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EXECUTIVE SUMMARY
of
Environmental Impact Assessment Report
New 60 KLPD Molasses Based Distillery

M/s. SOPANRAO BALKRISHNA DHASAL AGRO PRODUCTS LIMITED

Village Malkup, Tal. : Parner, Dist. : Ahmednagar,
Maharashtra - 414 103

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EXECUTIVE SUMMARY

1.0 INTRODUCTION

M/s. Sopanrao Balkrishna Dhasal Agroproducts Ltd., (SBDAPL), At. Post. Malkup, Tal. Parner Dist. Ahmednagar-414103 (Maharashtra) is incorporated under the Companies Act 1956 (No.1 of 1956) as Limited Company vide registration number is 142602, dated 16th March 2012. The proposed plant will be based on advanced technology of cascade continuous fermentation. For distillation, multi-pressure technology will be adopted and Molecular Dehydration (MSDH) for the production of ethanol from rectified spirit. Multi-effect evaporation (MEE) followed by incineration boiler will be used for spent wash and condensate polishing unit (CPU) for spent lees and condensate as a primary effluent treatment system.

The purpose of this environmental impact assessment (EIA) study is to obtain Environmental Clearance for proposed 60 KLPD molasses-based distillery unit M/s. Sopanrao Balkrishna Dhasal Agroproducts Ltd. The notification no. S.O. 1533 promulgated on September 14, 2006 has covered distillery industry under activity 5(g). This report presents the executive summary of environmental impact analysis of the proposed distillery project. The adverse impacts can be minimized by using appropriate control or mitigation measures.

Because of new ethanol related policies of Government of India, the management of the factory has planned extensive cane development activities in its command area (i.e. area of operations). Hence, sugarcane area is anticipated to increase over a period of time. Considering the increased availability of sugarcane, the production of byproduct like molasses is also increase, so the management of SBDAPL has decided to establish a new 60 KLPD molasses based distillery unit to improve its financial viability.

1.1 Selection of Site:

The present site fulfills the industrial site selection criteria of MoEFCC. Molasses will be available from own sugar mill and supplementary from nearby sugar mills. Also, water, electricity, good infrastructure, support facilities and labour etc. is also available in the area.

Table 1: Highlights of the project

1.	Name of the Industry	M/s. Sopanrao Balkrishna Dhasal Agroproducts Ltd., (SBDAPL)
2.	Project	New 60 KLPD molasses based distillery
3.	Location of the project	Adjacent to the new sugar factory on Gat No. 214/3, 222, 223, and 224, village Malkup in Parner taluka of Ahmednagar district, Maharashtra

4.	**Working days**	Year around	
5.	**Product**	Rectified Spirit OR ENA OR Ethanol: 60 KLPD	
6.	**Effluent Treatment System**	Multi-effect evaporation (MEE) followed by incineration for spent wash and Condensate polishing unit (CPU) for the treatment of spent lees and process condensate	
7.	**Air Pollution Control Systems**	Electrostatic precipitator	
	INFRASTRUCTURE		
8.	**Land**	Distillery unit=28328 sq.m Total area including sugar mill= 96200 sq m Green belt (33% of total plot) = 32014 sq.m	
9.	**Main Raw Material**	B- Heavy Molasses OR C- Molasses OR Cane Juice OR Sugar syrup/sugar	206 TPD 222 TPD 910 TPD 910 TPD
		Nutrient (N,P)	200 kg/d
		Turkey Red Oil (TRO)	3000 kg/d
10.	**Technology for Product Manufacturing**	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	
11.	**Steam**	**Maximum 15.5 TPH = 372 TPD** **Source:** Proposed incineration boiler**: 21 TPH** **Steam utilization:** Distillery unit + MEE + Boiler- de-aerator & SCAPH + losses	
12.	**Fuel**	Concentrated spentwash-148.8 TPD Indian coal- 54.48 TPD or Bagasse- 98 TPD	
13.	**Boiler**	New incineration boiler of 21 TPH with pressure of 45 kg/cm^2	
14.	**Stack height and Inner diameter**	Stack of 70 m with inner diameter of 3.5 m	
15.	**Power**	1.57 MW (Maximum); Source: Captive	

16.	**Total Water Requirement**	564 m^3/day (after considering recycling)
17.	**Water Source**	Mula dam
18.	**Manpower**	40 (permanent) + 37 (seasonal) = 77
19.	**Green belt**	**Proposed 3.2 Ha**
	FINANCIAL ASPECTS	
20.	**Total Project Cost**	Rs. 10168.14 Lakhs
21.	**Capital expenses for EMP**	Rs. 2915.00 Lakhs

TPD = Tons Per Day

2.0 MATERIAL AND INFRASTRUCTURE

2.1 Molasses/Sugarcane syrup

The estimated molasses requirement for 60 KLPD production capacity for year-round of operation (330 days per annum) will be 73,260 TPA (C heavy) and 67,980 TPA (B heavy). The sugar mill expected to be operated at an average crushing rate of 2,400 TCD and average crushing of 4.00 lakhs ton per season for initial 2-3 years (seasons).

