton.

3.3 Distillation

After fermentation, the next stage in the manufacturing process is to separate alcohol from fermented wash and to concentrate it to 95%. This called Rectified Spirit (RS). For this purpose, method of multi-pressure distillation will be adopted. After separation of alcohol, the remaining part is the effluent of the process i.e. spent wash and spent lees.

3.3.1 Multi-pressure Distillation

Multi-pressure distillation system for production of Rectified spirit consists of distillation columns namely – For –Rectified Spirit mode

1. Degasifying cum analyzer column
2. Rectification column
3. Fusel Oil Concentration column
4. Extractive Distillation columns

For –ENA mode

1. Degasifying cum analyzer column
2. Pre-rectifier column
3. Extractive Distillation column
4. Rectification Column
5. Refining /Simmering column
6. Fusel Oil Concentration column
7. Head Concentration column

Advantages of MPR distillation:

a. Maximum heat integration is possible.
b. Few columns operate under vacuum, few under pressure and few under atmospheric pressure.
c. Low steam consumption with reboiler (2.2 Kg/lit. of Rectified Spirit)
d. Spent wash generation is less compared to atmospheric distillation

3.3.2 Re-Distillation to Manufacture Extra Neutral Alcohol (ENA)

ENA is prepared by re-distillation of the rectified spirit (RS) for the removal of impurities like higher alcohols, aldehydes and methyl alcohol. This is done by, remixing rectified spirit with soft water and distilling it in the ENA column.

3.3.3 Anhydrous Alcohol (AA)

Anhydrous alcohol is an important product required by industry. As per IS specification it is nearly 100% pure or water free alcohol. Alcohol as manufactured by Indian distilleries is rectified spirit, which is 94.68% alcohol. It is not possible to remove remaining water from rectified spirit by straight distillation as ethyl alcohol forms a constant boiling mixture with water at this concentration and is known as azeotrope. Therefore, special process for removal of water is required for manufacture of anhydrous alcohol.

The various processes used for dehydration of alcohol are as follows-

i) Azeotropic Distillation

ii) Molecular Sieves de-hydration (MSDH)

iii) Evaporation / Vapour permeation system

In case of proposed project, MSDH technology will be adopted. The life of molecular sieve may be around five to seven years. However, the operating cost is considerably less than azeotropic distillation. This technology is well established.

Details of molasses and product storage tanks are given in **Table 5**

Table 5: Details of Storage Tanks

Specifications For Receivers & Storage Tanks – Thickness As Per IS-803-1976:			
#	**Particulars**	**Quantity**	**Capacity (in m^3)**
1.	Rectified spirit receivers	03	40
2.	Impure spirit receivers	02	10
3.	* Rectified spirit storage tanks	02	600
4.	* Impure spirit storage tank	01	200
5.	Fusel oil storage tank	01	10
6.	Molasses Storage Tank		
	1. Existing	03	4200 MT
	2. Proposed	01	10000 MT

* These will be provided with flame arrester & cooling vent condenser. The level indicators provided on all tanks. Receivers are also provided with flame arrester (SS-304).

4. ENVIRONMENTAL ASPECTS

Table 6: Overview of Environment management processes

#	Waste product and source	Treatment and disposal
1.	**Effluent/Wastewater**	
	Spent wash	Stand-alone multi effect evaporation followed by incineration
	Spent lees, condensate from MEE and Other effluent (e.g. blow down water)	Treated in CPU; comprised of primary treatment of effluent followed by aeration as secondary treatment and tertiary treatment Hot water recycled after cooling
	Sewage: Domestic wastewater	In STP
2.	**Gaseous and dust emission**	
	Flue gasses from boilers Due to burning of spent wash with coal	Particulate emissions will be controlled by ESP and then vented through a stack of height 60 m Mechanized handling and transportation of coal and ash (through closed conveyors) Greenbelt area proposed is 1.6 ha
	Coal and ash handling	Dust quenching and/or dust suppression system will be provided to control fugitive dust from coal and ash handling
	Diesel generators	It will be operational only when captive power supply failure, hence emissions anticipated to be less frequent and minor
	Fermentation unit: (CO_2)	Fermenters will be covered, CO_2 scrubber
3	**Solid waste**	
	Boiler ash	It will be sold to brick manufacturers
	Fermented sludge: Yeast sludge, CPU sludge	The sludge from fermenter will be degradable, containing organic nutrient and micro elements. It will be mixed with bio-compost

