

## EXECUTIVE SUMMARY

### 1. INTRODUCTION

M/s Indreshwar Sugar Mills Ltd., is proposed molasses based ethanol plant of 45 KLPD Bhagwantnagar, Upalai(T), Tal: Barshi, Dist: Solapur . The plant is having existing 2500 TCD sugar unit and 12.5 MW co-generation unit. The geographical location of the project site is at **Latitude:- 18° 13'21.51" N, Longitude:-75° 37' 31.36" E**. Site is well connected with State highway -67 at 2 km. Nearest Railway station is also at Uplai (5 km) and nearest Airport is Pune at the distance of 189 km.

### 2. PROJECT DESCRIPTION

#### 2.1 Salient Features of the Project

The proposed distillery of 45 KLPD is proposed within the existing premises. The benefit of the sites is that the raw material and water availability is within the premises.

The projects requirements are as follows:

- The land requirement for the proposed 45 KLPD distillery is approximately 10 acres and is already in possession of ISML.
- Operational days of the distillery are 330.
- The water requirement for the proposed distillery is 360 m<sup>3</sup>/day
- The raw material required will be in the form of molasses. The amount required for proposed project will be 54179 MT/A and will be sourced from own sugar factory.
- The source of steam will be slop fired boiler of 22.3 TPH capacity.
- Salient Features of the proposed 45 KLPD distillery are given below:

Sr. No.	Feature	Particulars
1.	Name and address of the Company	M/s Indreshwar Sugar Mills Ltd., Bhagwantnagar, Upalai(T), Tal: Barshi, Dist: Solapur
2.	Project	Proposed distillery of 45 KLPD
3.	Date of registration of Sugar Factory	17 <sup>th</sup> February 2010
4.	Working days per year	330/Annum
5.	Products Alcohol	Proposed 45 KLPD Plant
6.	Main raw material	54179 MT of Molasses/Annum
7.	Total land area	10 Acre (within premises )
8.	Boiler capacity	23.5 TPH
9.	Boiler fuel	Slop/ coal or bagasse
10.	Steam Requirement	4kg/cm <sup>2</sup>

11.	Power requirement	1.8 MW
12.	<b>Water requirement &amp; source</b>	
	Source	Existing water supply scheme
	Quantity	360 m <sup>3</sup> /day
13.	Investment on EMP	14.30 Crore
14.	Project Cost	Rs.84 Crores

## 2.2 Manufacturing Process

The process used for proposed expansion unit is Hi Ferm fermentation process is in batch mode followed by Multipressure Vacuum Distillation.

### 1) Fermentation

- **Molasses handling and Distribution-** This includes Screening of molasses, transfer to molasses receiving tanks, distribution to cell mass propagation, fermentation and sent to yeast activation section
- **Yeast propagation-** Yeast propagation section comprises molasses diluter and hygienically engineered yeast vessels equipped with heating, cooling and air sparging facility.
- **Fermentation-** The purpose of fermentation is to convert the fermentable sugars into alcohol. The fermenter temperature is maintained at around 32 -35°C by forced recirculation flow through plate heat exchangers.
- **Yeast Recycling-** The yeast in the fermented wash is removed as a 45 to 55 v/v slurry, and is returned to the fermenter.

### 2) Distillation

This step is followed to purify the product of fermentation process. In ISML proposed project the following products are harnessed.

1. **Rectified Spirit (RS)**
2. **Extra Neutral Alcohol (ENA)**
3. **Absolute Alcohol**

### 3) Dehydration of Alcohol

The feed (Rectified Spirit) ,pumped from the storage tanks, Is heated through the heat exchanger by the dehydrated alcohol ,then heated Rs of 93% to 96% is fed to the top of the distillation column.

The liquid passes through the distillation column where ethanol is stripped of. The alcohol free liquid called spent lees is separated and discharged from the bottom of

the distillation column and the ethanol stream, with strength of about 96% by volume, is removed as vapor, at the top section of the distillation column and feed to the molecular sieve unit after a super heating about 115°C by steam in the heat exchanger

## **2.3 Pollution control & Safety measures**

### **1) Water Pollution**

The major pollutant from the Distillery is the Spent wash. This will be treated by following steps:

- **Biomethanation unit:** The spent wash from the ethanol plant will be passed through bio-methanation process to generate bio-gas and reduce the BOD / COD to the targeted levels and converts the sugar-rich biomass into methane.
- **Multieffect Evaporator:** The spent wash after bio-methanation will be passed through a 5 stage multiple effect evaporator system to concentrate the solid to 10%. Hence it will be a totally zero discharge spent wash treatment. By means of incineration.
- **Incineration:** The reduced quality of spent wash will be sent to incineration in the boilers.