During cane crushing season, SBDAPL has planned to initiate and run distillery using cane juice i.e. juice to ethanol route. Therefore, it will use ~860 tons of cane (per day) for distillery purpose and divert the extracted juice to distillery unit for fermentation. Remaining 1,540 tons of cane will be processed further for manufacturing of sugar. Juice/syrup to ethanol production is considered @ 70 L of ethanol per ton of cane crushed. The molasses generation during season will be

B- heavy @ 6% on cane = 92.4 TPD x 167 days = 15,430 TPA OR

C- type @ 4% on cane = 61.6 TPD x 167 days = 10,287 TPA

During off-season of sugar mill, the distillery will start using B-heavy or C-type molasses stored during season. Thus, using combined route of juice to ethanol during cane crushing season and use of B-heavy molasses during off-season, the proposed distillery can be operated for 167 + 77 = 244, days during initial years. Thus, distillery operations at 75% efficiency is feasible using own raw material. However, In order to operate the unit year around (considered 330 days of actual production), it will require B heavy molasses for 86 days = 200 TPD x 86 days = 17,200 tons. It will be procured from market.

In due course i.e. around 3-4 years, the mill is expected to achieve crushing of about 6,00,000 tons in 160 days crushing season (i.e. = 3,750 TPD). At that rate, using the abovementioned combined route the distillery will achieve operation of 304 days using its own raw material.

Molasses or sugarcane syrup will be available from own proposed sugar factory. The availability of the sugarcane for the mill is discussed above. Molasses will be cooled before being stored in molasses storage tank. The storage tank will have suitable pumps for recirculation of molasses. Two months stored molasses is ideal for fermentation. The molasses will be pumped through pipeline, from storage tanks to the distillery day molasses tank. Raw material and chemical requirements given in the following table.

Table 2: 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-Type)	222 TPD	Own sugar mill &nearby sugar mill	Rectified spirit + Impure spirit (5%) or ENA + IS or Fuel Alcohol + IS	60 KLPD	By Road-through Tanker
Molasses (B-Type)	206 TPD				
Sugarcane juice	910 m^3/day				
Chemicals					
Nutrients N, P	125-150 kg/d	Parner, Ahmednagar etc.	-	-	By Road-Truck
Turkey Red Oil	225 Kg/d				
Utilities					
Fuel					
Spentwash + Coal/ Bagasse	148.8 TPD + 54.48 TPD/ 98 TPD	Distillery, market, Sugar mill	-	-	By Road/ rail
Water (daily)	564 m^3/d	Mula dam	-	-	Closed pipeline
Steam	372 TPD	Captive incineration boiler	-	-	-
Power	1.6 MW		-	-	-

2.2 Water

Estimated water requirement is given in table 2.5. According to which water requirement for the proposed project will be 564 m^3/day (after recycling). It will be lifted from canal (or as per permission) and stored in ground reservoir of 6000 m^3. The project proponent has applied for

permission from irrigation department to lift water from Mula dam. Water will be required for domestic, process and utility purpose. Detailed water budget is as follows.

Table 3: Water Balance: Distillery of 60 KLPD (Quantities in m³/ day)

WATER INPUT	m³/ day
Process Water for Fermentation section and CO_2 scrubber	530
Boiler feed water capacity 21 TPH steam	392
DM Water For RS Dilution	240
Soft Water For Vacuum Pump & Others	100
Soft Water Makeup For Cooling Towers	326
Other Domestic Usage	20
Total Water Input at start-up	1608
WATER OUTPUT	
Spent Lees (PR & Rect.)	170
CT Evaporation & Drift Losses	326
Domestic Consumption loss	20
Process condensate	360
Soft Water For Vacuum Pump & Others	100
Boiler blow down	20
Steam condensate	372
Over all process loss	100
Concentrated spent wash @60% solids	120
Total Water Output	1608
RECYCLE STREAMS	
Lees Recycle For RS Dilution (after CPU)	170
Process Condensate (after CPU)	380
Steam condensate recycled to boiler	372
Soft Water For Vacuum Pump & Others cooling water	100
Other minor polluted waste water treat in CPU and recycle back	20
Total Recycling /Re-utilization of water per day	1044
Total Daily Water requirement/Input = (1608 - 1044 = 564)	564
The fresh water requirement per lit of Alcohol including domestic water	9.4 lit/lit of RS

Fresh water requirement for the proposed distillery unit will be of 564 m³ per day.

2.3 Fuel

Concentrated spent wash of >55^{0} brix up to 60^{0} brix (Solids) will be incinerated along with coal or bagasse. Spent wash available for incineration will be 120 m^3/day and its specific gravity usually observed 1.24. Thus, estimated spent wash availability per day will be 148.8 TPD. This quantity of spent wash will produce 16.26 TPH steam (GCV 1750K.cal). Along with spentwash, coal or bagasse will be used as supplementary fuel in 70:30 ratio.