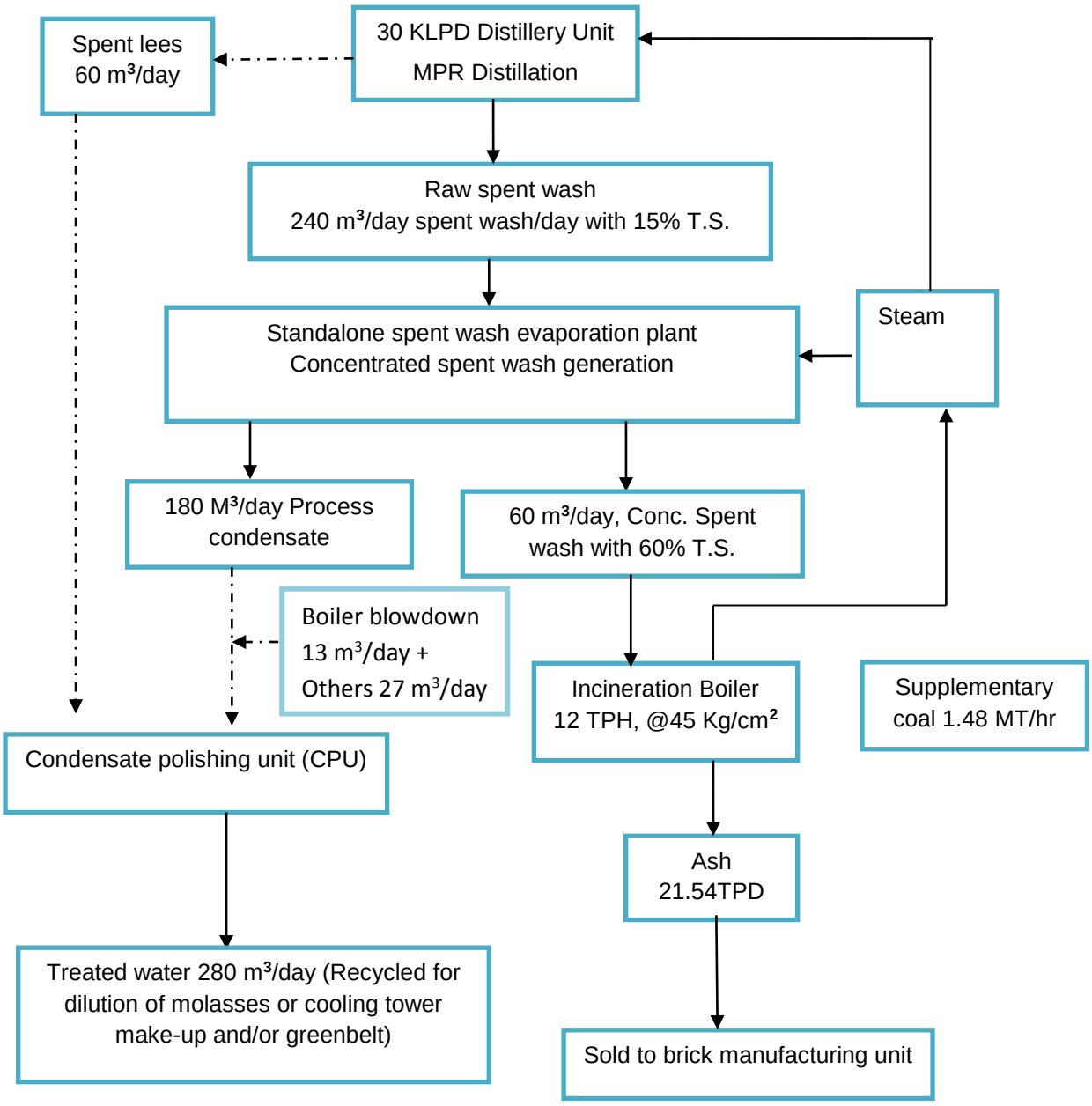

Figure 3: Schematic diagram of Water and Mass Balance with Zero Liquid Discharge of spent wash

5. COST OF THE PROJECT

The proposed activity of distillery unit will require about Rs. 6457.39 lakhs investment including Rs. 64.00 lakhs for CER. Rs. 2085.00 lakhs will be allocated for Environment management. The cost for proposed activity and environment management are mentioned in **Table.7**

Table 7: Project Cost Details

#	Particulars	Amount (Rs. in Lakhs)
1.	Civil work and building	725.70
2.	Plant and machinery including taxes and duties	4944.20
3.	Miscellaneous fixed assets	106.20
4.	Preliminary & Pre-operative and other expenses	366.19
5.	Machinery stores/spares	5.00
6.	Contingencies @ 2%	96.10
7.	Margin Money	25.00
8.	Provision for environmental management, green belt and rainwater harvesting, STP	125.00
Total		**6393.39**
Additional provision towards CSR/CER (1% of capital)		64.00
Total project cost		**6457.39**

6. BASELINE ENVIRONMENT CONDITION

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 October 2019 to Jan 2020. The baseline study begins with site visits and reconnaissance survey in the study area. During these visit the locations were fixed for the monitoring and collection of primary data.