### **2) Air Pollution**

- The emission characteristics will be monitored regularly.
- Green belt to trap dust and fugitive emissions.
- The control of fugitive emission such as hydrocarbons from DG sets, process units/storage, the following measures are recommended:
  - Proper maintenance and clearing of the roads inside the plant
  - Raw materials trucks should be covered to stop dust emission
  - Monitor the consented parameters at ambient air quality monitoring station.
  - Monitor the work zone at various stations to satisfy the corporate requirements for health and environment.

### **3) Occupational Safety & Health**

All precautionary methods will be adopted by the company to reduce the risk of exposure of employees to occupational safety and health hazards.

Pre & post medical check-ups will be done of all the employees. Employees will be regularly examined and the medical records will be maintained for each employee.

#### **4) Risk Assessment- Storage & Transportation RS/ENA**

The proposed project will produce RS/ENA which is a flammable liquid. Leaving aside earthquake, cyclone, lightning, flood, arson, war and sabotage, the possible emergencies that can arise in the proposed project are:

**Mitigation Measures-** The following mitigation measures are adopted

- Avoid breathing vapors & use of Self Contained Breathing Apparatus.
- Fire fighters should wear proper protective equipment.
- Spark & Leak arrestors will be provided at proper places.
- During Transportation the electrostatic charges should be prevented to avoid the explosion.

### **3. EIA STUDY**

MITCON Consultancy & Engineering Services Ltd., Pune has been entrusted the task of carrying out EIA/EMP studies in order to obtain regulatory clearances from MoEF for the proposed 45 KLPD Distillery. The EIA studies were carried out for various environmental components so as to assess the anticipated adverse impacts due to the proposed facilities and to suggest suitable mitigation measures.

TOR has been issued for the preparation of the EIA report vide F.No. J-11011/118/2014-IA II (I) dated 24<sup>th</sup> July 2014. Considering the points in TOR the EIA report is prepared as per the EIA notification dated 14<sup>th</sup> September 2006 of the Ministry of Environment & Forests, New Delhi (MoEF).

The EIA study is carried out by using Field Surveys Methodology and Impact Assessment Methodology.

To get the idea of existing environmental conditions the survey of 10 Km radial area from project site is done. This includes data collection for air quality at 6 locations, Noise quality at 6 locations, water quality at 8 locations and soil quality in 6 locations. The Ecological study is also carried out for 6 locations.

### **4. PRESENT ENVIRONMENTAL CONDITIONS**

#### **4.1 Topography**

- The existing site has plain topography with undulating surface. The site does not require cutting or filling.
- The R.L of the project site is 540 m.
- The highest R.L in north is 540 m while the lowest R.L is in south is 480 m

## **4.2 Climate & Rainfall**

- The climate of the district represents hot summer and general dryness throughout the year except during the south-west monsoon season, i.e., June to September.
- The mean minimum and mean maximum temperature is 13.5°C and 45.1°C respectively.
- The normal annual rainfall in the study area 642.65 mm

## **4.3 Air Quality**

- The Air Quality are studies in the 6 locations including upwind and downwind direction
- The PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub> and NO<sub>x</sub> level are within permissible limit

## **4.4 Water Quality**

### **4.4.1 Surface Water**

- Surface water sample is taken from project site jackwell
- pH of water 7.26 shows that the water is nearly neutral in nature.
- Electrical conductivity is 385 µmhos/cm.
- Total hardness of the sample ranges is 276 mg/l.
- Total Dissolved solid content are 280 mg/l.
- All the parameters are within permissible limit of IS 10500. However the hardness of water is on the higher side.

### **4.4.2 Ground Water**

- The Ground water quality in the study area is within permissible limits of IS 10500. However the TDS of water is slightly exceeding at some places.

## **4.5 River System and Drainage**

- The major river in the district is Bhima and Sina, Nira, Mann and Bhogawati are its tributories.
- The project area follows dendritic drainage pattern.

## **4.6 Seismology**

- Project area falls in Seismic Zone III.
- It suggests that the area is a moderately affected Zone.

## **4.7 Soil Types**

- The soil type of the study area is black soil.