2.4 Steam

Maximum steam requirement to produce R.S. or ENA or anhydrous alcohol will be 7-7.5 TPH. In addition, steam will also be required for standalone spent wash multi-effect evaporation plant which will be about 4.5 TPH and about 3-4 TPH will be required for de-aerator and steam coil air pre-heater (SCAPH) of incineration boiler. Thus, the distillery will require maximum 15.5 TPH steam. The breakup of steam consumption is as follows

a. Fermented Wash to Rectified spirit: 2.2 Kg /litre
b. Fermented Wash to ENA: 3.2 Kg /litre
c. for Anhydrous ethanol: 2.8 Kg /litre
d. Standalone evaporation: 0.3 Kg /litre

However, this steam requirement is tentative and may change depending on technology selected for evaporation as well as on the selection of incineration boiler. The steam requirement will be fulfilled by an independent incineration boiler of 21 TPH along with MW steam turbine generator (STG) set is proposed for the project. Exhaust steam from STG will be used for distillery.

2.5 Power

The mill has decided to install a separate 2 MW capacity steam turbine generator. It will fulfill an estimated power requirement of 1.6 MW of distillery including MEE, CPU and auxiliary units. In case of shut down, power will be purchased from state electricity grid.

2.6 Boiler

One incineration boiler of 21 TPH capacity, having 45 kg/cm² (g) pressure & 400 ± 5^{0}C temperature, proposed for the project. It will comply IBR specifications. The scheme for the incineration boiler and power generation are as per figure 1.

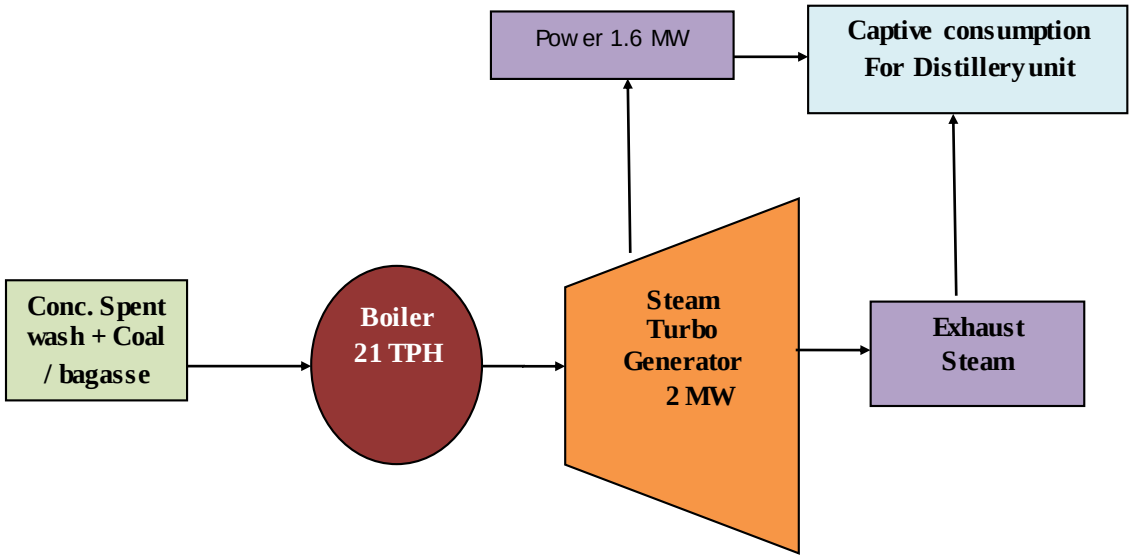

Figure 1: Schematic of steam and power generation

2.7 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. 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.

2.8 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.

2.9 Land

The project requires around 2.83 ha of land. The detailed break-up of land for different units of the distillery are already given in table 1.

2.10 Manpower

The project will be generating direct employment for 77 persons out of which 40 will be permanent

and 37 will be seasonal. 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.

3.0 PROCESS DESCRIPTION

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). The characteristic of manufacturing process is given below and a schematic is shown in Fig. 2.

3.1 Manufacturing Process

The production process mainly involves fermentation and distillation process.

3.1.1 Fermentation

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 continuous 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. Continuous fermentation also results into consistent performance over a long period as compared with batch Fermentation. Most modern ethanol production plants adopt this continuous fermentation technology. Hence, continuous fermentation process will be adopted in the proposed unit. The yield of alcohol is ~270 litres/ ton of C type molasses and 300 to 330 litres for B-heavy type.

3.1.2 Distillation

After fermentation, the next stage in the manufacturing process is to separate alcohol from fermented wash and to concentrate it to 95%. This is 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.

3.1.2.1 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, few under atmospheric pressure.
c. Low steam consumption with reboiler (2.2 Kg/lit. of Rectified Spirit)
   Spent wash generation is less.

3.1.2.2 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.

3.1.2.3 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
iii. Evaporation / Vapour permeation system

Details of molasses and product storage tanks are given in Table 3.

Table 4: Details of Storage Tanks

SPECIFICATIONS FOR RECEIVERS & STORAGE TANKS – THICKNESS AS PER IS-803-1976:			
#	Particulars	Quantity	Capacity (in m³)
1.	Rectified spirit (Product)	02	800
2.	Fuel Alcohol (Product)	02	800
3.	Impure Spirit/Technical Alcohol storage tank	01	200
4.	Impure Spirit/Technical Alcohol Receivers	02	10
5.	Rectified Spirit day storage tanks	03	70
6.	Fuel Alcohol Receiver	03	70
7.	Molasses Storage at distillery (Tons)	02	10000

* 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).