Table 8: Summary of all environmental parameters

#	Facet	In brief
1	General characteristics	Hot and dry

2	Rainfall	An average annual rainfall of 816.6 mm Rains are received mainly during June-September months
3	Temperature	The maximum temperature in summer is around 42.5°C and minimum temperature in winter is around 8.5°C.
4	Humidity	The relative maximum humidity ranges between 58 - 62% and minimum humidity ranges from 43-48%.
5	Wind	Predominantly wind direction East and North East during study period
6	Land use	Crop Land area 99.18%, Settlement 0.37%, Mining/industrial area 0.03%, Water body 0.08%, Scrub land 0.29%, Road 0.05%
7	Air Quality	Complies NAAQ standards of Nov. 2009 at all monitored locations
8	Noise	Complies the standard
9	Ground water	As per Central Ground Water Board report 2012 - Slightly alkaline, good for irrigation purposes throughout the district.
10	Soil	The soils of the district are the weathering products of Basalt and have various shades from gray to black, red color.
11	Nearest sanctuary	Yedshil Ramling Ghat Wildlife Sanctuary at 70 km from the project site

7. IMPACT ASSESMENT

7.1 Air environment

Ambient air quality of the study area is likely to be impacted by vehicular emission due to transportation of raw material, fuel, finished products and process emissions.

Process emissions can further be divided into two categories i) from burning of fuel to generate steam and ii) from fermentation process.

7.1.1 Anticipated impact from transportation

Transportation activities due to transportation of raw material such as molasses, coal, finished products as well as employee's vehicles are anticipated to cause increase in vehicular emissions. Increase in the particulate matter, CO, CO2, NOx and hydro-carbon in ambient air is anticipated due to increase in vehicular emissions. This increase is anticipated mainly at project site and along the transportation route. Since, the transportation will take place in bulk at periodic interval, increase in vehicular emissions will be fluctuating throughout the year.

7.1.1.1 Preventive, control and mitigation measures

- Provision of asphalted or RCC roads inside the premises
- Approach road is already available up to highway
- Provision of separate parking for goods vehicles
- Engaging authorized transport agency for goods transport on the term to use well maintained vehicles for all transportation activities
- Provision of separate entrance and exit lanes/gates for vehicles
- All roads with street light and proper signage at strategic locations
- Main gate/s with 24x7 security arrangements

7.1.2 Manufacturing process- fermentation

The process of fermentation of sugar (present in molasses or juice) to produce alcohol also generates CO_2 which is a major greenhouse gas. CO_2 scrubbers separate the gas from the fermented wash and alcohol. The expected generation of CO_2 from 30 KLPD distillery is 22 TPD. It is considered for greenhouse effect.

7.1.2.1 Mitigation Measures

CO_2 scrubber will be used for removal of the gas from alcohol stream. Separated CO2 will be either bottled or converted into dry ice for further commercial use.This will also help to generate additional revenue for the distillery.

7.1.3 Manufacturing process- emissions due to incineration (from boiler furnace)

There are two major types of air pollution sources i.e.

a) point source including stack gases;

b) non-point and line source such as dust generated from coal handling and storage areas, ash ponds, roads, etc.

Amongst these, the stack gas emissions are very significant because of its overall contribution in increasing concentration pollutants such as PM, SO_2 and NOx, over a large area. Now a day, it is feasible to estimate the concentration of these pollutants, even before actual operation phase by using software based simulation studies. This study gives an incremental ground level concentration for pollution parameter of users interest.

7.1.3.1 Air Dispersion Modeling

Prediction of impacts on air environment has been carried out employing – 'AERMOD' view dispersion model 9.5' software developed by 'Lakes Environment Software', Canada.