- The soil quality analysis shows that the electric conductivity ranges from 143 to 288  $\mu\text{mhos/cm}$  which is within the normal range.
- The soils are non acidic, as the pH ranges from 7.22 to 7.92 the soil is neutral in nature.

#### **4.8 Minerals**

- No major Minerals found in the study area.

#### **4.9 Ecological Status**

- **Flora-** The commonly found tree species are Tamrind, Karanj, Bahava, Bor, Neem, Vad, Peepal, Teak, Mango, Palas, Dalimb etc.
- **Fauna-** No forest area comes under the study area. The Mammals found in the study area are Five Striped palm squirrel, Common / Indian Mongoose, Common Indian Hare, Indian Field Mouse, House mouse, House Shrew. Some reptiles like water snakes, monitor lizards and common lizards and Chameleon were also observed near village boundary. The dominant birds in the study area are House crow, Owl, Asian koel, Common Myna.

#### **4.10 Socio-economic Aspects observed in the Study Area**

The demographic details have been abstracted from Primary Census Abstract - 2001 (CD) of Maharashtra. The salient features of the study area are as follows:

- Study area includes 35 villages
- No of household falls under study area are 39060 nos.
- Total population of villages under the study area is 186651.
- Sex ratio (No. of females per 1000 males) is which indicates that females are less in number than their male counterpart in the study are.
- Workforce percentage is 39%.
- Primary education facility, PHCs and post office
- Pucca & kaccha roads and bus facility is present
- Handpump or wells are used for Drinking water

### **5. ENVIRONMENTAL IMPACTS**

Major impact due to the project will be on water use and water quality. However the other parameters are not affected much. However each parameter is covered in this section.

#### **5.1 Impact on Water Use**

The water requirement of the project is 118800  $\text{m}^3/\text{annum}$ . Water will be drawn from existing water supply by means of jackwell. Therefore the impact on this parameter will be negligible.

## **5.2 Impact on Water Quality**

Nominal quantity of water will be used during construction period. Stagnant pools of water would promote breeding of mosquitoes and generally create unsanitary conditions. However, adequate arrangements would be made to ensure proper drainage of wastewater from the construction sites. During operation the existing ETP of sugar unit will be used to treat the waste water generated. However the spent wash generated will be concentrated in Multi Effect Evaporation followed by incineration in slop fired boiler. This will be achieving 'Zero Discharge' plant to meet the guidelines of MoEF. All sewage will be collected in a common septic tank and discharged as per accepted norms.

In addition to that the ISML has proposed to adopt rainwater harvesting. Total 1454 Sq.M. roof top harvesting area is available in the factory campus.

## **5.3 Impact on Land Use Pattern**

There would be very insignificant impact of the proposed project on the land use pattern as ISML has already possess the required land (10 acre) in factory premises. The land required for construction will be minimized by proper planning and time scheduling of construction activities. All sewage will be collected in a common septic tank and discharged as per accepted norms.

## **5.4 Impact on Soil**

This impact would be confined principally to the plant site and thus would be of localized nature. During the construction stage proper drainage system will be constructed for the waste water generated during construction period which will be discharged into low land areas and accumulation of water will be avoided. During operation phase the soil will not be affected due to any operation. However, any percolation of any contaminates into ground water will be prevented by constructing suitable storage facilities.

## **5.5 Impact on Air Environment**

During construction the air quality will be impacted due to fugitive dust emission. During operation emission will be from proposed slop fired boiler of 23.5 TPH. The emission from the boiler will be attached to existing stack of sugar unit boiler. The stack height is 70mts. During construction and operation phase regular upkeep and maintenance of vehicle will be done to check the air pollution level under control. To reduce the fugitive dust emission regular sprinkling of water at the construction site is suggested.

## **5.6 Noise Environment**

Noise would be an inevitable by-product of the operation. ISML will take all mitigation measures to control noise pollution by means of adopting paved roads and Proper study foundation provided for all the machines and equipments. Green belt plantation will act as noise buffer.

## **5.8 Impact on Ecology**

The impact of construction activities would be primarily confined to the project site which is already in possession of proponent. As stated earlier, the land is principally agricultural in nature in the surrounding areas the impact on ecology will be very minor. ISML is proposing to develop the green belt at project premises which will restore the ecology of the study area along with increase in aesthetic beauty.