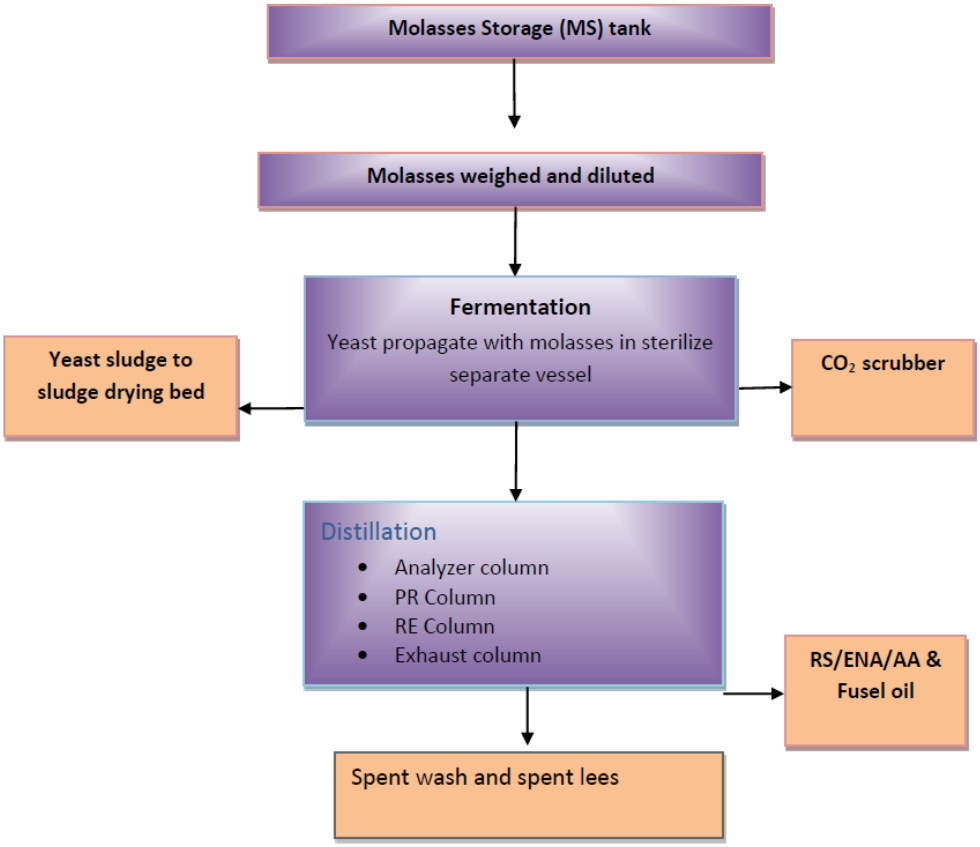

Figure 2: Schematic of RS/ENA/AA manufacturing process

4 .0 BASELINE ENVIRONMENTALCONDITIONS

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 January 2020 to March 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 5: Summary of Environmental features of study area

#	Facet	In brief
1	General characteristics	Hot and dry
2	Rainfall	The normal rainfall over the district varies from 484 mm to about 879 mm. Rains are received mainly during June-September months
3	Temperature	The maximum temperature in summer is around 39°C and minimum temperature in winter is around 12°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 South West followed by North and the average wind speed was 1.74 m/s during the study period
6	Land use	Crop land area 45.81.7%, scrub land 49.64%, forest 3.35%, settlement area 0.34%, river/water bodies 0.85%
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	Medium and deep black
11	Nearest sanctuary	Rehkuri Wildlife Sanctuary at 74 km from the site

4.1 Land use

Satellite remote sensing, in conjunction with geographic information systems, has been widely applied and recognized as an effective tool in analyzing land cover/use categories. This study evaluates qualitative and quantitative outcome of land cover/use distribution using remote sensing data and GIS technologies.

The existing site is located at village Malkup, Tal-Parner, Dist. Ahmednagar is covered in survey of India Toposheet no. E43C8 and E43C12, and latitudes and longitudes of corners of the site are as follows:

1. 19°08'21.29"N & 74°31'15.28"E; 2. 19°08'18.59"N & 74°31'28.94"E;
3. 19°08'07.46"N & 74°31'23.29"E; 4. 19°08'08.61"N & 74°31'16.68"E