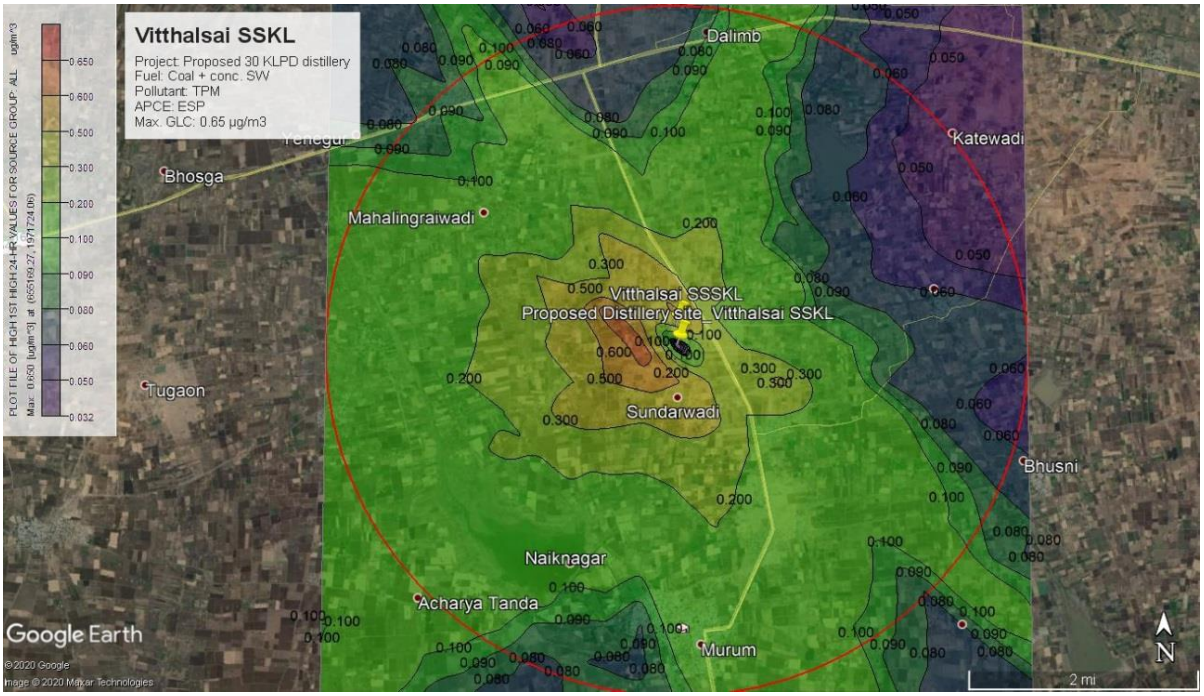

Figure 4: Isopleth showing GLC location and distance for PM (Short term 24 hourly)

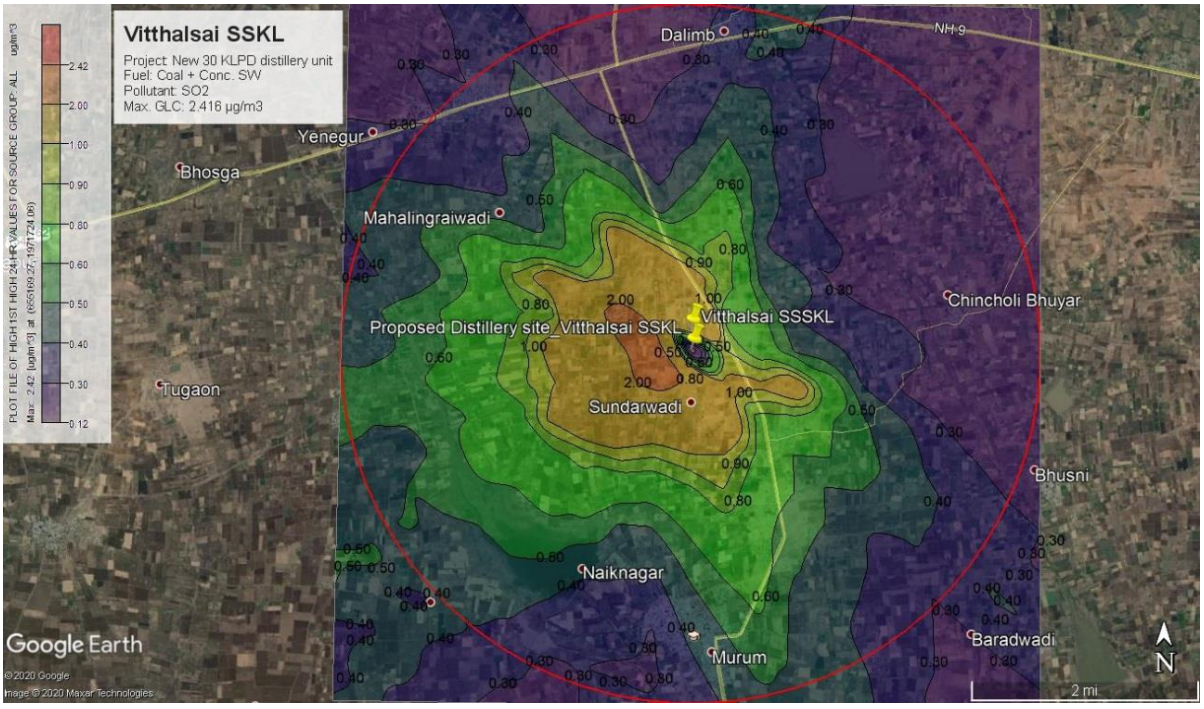

Figure 5: Isopleth showing GLC location and distance for SO_2 (Short term 24 hourly)

Observation:

- There will be an increase in the concentration of PM and SOx mainly towards west
- The maximum incremental load of all these pollutants will be at a distance of 1.1 km towards west where increase of 0.65µg/m³ for PM and 2.42 µg/m³ for SOx could be observed. This area is predominantly occupied by agricultural vegetation

- Nearest residential area towards south is village Sunderwadi which is ~0.72 km
- From the results derived from the mathematical modeling study, it is observed that resultant concentration of these air pollutant in downwind direction will be well within the national ambient air quality standards prescribed by CPCB in Nov. 2009.