## **5.9 Impact on Demography & Socioeconomics**

### **• Impact on Demography**

The peak workforce strength during construction would rise-up to hundred persons. Though the technical persons and skilled labors would by and large, be imported from outside the study area, bulk of the labor force would comprise of unskilled and semi-skilled workers, a substantial number of whom would presumably be recruited from the surrounding areas itself.

Operation of the unit will require an appreciable quantum of skilled and semi-skilled workforce which, would have to be imported from outside the study area.

### **• Impact on Socioeconomic conditions**

Construction of any major industrial project invariably results in socioeconomic changes. The influx of material and money lends to change the economic status of the community. Markets, workshops and commercial centers would develop in the area.

### **• Growth Dynamics and Stress Areas**

It has been observed that people always have a propensity to settle at locations where civic amenities as transportation, postal service, educational institutions, drinking water, market, medical treatment, electricity etc. are easily available within a short distance, as well as the working place being within a reasonable distance. Therefore, some migrated people would settle in the peripheral zone.



## **6. ENVIRONMENTAL MANAGEMENT PLAN**

### **6.1 Construction Phase Environment Management**

#### **a) Site Preparation**

The development of site for erections of plant structure, office building & other allied activities shall require careful management planning as the construction activities will be located in plain barren land owned by the project proponent.

Care will be taken to control the dust nuisance that would be created by excavation, leveling and transportation activities so that impacts on the various components of environment would be minimized.

#### **b) Noise**

Though level of construction activities shall not be very high, still some specific sources of noise like welding, transportation, movement of earth movers, tractors, concrete or asphalt mixing etc. will be carried out in a controlled manner. Neither the plant nor the construction workers should be exposed to excessive noise levels.

#### **c) Construction Equipment and Waste**

Transport vehicles as well as transport routes will be properly maintained during whole construction phase to minimize smoke / dust emission from vehicle exhausts and unpaved roads. Composite solid wastes including metal scrape, earthwork, other wastes, getting generated in construction process will be disposed off in safe manner. Certain hazardous waste materials, though the requirement of such materials shall be small, will be stored safely and be disposed off properly.

### **6.2 Operational Phase Environment Management**

#### **a) Water Environment & Management**

The water shall be used for the plant operation and generation of waste water & discharge should be maintained as per the MoEF current guidelines. The followings are to be strictly followed to meet the requirement:

- Multi effect evaporator will be used to reduce the spent wash generation from about 9.4 liters / liter of ENA to 940 ml/ liter of ENA in order to reduce pollution. Reduced spent wash will be burnt in slop fired boiler.
- All sewage will be collected in a common septic tank and discharged as per accepted norms.

- The record of input water every day for quantity will be recorded by installing water meters and periodically of quality will be ascertained.
- Measures will be adopted to segregate the storm water drain from effluent.
- Water conservation is to be accorded high priority in every section of the factory by avoiding wastage of water.
- Record of wastewater returned back to process and to gardening, both the quantity will be kept by installing water meters.

### **Water Pollution & Control Facilities**

The major contributions of pollution in a proposed expansion of distillery is aqueous effluent i.e., spent wash.

The spent wash will be sent to multi-effect evaporator to reduce the volume of spent wash from the distillery. The concentrated sludge from the multi effect evaporator will be used as boiler fuel.

### **b) Air Environment Management**

To minimize the impact due to the proposed project operations the following steps would be initiated:

- The emission characteristics will be monitored regularly.
- Green belt to trap dust being emitted from fuel combustion and /or fugitive sources and also attenuate the other gaseous pollutants.
- The control of fugitive emission such as hydrocarbons from DG sets, process units/storage, the following measures are recommended:
  - Proper maintenance and clearing of the roads inside the plant
  - Raw materials trucks should be covered to stop dust emission
  - Monitor the consented parameters at ambient air quality monitoring station.
  - Monitor the work zone at various stations to satisfy the corporate requirements for health and environment.

### **c) Noise Environment**

The following precautionary measures are to be adopted in the proposed project

- Insulate/enclose all the noise sources to avoid occupational exposure to the workers and to minimize the generation of excess noise level.
- Monitor the ambient and work zone noise level to conform the stipulated norms.
- Noise attenuation devices such as ear mufflers will be provided to the workers in the high noise exposure areas.

#### **d) Biological Environment**

Special attention is given to maintain green belt in the factory premises.