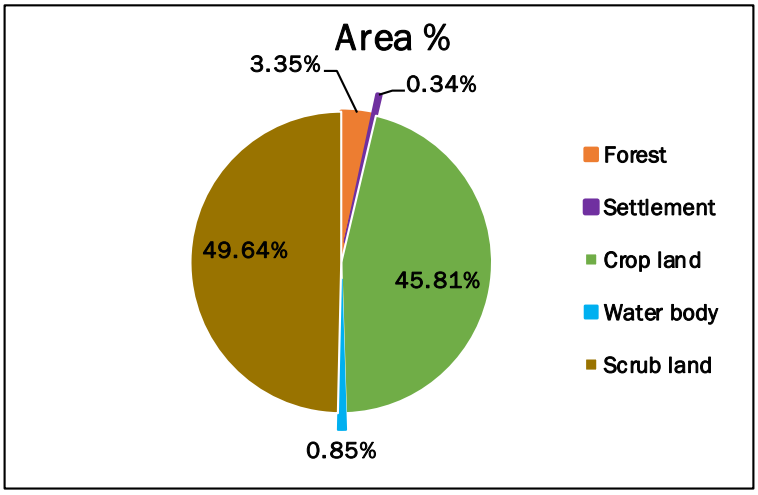

Figure 3: Landuse/ Landcover statistics for the 10 square km area

5.0 IMPACT ASSESSMENT

5.1 Air Environment

Ambient air quality of the study area was assessed through a network of 8 air monitoring stations, considering the wind pattern for the study area. The observed 24-hour. Methods used for AAQ analysis:$PM_{2.5}$ & PM_{10}: USEPA, NOx: IS- 5182 (Part vi) 2006, SO_2: IS- 5182 (Part ii) 2001.

The values for PM10, PM2.5, SO2, NOx and CO 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 spent wash 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. For transportation of the coal approx. 900 trucks will get involved on annual basis and transportation of finished product i.e. RS/ENA or AA will require about 990 tankers (considering each tanker of 20 KL capacities). 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 SO_x 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

- Provision of asphalted or RCC roads inside the premises
- Approach road is already available up to highway (Nirmal Kalyan)
- Provision of additional parking for goods vehicles to accommodate the increase after expansion
- Engage authorized transport agency for goods transport on the term to use well maintained vehicles for all transportation activities
- While bulk transportation of raw material/finished product, manage the vehicles in such a way that waiting period for vehicles will be minimum. This will help in reducing the risks of traffic congestion and minor accidents, and over all air pollution.
- Provision of separate entrance and exit lanes/gates for vehicles
- Strict prohibition on washing and maintenance of vehicles on site or in parking area
- All roads with street light and proper signage at strategic locations
- Main gate/s with 24x7 security arrangements

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.