Table 9: Summary of Maximum 24-hour GLC due to proposed project

Description	**Concentration µg/m³**	
	PM	**SO_2**
Maximum rise in GLC	0.65	2.42
Direction of Occurrence and distance	W (1.1 km)	W (1.1 km)
Coordinates of maximum GLC	17°49'39.55" N 76°27'51.11" E	17°49'39.55" N 76°27'51.11" E
Baseline Concentration reported nearby maximum incremental GLC	69.48 (Sunderwadi)	20.44 (Sunderwadi)
Maximum rise in GLC at Sunderwadi	0.3	1.0
Total Concentration (Post project scenario at Sunderwadi)	69.51	21.44
NAAQS	**PM_{10} 100**	**80**
***The distance is measured from stack to the receptor of maximum GLC**		

7.2 Water Environment

7.2.1 Anticipated impact

The impact of a distillery project on water environment is crucial from two aspects viz. the consumption of water in process and wastewater handling, storage, treatment and disposal.

7.2.2 Impact assessment

Water availability: Water scarcity or shortage anticipated for other users from the region during a season when rainfall will be less than average. Though, reuse and recycle of water will save significant amount of freshwater intake but in abnormal conditions, there is a possibility of water shortage for other users.

Water/aquatic environment: Considering the option/s planned for ZLD, no negative impact envisaged on water environment as well as aquatic ecosystems of the surrounding area. However, negative impact in the form of change in the qualitative characteristics of receiving waters, envisaged in case of accidental leakages and spillage of spent wash. Spent wash is having strong odour. It is likely to cause irritation in humans. Thus, minor negative impact anticipated due to odour of spent wash.

Soil Environment: Due to impervious tanks for storage of spent wash, probability of soil pollution/contamination due to percolation of spent wash becomes very low. Hence, no change in the qualitative characteristics of soil (from the project area and surrounding) anticipated and thereby no negative impact.

Ecology and biodiversity: In normal operational conditions, no change in the aquatic or terrestrial flora/fauna anticipated due to the wastewater from the proposed project. Hence, no negative impact anticipated on ecology and biodiversity of the surrounding area.

7.2.3 Environment Management Plan: Spentwash of 240 m3 /day will be sent to multi effect evaporation unit to reduce its volume from 240 m3 to 60 m3 and incinerate in boiler with coal. Condensate from MEE and other wastewater will be treated in CPU and reused; thus achieving 'zero liquid discharge'. Spentwash storage lagoons will be constructed as per CREP guidelines.

7.3 Soil Environment

Impact causing factors: discharge of effluent, solid and hazardous waste generated due to production activity.

7.3.1 Impact assessment

Soil Environment: Sludge generated from the project will be rich in organic matter. Thus, it will enhance the organic content of the soil where it will be applied. Hence, positive impact envisaged on soil due to sludge. Ash from the project will be utilized for brick manufacturing.

Ecology and Biodiversity: Ash from the pit and during transportation likely to get air borne and settle on leaves of surrounding plants. In case of fauna, negative impact envisaged from the activity presumed low. Enhancement in soil micro-flora due to sludge application is anticipated as positive impact.

Water environment: Considering the measures proposed for handling, transport and disposal of solid waste observed adequate. Thus, no negative impact on water environment anticipated due to solid waste of the project.

7.3.2 Environmental management plan

Table 10: Solid Waste and Management

Waste Material	Quantity	Disposal
Ash (from spent wash + Coal/bagasse)	8521 TPA max	Sold to brick manufacturers
Yeast Sludge Sludge from CPU	50 TPA 70 TPA	It will be sent to sludge drying bed. Dried sludge will be used as soil conditioner

Hazardous Waste: The only hazardous waste likely from the project is the scrap oil mainly from DG set and machines. However, the DG set will be used only in case of total power failure i.e. captive as well as failure of power supply from electricity board. Thus, the quantity of used or scrap oil is assumed very minor. This waste oil can be disposed-off safely by giving it to authorized hazardous waste oil dealer. Alternatively, it can be burnt in boiler along with fuel at periodical interval.

- fly ash generated will be collected in tractor trollies or dumpers (properly covered) from generation point to the final disposal point
- Provision of asphalted or RCC roads inside the premises
- Spentwash storage lagoons will be constructed as per CREP guidelines

7.4 Noise

7.4.1 Anticipated Impacts

The noise levels in the industry and vicinity are expected to increase due to the industrial sources mentioned above and also due to increase in traffic due to transportation of raw material and finished product. Increase in noise levels impacts people working in the industry as well as those staying in the surrounding areas.