##### **Features of Green belt:**

- Suitable tree species will be planted in the green belt.
- This will act as a noise barrier and would also reduce the air pollution
- Plantation will also improve the aesthetic backdrop of the site

As far as possible, the species should be indigenous and locally available Species would be planted.

#### **e) Land Environment**

However, the construction of green belts, parks, would largely offset the change to the existing landscape and would provide visual comfort. The improved economy of the area is expected to cause increased outputs to agriculture, trade and commerce. As ISML will implement zero wastewater discharge methodology, there would be no impact due to any wastewater disposal on land.

#### **f) Occupational Safety & Health**

All precautionary methods will be adopted by the company to reduce the risk of exposure of employees to occupational safety and health hazards.

Pre & post medical check-ups will be done of all the employees. Employees will be regularly examined and the medical records will be maintained for each employee.

Pulmonary function test and periodical medical check-up shall be done once in every year. The following tests will be conducted for each worker:

- Lung Function Test
- Radiology – X-ray
- Pulmonary Function Test
- Audometric Test
- General clinical examination with emphasis on respiratory system
- Pre employment examinations
- Periodical medical examinations at the time of employment and after completion of employment.

For the safety of workers, personnel protective appliances like hand gloves, goggles, aprons, ear mufflers, nose mask etc. will be provided. Nose mask will be provided at places, where there is possibility of dust generation. In high noise generation areas ear mufflers will be provided for the workmen. Proper ventilation system will be provided in the processing area.

**g) Socio-Economic Welfare Activities**

The operators and workers are to be trained in various aspects of ESH (Environment, Safety and Health). The managers and officers involved in Environment Management Cell will undergo refresher workshop and up-gradation of information on various environmental issues.

The management of ISML will help in promoting the activities related to environmental awareness in nearby villages. The proponent will help in promoting local people for livelihood commensurate with their will, skill and abilities. Many other welfare measures will be taken from time to time.

**h) Risk Assessment- Storage & Transportation RS/ENA**

The proposed project will produce RS/ENA which is a flammable liquid. The possible emergencies that can arise in the proposed project are:

- Release of ENA due to Failure of vessels, failure of pipelines, failure of process equipment.
- Specific failures like accidental spillage during handling.
- Consequential fires involving the flammable materials.

**Mitigation Measures-** The following mitigation measures will be adopted

- Avoid breathing vapors & use of Self Contained Breathing Apparatus.
- Fire fighters should wear proper protective equipment.
- Spark & Leak arrestors will be provided at proper places.
- During Transportation the electrostatic charges should be prevented to avoid the explosion.

**6.3 EMP Cost**

The ISML has proposed to incur the following one time and recurring cost for the EMP measures.

**EMP Cost for Expansion unit**

<b>Sr. No.</b>	<b>Parameter</b>	<b>Capital Cost (Rs lakh)</b>	<b>O &amp; M cost per annum (Rs. lakh)</b>
1.	Spent wash fired boiler including ESP	1200	24
2.	Solid waste management/ Ash handling system	100	10
3.	Gardening & Landscaping i.e. Green belt development	30	3
4.	Noise pollution control	50	6.5

5.	Environmental Monitoring	--	10
6.	Rain water Harvesting	50	7.5
<b>Total Cost</b>		<b>1430</b>	<b>61</b>

## 7. Environmental Monitoring

Environmental Monitoring is a tool to check the implementation of the Environmental Management Plan. It involves formation of a committee involving experts in various fields as well as Govt. officials for checking the implementation of the environmental management plan. The following monitoring plan is suggested for the project. The regular Environmental monitoring will be carried out to check the impact of the project on air, water, soil, noise quality and effluent.

## 8. Project Benefits

The proposed distillery will have overall positive impact owing to the following benefits due to the project.