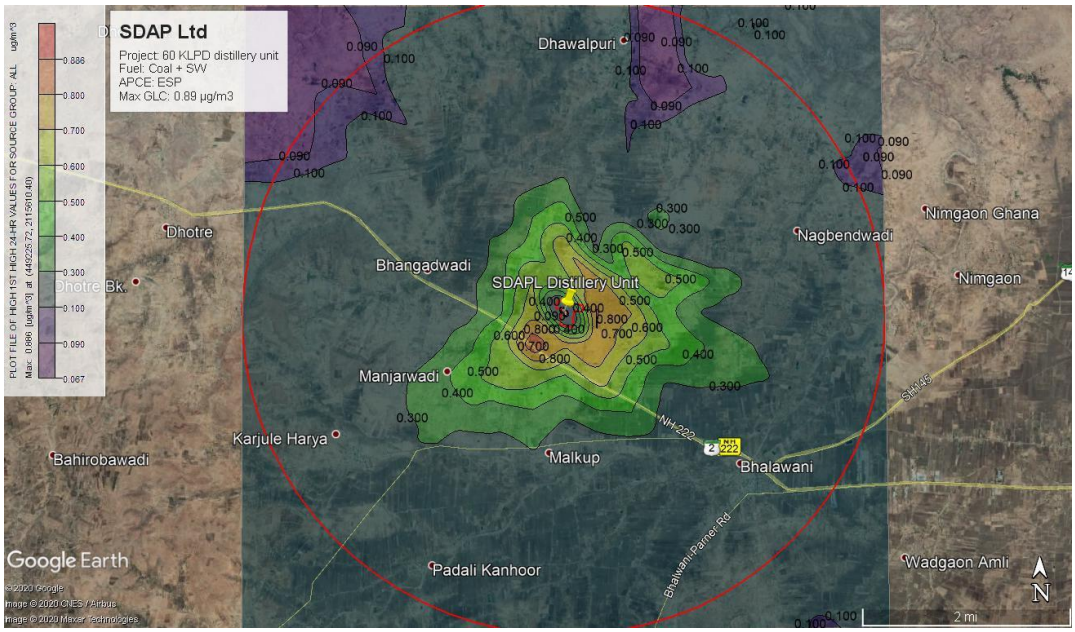

Figure 4: Short term 24 hourly GLCs of PM

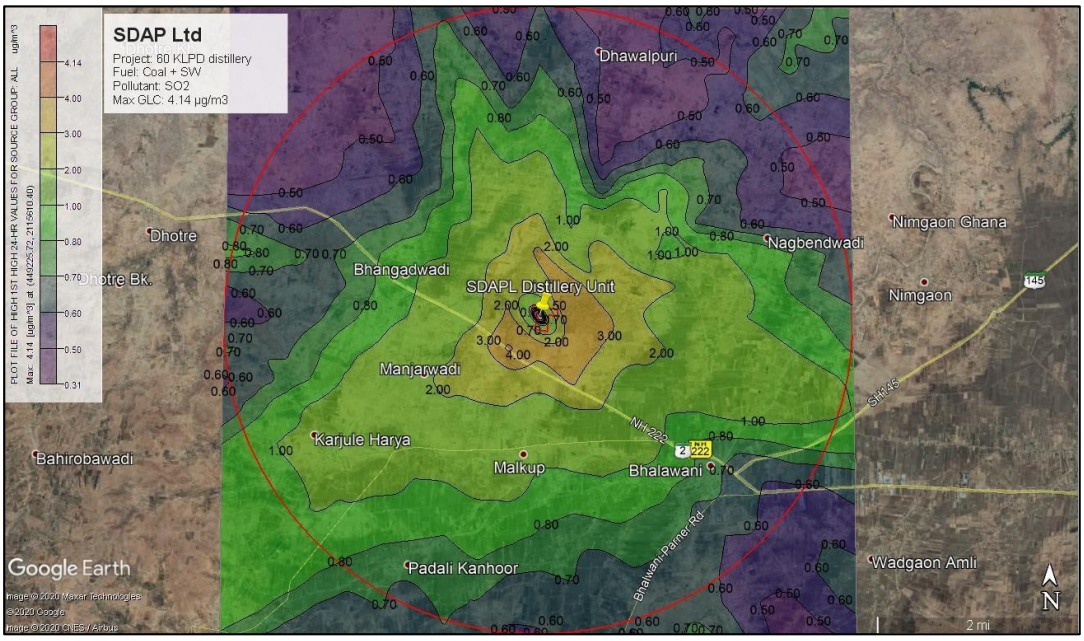

Figure 5: Short term 24 hourly GLCs of SO2

a. Observation

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

- There will be an increase in the concentration of PM and SOx mainly towards south-west
- The maximum incremental load of all these pollutants will be at a distance of ~0.7 km towards south-west and, where increase of 0.668 µg/m3 for PM and 3.19 µg/m3 for SOx could be observed. This area is predominantly occupied by agricultural vegetation
- Nearest residential area towards south-west is village Malkup which is ~1.5 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 6 : Summary of Maximum 24-hour GLC due to proposed project

Description	Concentration µg/m³	
	PM	SO_2
Maximum rise in GLC	0.88	4.14
Direction of Occurrence and distance	SW (0.7 km)	SW (0.7 km)
Coordinates of maximum GLC	19°07'58.70"N 74°31'01.90" E	19°07'58.70"N 74°31'01.90" E
Baseline Concentration(average) reported nearby GLC (at Village Malkup)	64.5	27.3
Total Concentration (Post project scenario) at village Malkup	64.8	28.3
NAAQS	100	80
*The distance is measured from stack to the receptor of maximum GLC		

5.2 Water Environment

5.2.1 Impact causing factors: The impact of a distillery project on water environment is crucial from two aspects viz. the consumption of water in process and the generation of wastewater.

5.2.2 Impact Assessment: 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. Considering the option/s planned for ZLD in the proposed expansion, 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. In such circumstances, severe impact anticipated if the accidental release of spent wash reaches to nay of the nearest natural waterbodies. In such circumstances, the water quality will deplete drastically due to acidic nature of spent wash; its dark brown colour and odour will make the water unfit for all sorts of usage, depletion of DO will make the water unfit for most aquatic life.

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. 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 disposed by using septic tank and soak pit system. 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 7: Solid Waste and its Management

Waste Material	Quantity	Disposal
Ash (from spent wash + Coal/bagasse)	12201 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

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

5.3.2 Impact Assessment: The project is not going to generate any hazardous waste. Since, the solid waste is non-toxic and non-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. Ash is estimated to be about 12,201 TPA during seasonal operation. 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 case of proposed project, the air dispersion modeling study reveals that the ground level concentration of PM (during operation phase) in ambient air will be an increase in the concentration of PM and SO_X mainly towards south-west at approx. 700 m (0.7 km) from the stack towards Malkup village. Nearest village Malkup is ~ 1.5 Km from proposed site and 1.0 Km from probable max. GLC location. The maximum incremental load at this point will be for particulate matter (PM) 0.668 µg/m^3 and 3.19 µg/m^3 for SO2. Agricultural vegetation is observed at this distance. Village Malkup is the nearest monitored location in residential areas, in this downwind direction; baseline concentration of PM_{10} and SO_2 observed at this location was considered for estimating resulting GLC. From the mathematical modeling study, it is observed that resultant concentration of this air pollutant in downwind direction will be well within the national ambient air quality standards prescribed by CPCB in Nov. 2009. The negative impact is anticipated due to following.

1. Due to construction on the present open areas, land- foraging ground may get lost permanently for some of the birds, insects and reptiles; also this activity may cause negative impact on soil micro- fauna
2. In addition, the transmission lines may cause minor negative impact on soil and avian-fauna. Beneficial Impact is anticipated due to following factors.

- The effluent/wastewater generated will be treated and recycled/reused for 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 rich in potash. It will be added to soils. Thus, nutrient will get recycled and soil enrichment will take place. This is anticipated as another positive impact on the land and the surrounding eco-system.
- 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.

5.4.3 Environmental management plan: ESP as an air pollution control device; stack of 70 m height; mechanized handling of bagasse and ash, etc. for air pollution prevention and control; 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 and infrastructure.