7.4.2 Environment management plan

- The rotating equipment to be maintained by periodical oiling and/or greasing
- Installing machines and equipment of standard make as well as using spare parts of standard make (complying with IS or other international standard)
- Providing noise proof cabins to operators where remote control for operating noise generating equipment is feasible.
- Providing personal protective equipment such as ear plugs or ear muffs for persons with high exposure to noise
- Developing greenbelt or barriers to reduce noise levels

7.5 Ecology and Biodiversity

7.5.1 Impact causing factors: change in land use, Grass cover removal, odour, transportation, and ash storage disposal, effluent discharge etc.

7.5.2 Impact assessment: Due to construction on the present open areas, land- foraging ground may get lost permanently for some of the birds, insects and reptiles; also probably cause negative impact on soil micro-fauna.

- The effluent/wastewater generated will be treated and recycled/reused for process/greenbelt, which is anticipated as positive impact for the conservation of

resource as well as efficient utilization of it. Solid waste generated in the project will be sold to brick manufacturing unit.

- Greenbelt development will help in enhancing the biodiversity of the area. It will also help in improving the aesthetics. This is another positive impact anticipated due to the project.

7.5.3 Environmental management plan: Greenbelt development - for mitigation of air and noise pollution. Tree plantation along the internal roads as well as in the nearby areas to enhancing the biodiversity of the area, rain water harvesting to save fresh water.

7.6 Impact on Socio-Economic Environment

The project is agro-based, that utilizes molasses which is a by-product of sugar mill. Therefore, positive impact of the project anticipated w.r.t following

- Local sugar cane cultivators (Estimated around 7,000 to 7,500), labour (estimated around 1500 to 1700), harvesters and transporters (800 to 1,000) of approx. 9,300 to 10,200 expected to get directly benefitted from to the project.
- The project involves transportation of coal, molasses as well as finished products. Thus, will generate indirect employment for drivers and transportation related service providers
- The project will provide permanent employment to approx 117 persons and in addition approx 25-30 seasonal employment anticipated
- The proposed project will employ local labour for various works during construction as well as operational phase. It is expected that about 30-35 labour will be get employment during construction phase
- The proposed project is estimated to improve livelihood of approx 9,500 to 10,500 families
- The products of distillery i.e. RS, ENA and ethanol are having good market demand. Therefore, by installing proposed unit, the sugar mill would able to generate additional income by using its land and molasses (resource use optimization)
- Existing available infrastructure such as road, water, health care centre, etc will be used and no pressure anticipated due to the proposed project on the same
- There are no rehabilitation or restoration issues involved. Thus, negative impact on local socio-economy is not anticipated.

Overall, long-term beneficial impact envisaged on local socio-economy.

Measures

- Prefer local candidates for employment as well as contractual work
- Skill development for local youths to be undertaken based on the requirement and situation

- Implementation of CER plan based on the needs and requirements of locals

7.7 Physiography, Geology and Hydro-Geology (Drainage)

The project doesn't involve any blasting or deep excavation work or mining of any minerals. Therefore, it is envisaged to have practically no negative impact on geological structure of the region. Change in physiography of the site considered as an irreversible, negative impact.

7.8 Other Impact: Traffic

During operation phase, the transportation activity will get increased marginally. Road network availability in the region assumed adequate considering proposed activity. Developing road infrastructure by implementing following –

- Internal roads asphalted and leveled
- Separate lane for entry/exit at main gate, road width minimum 12 m at main gate
- All other internal roads minimum 6 m wide with turning radius of 9 m
- Easy access – all around the unit and each unit is approachable
- Provision of street light and safety sign boards
- provision of adequate parking in the project premises
- Parking will be separate for goods and other vehicles

Probability of traffic congestion envisaged very low due to proposed measures.

7.9 FIRE AND SAFETY

Fire protection system will be provided in accordance to PESO, OISD-117 and LPA regulations. The firefighting 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. Non-flame proof and flameproof area will be separated by minimum distance of 15 meters. Portable fire extinguishers will also be provided in strategic locations viz., power house, control rooms, switch yard.

7.9.1 Safety Aspects through Design and Engineering

- All design will be as per ISI standard specification and drawings will get approved by concerned authorities such as factory /electrical inspectorate /safety inspectorate, weights & measurement inspectorate etc.
- The plinth level of distillery building will be at min 0.75 m height from developed ground level and it will built by brick masonry. For ground floor flooring of M10

grade (CC1:3:6) as a base concrete is to be made and its IPS shall be 50 mm of M15 grade (CC1:2:4). Plinth foundation should carry the load of 4 m height wall safely.

