

PREFEASIBILITY REPORT

1.0 INTRODUCTION OF THE PROJECT

Jakraya Sugar Ltd. (JSL), Watwate, Tal.: Mohol, Dist.: Solapur was registered vide registration no.U15421PN2007PLC130078.

As per the provision of "EIA Notification No. S.O. 1533 (E)" dated 14.09.2006 amended on 25.06.2014 it comes under Category 'A'; Item 5(j) 1(d), 5(f). It is an expansion project.

JSL have planned to go for expansion of Sugar Factory from 4900 to 7500 TCD, Co-gen plant from 11 MW to 30 MW and Distillery from 30 KLPD to 200 KLPD. Sugar cane will be available within 15 to 20 Km radius area. Co-gen plant will help to reduce/lower down the requirement of power in state of Maharashtra as well as other state. Promoters are well experienced in relevant fields and have made a thorough study of the overall project planning and implementation with prime objective towards development of the area and its economy. Molasses is a very important by-product of the sugar industry. The profits earned by conversion of molasses into alcohol are much higher than that of resale of molasses alone. Moreover, there is a good demand for alcohol in the country as production and consumption of alcohol in India are quite balanced. Also, there is a good export potential, out of the country, for the alcohol.

Table 1 Name and Designation of the Promoters

No.	Name	Designation
1	Birappa B. Jadhav	Chairman
2	Sachin B. Jadhav	Managing Director
3	Rahul B. Jadhav	Managing Director
4	Mrs. Umadevi B. Jadhav	Director
5	Mrs. Manisha S. Jadhav	Director

Presently, in the campus following projects are in operation-

1. 4900 TCD Sugar Factory
2. 11 MW Co-gen Plant
3. 30 KLPD Distillery

1.1 Need of the Project

Sugar industry in India is well maintained and growing at a steady pace, boasting of a consumer base of over billions of people. India is the second largest producer of sugar in the world. With more than 45 millions of sugarcane growers in the country, the bulk of rural population in India depends on this industry. One of the agro-based enterprises in India, sugar manufacturing is the second largest agricultural industry, after the textile sector.

Sugar manufacturing in Maharashtra is one of the most notable sectors in the country. The pace of growth of this industry has been massive over the past few years. Most of the sugar units have by-product utilization plants, based on bagasse and molasses. Ethanol, power and paper projects have tremendous scope for development in India. In near future, about 10-15% ethanol may be allowed to be blended with petrol. Thus, alcohol production from molasses has the most promising prospects. Bagasse based power generation projects, installed in the premises of sugar factory, not only fulfill captive need of the industry but also

make available surplus power which could be exported in the grid thereby providing value addition.

Distillery business is gaining more importance with regards to production, usage, easy availability of raw material (grains as maize, sugarcane molasses). With the increase in business it has a considerable share in national income. Alcohol industry is the second largest source of revenue of the state. The industry is probably only one in which the inputs are de-controlled, but selling prices are determined by local state levies and excise duties.

1.2 Employment Generation Potential

Activities in industry would improve the socio-economic status of people in the study area in terms of local labor employment and contract basis jobs, proposed activity might provide employment opportunities to the local populace, especially in business and other services. Under existing project about 255 skilled and 205 unskilled workers & in proposed expansion project about 272 skilled workers and 232 unskilled workers would be required.

2.0 PROJECT DESCRIPTION

2.1 Location

Proposed expansion of sugar factory from 4900 TCD to 7500 TCD, co-gen plant from 11 MW to 30 MW and distillery from 30 KLPD to 200 KLPD would be done in existing premises of Jakraya Sugar Ltd. at village: Watwate, Tal.: Mohol, Dist.: Solapur, Maharashtra. Solapur airport is 39.3Km and Bhima river is about 3Km away from the site.

2.2 Site Selection

Selection of project site at the above-mentioned location was done in light of following considerations-

- Availability of all basic facilities like raw material, water, power, man power etc. and other allied facilities.
- District has rail and road links to every destination so that procurement of raw material as well as marketing of finished product will be easier and economical.
- Good communication facilities are available
- No national park or wildlife habitats fall within 10 Km radial distance from proposed project site.
- No rehabilitation and resettlement shall be required.

2.3 Alternative Site

Proposed expansion of sugar factory, co-gen plant & distillery would be implemented in the existing factory premises. Hence no any alternative sites were examined.