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

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.

5.6 Other impact: Traffic

In the project, the transportation activity will take place mainly during the construction phase. Considering the availability of NH-222 (Nirmal-Kalyan) approx. 1.0 km from project site. The nominal increase in vehicles during construction phase may not cause any traffic congestion.

During operation phase, the transportation activity will be very negligible; hence, the probability of traffic congestion is insignificant.

6.0 FIRE PROTECTION SYSTEM

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. Non-flame proof and flame proof 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, storage yard.

Fire Protective System – Fixed supply of Carbon dioxide from the Tank, normally connected to fixed piping system with nozzles arranged to discharge CO_2 directly on the burning material, equipped with

Fire Alarm, Fire hydrant fm 200 and extinguishing system H.V.W / M.V.W Spray system (LOCAL APPLICATION ONLY). System consists of Alarm Bell, Control panel, remote station, electric control needed for operating system, Pressure switch Heat detector, Heat collector, and conveyor rail, Drain Board with dip tank and discharge nozzles.

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 valve opens.

6.1 Safety Aspects through Design and Engineering

- All design will be as per ISI standard specification and drawings are to be approved by 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 is to be 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.
- 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 mm thickness.
- For anhydrous ethanol receivers & storage tanks PESO (Petroleum and Explosive Safety Organizations) guidelines
- Distance between flameproof and non-flame proof area min. 15 m
- The layout will take into account the working space & safety requirement of Factory Inspectorate, Govt. of Maharashtra State.

6.2 Plant Lighting

a) The normal process area lighting will generally compromise of Fluorescent fittings & Mercury vapor fittings.

b) 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.

6.3 Energy and Water Saving Measures

- High alcohol % in fermented wash can result in substantial reduction in steam consumption (integrated evaporation system)
- 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.

7.0 ENVIRONMENT MANAGEMENT PLAN

Table 8: Environment management plan: operation phase

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 70 m • CO2 scrubber • 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 lagoons for storage of raw and

Environmental Aspect	Impact causing factor	Control/Mitigation Measures
		concentrated spentwash. • Lagoons 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 • 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 Habitat alteration causing man animal conflict	• 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 • Proper fencing to the proposed industrial unit to prevent entry of large carnivores • Areas should be strictly and effectively protected from fire. Mass level awareness at local level is required for this. Project proponent need to take help of Forest Department (local range office), local NGOs working in the field of wildlife to create awareness about behavioral characteristics of wolf, hyena and leopard. It will help in reducing probable man-animal conflict • Cane harvesting labour must be communicated about presence of these carnivores; they should be provided with some protective gear to use in such situation • Project proponent should monitor the man-animal conflict incidences very closely. Funding local NGOs working in the field of wildlife may be helpful. • Provision of ambulance with first aid facilities available at strategic location within premises as well as in the neighboring villages • provision of ambulance for animal or rescue van and support of veterinary doctor

Environmental Aspect	Impact causing factor	Control/Mitigation Measures
		• Restricting vehicular activities during night time for the areas which are highly sensitive for the movement of these carnivores (particularly northern, north-western part of the site) • Domestic solid waste to be disposed in such a way that it will not attract wolf or hyena • Avoid domesticating any dog or cat as leopard predate on these animals • 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 • 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 coal • Ethanol storage as per PESO guidelines • Firefighting system as per OISD and local

Environmental Aspect	Impact causing factor	Control/Mitigation Measures
		authority guidelines • Earthquake resistant construction

8.0 SAFETY, OCCUPATIONAL HEALTH MANAGEMENT

The goal of all occupational health and safety programs is to foster a safe work environment. In this project, aspects of Safety and Occupational Health are given with the due consideration, over and above applicable legislations such as Factories Act 1948. Extra attention will be paid to provide measures for ensuring safety and health of workers and as well integrity of plant. This will be done by applying following national or international standards.

- Use of flameproof 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
- DG sets of appropriate ratings and as per the CPCB guidelines will be provided to ensure the uninterrupted supply of power and thus for safety of plants and workers
- Smoking and igniting activities will be strictly prohibited in the entire unit
- Regular medical checkup of workers, contractual workers and employees
- Group insurance and medical insurance facilities provided in the existing setup will be extended after proposed project.

Facilities like drinking water, 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.

8.1 Schedule of medical check-up during operational phase

- Comprehensive pre-employment medical checkup for all employees
- General checkup of all employees (including contractual employees and casual labour) once every year.
- Local hospitals and Govt. health monitoring system will be engaged
- Dispensary and ESI facility will be provided to all workers as applicable

Table 9: Financial provision for CER activities planned for next five years

CSR 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	10	10	7	6	5	**38**
Provision of sanitary fixture and drinking water supply to local schools	10	10	7	5	5	**37**
Health facilities: Health check-up of workers, their family members, organizing medical camps, medical aid to villagers, etc.	2	2	2	2	2	**10**
Provision of an ambulance or rescue van for animals Provision of first aid and medicines	-	10	0.5	0.5	0.5	**11.5**
Education						
Education/training to local youths, farmers, family members of employee's	1	1	1	1	1	**05**
Awareness on safe agricultural practices and avoiding man-animal conflict	4	4	3	2	2	**15**
Infrastructure Development/Maintenance (Eg. Road, canal maintenance, etc)	5	5	5	5	5	**25**
Other activities for maintaining social and cultural harmony	2	2	2	2	2	**10**
TOTAL BUDGETARY ALLOCATION FOR NEXT FIVE YEARS (1.5% of the capital budget = Rs. 150 lakhs)						**150**