- Staircase – M.S. (Chequered plate with supports/grating of 5 mm thick) staircase of 1m wide, 150 mm risers and 300 mm treads with a landing at every 3 m maximum and rails provided on both sides, thus two staircases are provided up to top floor of distillery building (fermentation and distillation section). The staircases have to be inside the building.
- All floors (except ground) of the distillation building should be with MS grating of 5 mm thickness and each floor height should be minimum 4 m & Chequered plate at a condenser floor of 6 mm thickness.
- 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 galvanic loom sheet i.e. PPGL sheets) of 0.5 mm thickness.
- For anhydrous ethanol receivers & storage tanks PESO (Petroleum and Explosive Safety Organizations) guidelines
- Distance between flameproof and non-flame proof area min. 15m
- The layout will take into account the working space & safety requirement of Factory Inspectorate, Govt. of Maharashtra State.

7.10 Plant Lighting

The normal process area lighting will generally compromise of Fluorescent fittings & Mercury vapor fittings. Flameproof light fittings conforming to IS 2148 shall be provided for hazardous areas, particularly in distillation & storage section, while non-flame proof fittings in other areas. Plant building lighting will be as per norms & as per Electrical inspectorate / factory inspectorate norms.

7.11 Energy and Water Saving Measures

- High alcohol percentage in fermented wash can result in substantial reduction in steam consumption.
- It is possible to recycle of low strength waste generated i.e. process condensate, spent lees and other streams in distillery after treating through condensate polishing unit. It will help to reduce the consumption of fresh water for process and non-process applications.

8.0 ENVIRONMENT MANAGEMENT PLAN

Table 11: Summary of Environment Management Plan

Environmental Aspect	Impact causing factor	Control/Mitigation Measures
Air Environment	Generation of Particulate Matter (PM), SO_2, NO_x during incineration Generation of Carbon dioxide from fermentation, Odour from spent wash storage Handling of coal and ash	• ESP to control ash emission through stack with height 60 m • CO2 scrubber followed by bottling/conversion to dry ice • Mechanized system for coal and ash handling • Fugitive dust control/suppression for coal yard will be done properly • Wind breaks for ash storage area • Development of greenbelt
Water Environment	Effluent generation from processes, cleaning, blow down water & condensate. Storage of spentwash, its treatment and disposal	'Zero liquid discharge' will be achieved by implementing - • Integrated and stand-alone evaporation (using MEE) as a primary treatment to reduce the spentwash volume • 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. • All the effluent will be properly treated/ utilized/disposed within the premises • Separate tanks for storage of raw and concentrated spentwash. • Spent wash storage tanks will be made impervious as per CREP guidelines • Fresh water requirement will be reduced by recycling of water (treated water), using rain water during startup period

Environmental Aspect	Impact causing factor	Control/Mitigation Measures
		• Piezometric well, in downstream area of spentwash storage to monitor ground water quality
Soil Environment	Boiler Ash	• Sold to nearby brick manufacturing unit
	Sludge from Fermentation unit and CPU	• Sludge is degradable, organic in nature hence, used for soil application
	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.	• Regular maintenance of machines and factory vehicles • provisions of separate parking for goods and other vehicles • Internal roads will be either asphalted or RCC, leveled, illuminated and will be maintained • Safety sign boards will be placed at strategic locations within premises • Provision of adequate personal protective equipments 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

Environmental Aspect	Impact causing factor	Control/Mitigation Measures
Ecology and Biodiversity	Air, water, soil and noise pollution Tree cutting failing, disturbance to wildlife due to project	• Adequate preventive, control and mitigation measures for air, water and soil pollutants • No tree cutting/ felling involved since project is on barren land • Development of greenbelt will help to enhance the biodiversity and will provide habitat to many species • Nigh time light arrangements in the unit, to be made non-intense, non-glary; it should not disturb the wild animals • Provision of fresh water through artificial ponds/structures to domestic and wild animals during summer
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 • Regular health check-up
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

Environmental Aspect	Impact causing factor	Control/Mitigation Measures
		coal • Ethanol storage as per PESO guidelines • Firefighting system as per OISD and local authority guidelines • Earthquake resistant construction

8.1 SAFETY, OCCUPATIONAL HEALTH MANAGEMENT

In case of proposed distillery project, aspects of Safety and Occupational Health are given with due consideration, over and above applicable legislations such as Factories Act, 1948. Extra attention is paid to provide measures for ensuring safety and health of workers as well as integrity of the unit.