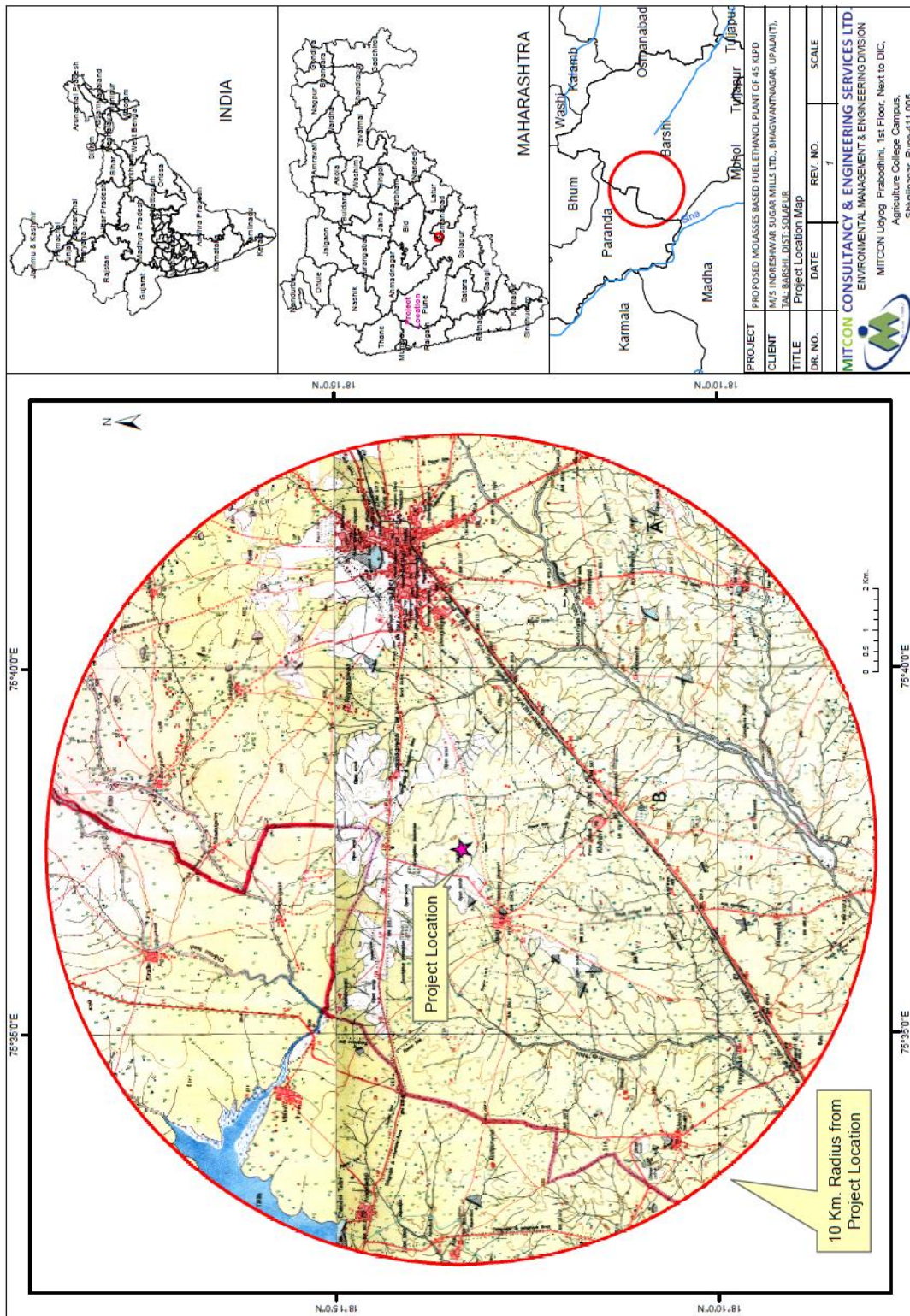
- The captioned project will have major socio-economic benefits including Employment generation, Infrastructure Development
- Development of sugar Cane in the command area.
- Increase in income of nearby farmers

## 9.0 Conclusion

This industry will produce ethanol as useful material for India, which will save foreign exchange in these days. This will not disturb the present landuse because our area occupied will be only small % of Influence zone 10 km. Compatible Architecture will be adopted and No Prime Agriculture Land will be put to this industrial use. Trees will be maintained and not razed down. No Rehabilitation is involved. The problematic waste materials of sugar mills like molasses, press mud and bagasse will be utilized within the existing project. People will get some jobs here and the sugar, power and organic compost generated here will be useful for farming, and some incidental small employment like eatery, canteen, tyre repairs, garage too will become available to nearby people. This will be beneficial to the society.

- ❖ This project is very necessary in view of converting waste bagasse, molasses into useful steam, power and foreign exchange saver product.
- ❖ The project site is suitable from general MoEF expectations.
- ❖ Water, power, Raw material and Market is assured and available with ease.
- ❖ Full precautions will be taken for Pollution Control, Resource Conservation and Environmental Protection.
- ❖ This is cost effective and Sustainable Development.

### Annexure 1- Location Map





### **Annexure 2- Plant Layout**