Table 10: 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	2915.00
	Additional provision towards CSR/CER (1.5% of capital cost)	**150.00**
	Recurring Expenses/Annum	
1.	Salaries and wages	25.00
2.	Maintenance (@ 5% on capital investment of Rs. 2915 lakhs) of pollution control devices e.g. ESP, etc.	145.75
3.	Fuel (incineration activity)	719.12
4.	Miscellaneous	15.00
	TOTAL	**904.87**

9.0 CONCLUSION

The SBDAPL is a private sugar mill, located at village Malkup, Tq. Parner, Dist: Ahmednagar, Maharashtra, has decided to install a new 60 KLPD molasses based distillery plant. The project is placed under item 5 (g) - as 'B' category as per EIA Notification, 2006 (as amended June 2019) and will be appraised at state level. Estimated cost of the project is Rs. 9868.00 lakhs, out of which Rs. 430.00 lakhs are allocated for environment management.

Geographical coordinates of the site are $19^0$08'15.3"N, $74^0$31'18.9" E. It is located 0.8 Km away from Nagar-Kalyan National highway no. 222. Nearest railway station is Ahmednagar (25 km) & Pune is the nearest airport approx. 108 km away from the project site.

The sugar factory has allocated ~28328 m^2 land, for proposed distillery unit and ancillary activities. This includes main unit, incineration boiler, coal storage, evaporation unit (MEE), storage lagoon and green belt development of 32014 m^2 .

Production process: Molasses diluted and feed to fermentation tanks where yeast converts the reducing sugars of molasses into alcohol. This alcohol is separated from rest of waste material by the process of distillation. The process produces wastewater in the form of spentwash, spent lees and solid waste in the form of sludge.The distillery unit will be producing, Rectified Spirit (RS =60 KLPD)/Extra neutral alcohol (ENA =60KLPD) Or Ethanol

i.e. AA (60KLPD) which are very significant for other industries, medical services, etc. Ethanol used to blend with petrol, thus able to save valuable foreign exchange on import of fossil fuel.

The factory will be in operation for year around. The raw materials used are molasses 'C' (222 TPD)/ molasses 'B' (206 TPD)/ Sugarcane juice (910 m^3/Day) Nutrient N,P (200 Kg/d) and Turkey Red Oil (300 Kg/d). The steam requirement for the project is maximum 372 TPD. Coal/bagasse and concentrated spentwash will be used as a fuel for the steam generation activity. The requirement of coal will be (max) 54.48 TPD or bagasse 98 TPD. The requirement of power for distillery, boiler and ETP will be 1.6 MW. Therefore, an independent boiler of 21 TPH (tons per hour) of 45 Kg/cm2 (g) pressure and turbine set of 2 MW capacity will be installed. In case of failure of captive power generation, electricity will be purchased from state electricity board (MSEDCL).The total water in- put for the proposed project will be 1720 m^3/day and will be sourced from Mula dam. Considering recycled water day-to-day fresh water requirement will be 440 m^3/day.

Waste Management: Effluent generated in the form of spent wash will be 600m^3/day. Spentwash will be concentrated by Multi Effect Evaporation (MEE) followed by incineration to achieve Zero Discharge (ZD). Spent lees and condensate will be treated in Condensate Polishing unit (CPU) and treated water will be recycled. Estimated domestic effluent will be 16 m^3/day, which will be treated in STP. The

proposed industrial activity could generate solid waste in the form of yeast (50 MT/annum) and ETP/CPU sludge (70 MT/annum). These are biodegradable material. The boiler ash 40.67 TPD (19.07 TPD coal and 21.6 SW /day) OR 23.56 TPD (1.96 TPD Bagasse and 21.6 SW T/day) will be produced. This ash will be sold to brick manufacturing unit. Hazardous waste is will be the spent oil from DG set – quantity anticipated to be minor due to captive power source. It will be burnt in boiler. The stack height will be 72m. Bag filter system will be installed as air pollution control equipment. The plant and equipment's will be specified and designed with a view to minimize noise pollution. SBDAPL is committed to the Health and Safety of all its employees. It strives to provide hygienic & safe work place and continually improve the effectiveness of Health & Safety system.

The basic infrastructure such as roads, electricity, transportation, drinking water supply, health centers and hospitals, school, colleges, sanitation facilities are available in the vicinity. The proposed project is not going to exert any unbearable load on any of these resources. In fact, it will generate employment for the local people there by raising their standard of living. The proposed project will be generating 77 direct employment opportunities. Apart from this, the project anticipated to give indirect opportunities to transporters, shopkeepers and various facility providers such as schools, medical facilities, etc. Full precautions will be taken for pollution control, resource conservation and environmental protection. The unit is agro-based and hence it will promote sustainable development.