Following applicable national or international standards shall be followed

- Use of flameproof and standard electrics
- Standard operating procedures (SOP) will be developed as per the manual of respective equipment and machines. These SOP will be strictly implemented to ensure safety, health and environment throughout the premises
- Provision of safety gears such as safety shoes, gloves, goggles, helmets, masks, ear plugs, etc. is made for workers
- Noise proof cabins will be provided to controlling operators
- Workers working in high noise/ high risk areas will be rotated to other areas
- Smoking and other igniting activities shall be strictly prohibited in the distillery/ parking areas
- The plant and buildings will be designed to meet the corresponding provisions of statutes regarding inter-distances, exits, ventilation, illumination, etc.
- Firefighting arrangements shall be provided as per the required statutes as well as corresponding standards
- Proper earthling arrangements will be made
- Work entry permit system will be implemented
- Necessary data and transport emergency (TREM) card must be available with the all vehicles used for transportation of finished products as well as raw material.
- Only well-maintained vehicles to be used for raw material and finished product transport

Facilities provided and proposed by the Management

- Separate parking facility for private vehicles (non-goods), fuel station i.e. petrol pumps

- Drinking water facility
- Canteen
- Toilet and bathrooms
- First aid facility
- Safety gears

The above mentioned facilities will be made available to construction workers, harvesting labours as well as to the visitors and transporters. This will insure healthy and hygienic working conditions in the factory premises.

Plan of evaluation of health of workers

- SVSSKL will monitor the health of its workers before placement and periodically examine during employment
- Proper schedule is in place which will be modified suitably if required and followed with help of occupational health experts and doctor
- Health effects of various activities and health hazard, if any observed will be recorded and discussed with the health experts for corrective and preventive actions need to be taken by the industry

8.2 MANAGEMENT PLAN FOR SOCIAL ENVIRONMENT/ ENVIRONMENT RESPONSIBILITY OF THE INDUSTRY

The management will undertake activities to maintain as well as improve socio-economic conditions of the region.

Table 12: Financial provision for CER activities planned for next five years

CER activity head	**Year**					**TOTAL**
	1st	**2nd**	**3rd**	**4th**	**5th**	
	Budgetary provision (Rs. in lakhs)					
Improvement in social infrastructure:						
Provision of rooftop solar panels to local schools	8	8	8	8	8	**40**
Provision of sanitary fixture and drinking water supply to local schools	4	4	4	4	4	**24**
Total Budgetary Allocation for Next Five Years (1% of the capital budget = Rs. 64 lakhs)						**64**

8.3 CAPITAL & RECURRING EXPENSES FOR ENVIRONMENTAL MANAGEMENT PROGRAM

The estimated capital cost on EMP is Rs. 2085.00 lakhs and recurring expenses per annum is around Rs. 570.24 lakhs. The details of EMP cost are given in table 10.13.

Table 13: Estimated Capital & Recurring Expenses for Environment Management

#	Particulars	Amount (Rs. in Lakhs)
	Capital Expenses	
1.	MEE	445.00
2.	Incineration boiler with electrostatic precipitator and dump condenser	1820.00
3.	Fuel handling system	160.00
4.	Ash handling system	80.00
5.	Stack	100.00
6.	Spentwash storage lagoon	10.00
7.	Condensate polishing unit	150.00
8.	Environmental monitoring and management	80.00
9.	Greenbelt development	50.00
10.	Rainwater harvesting	20.00
	TOTAL	2085
	Additional provision towards CSR/CER (1% of capital cost)	**64.00**
	Recurring Expenses/Annum	
1.	Salaries and wages	25.00
2.	Maintenance (@ 5% on capital investment of Rs. 2085 lakhs) of pollution control devices e.g. ESP, etc.	104.00
3.	Fuel (incineration activity)	426.24
4.	Miscellaneous	15.00
	TOTAL	**570.24**

9. Conclusion

Shri Vitthalsai SSK Ltd. (SVSSKL) located at Murum in Omerga taluka of Osmanabad district in Maharashtra has proposed a new molasses based distillery unit of 30 KLPD. Baseline environmental quality data was collected for post monsoon season during October 2018 to January 2019. Identification and prediction of significant environmental impacts due to proposed activity has been given in detail in Chapter 4 of EIA report.

This project will help in increasing rural economy of this region, ultimately this will improve the social and economic conditions of this region. 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 project is going to use captive power and dependence on external power is only incidental. The project is going to install a 12 TPH incineration boiler to produce required steam for process as well as allied activities. This incineration boiler will use spentwash and coal as a fuel. ESP will be installed to control particulate matter from flue gasses. Appropriate systems will be developed to arrest fugitive dust from handling and transportation of coal and ash. In case of wastewater, the project will provide impervious lagoons for storage of spentwash will be used as fuel for incineration boiler after treatment in MEE (Multi-effect evaporator). Low strength effluent will be treated in CPU, it will be reused and treated water will be reused. In short, proposed distillery will follow all norms and guidelines for prevention and control of pollution (air, water, land and noise). As a result, it will be able to maintain environmental conditions. Greenbelt development will help in maintaining the biodiversity. 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 SVSSKL for EMP and CSR activities (i.e. for upliftment of the local people). The proposed project will contribute to economic growth and help in generating Government revenue.