2.4 Products & Raw Materials

Products considered for manufacturing and their maximum production quantities areas under-

Table 2List of Products and By-products in Sugar factory & Co-gen Plant

Sr. No.	Name of Product	Quantity		
		Existing	Expansion	Total
1.	Sugar (MT/ M)	16500	8580	25080
2.	Molasses (MT/ M)	6450	3400	9850
3.	Bagasse (MT/ M)	45050	23900	68950
4.	Press Mud (MT/ M)	6000	3200	8200
5.	Electricity (MW)	11	19	30

Table 3List of Products and By-products in Distillery

Sr. No.	Product	Quantity		
		Existing	Expansion	Total
1.	Rectified Spirit (RS)	30 KLPD	170 KLPD	200 KLPD
2.	Extra Neutral Alcohol	30 KLPD	170 KLPD	200 KLPD
3.	Ethanol	30 KLPD	170 KLPD	200 KLPD

Details of raw material consumption under the proposed project are summarized as follows:

Table 4List of Raw Materials in Sugar factory & Co-gen Plant

Sr. No.	Name of Raw Material	Quantity		
		Existing	Expansion	Total
1.	Sugarcane (MT/D)	4900	2600	7500
2.	Lime (MT/D)	5.16	2.4	7.56
3.	Sulphur (MT/D)	1.8	0.8	2.6

Table 5List of Raw Materials in Distillery

Sr. No.	Name of Raw Material	Quantity		
		Existing	Expansion	Total
1	Molasses (MT/M)	6450	3400	9850
2	Yeast	Test Tube Culture		
3	De-foaming Oil (MT/M)	3.6	16.8	20.4

2.5 Investment

Table 6 Project Investment Details

No.	Industrial Unit	Capital Investment (in Rs. Crores)		
		Existing	Expansion	Total
1.	Sugar factory & Co-gen Plant	135.07	45	180.07
No.	Industrial Unit	Existing	Expansion	Total
	Distillery	26.45	96	122.45
	Total	161.52	141	302.52

2.6 Size / Magnitude of Operation

Based on availability of sugarcane in its area of operation, the management of JSL has planned to go for expansion of sugar factory, co-gen & distillery plant.

Process Details

Sugarcane, which is used as a raw material in sugar factory, is grown in the field and harvested according to the maturity survey and date of plantation after ensuring maximum sugar content in the cane. Harvesting may be done either manually or mechanically. Thereafter, the cane is transported to the factory. Sugarcane is unloaded mechanically on cane carrier and subjected to different units like crushing mills, raw juice extraction & its processing, weighing of the juice, juice heater, clarifier, evaporator, pan boiling, crystallizer and ultimately centrifuge to obtain final product.

Manufacturing of Ethanol, Extra Neutral Alcohol (ENA) and Rectified Spirit through molasses route comprises of a number of operations and processes involving various reactions of basic raw materials. Eventually, the desired products are formed which are refined and separated.

2.7 Resource Optimization/ Recycling and Reuse

Company has set up of a Multiple Effect Evaporation (MEE) system in distillery for concentration of spentwash. Concentrated spentwash will be mixed with bagasse. Condensate from MEE along with other effluents & spentlees will be forwarded to proposed Condensing Polishing Unit (CPU). Treated water from CPU shall be then reused for industrial operations and reject shall be forwarded to MEE thereby achieving Zero Liquid Discharge (ZLD) of process effluent.

2.8 Input Requirements & Infrastructure Facilities including Power Sources

➤ Water

Water requirement for existing industrial activities of sugar factory & co-gen plant is to the tune of 1588 CMD. Condensate from sugarcane will be recycled in process. Hence no any fresh water will be required during crushing season. Harvested rainwater will be used during startup of factory. For domestic purpose total 50 CMD water is used.

For expansion of sugar factory & co-gen plant total 856 CMD water will be required. Same will be condensate from sugarcane. For domestic purpose additional 15 CMD will be required.

For existing distillery operations total 337 CMD water is required. Out of this 162 CMD will be CPU treated water, 165 CMD fresh water is used for fermentation dilution, cooling tower, boiler makeup. For domestic purpose total 10 CMD water is required. Fresh water is taken from Bhima river.

Table 7 Water Requirement of Sugar Factory & Co-gen Plant

Description	Existing M ³ /day	Expansion M ³ /day	Total M ³ /day
Domestic	50[#]	15[#]	65[#]
Industrial			
a. Process	1050*	485*	1535*
b. Cooling	175*	75*	250*
c. Boiler Makeup	93.6 [#] + 74.4*	88.3 [#] + 127.7*	181.9 [#] + 202.1*
d. DM back wash	70*	40*	110*
e. Washing	20*	10*	30*
f. Ash quenching	10*	05*	15*

Industrial Use (a+b+c+d+e+f)	1493 (1399.4* + 93.6[#])	831 (742.7* + 88.3[#])	2324 (2142.1* + 181.9[#])
III. Gardening	45*	10*	55*
Grand Total	1588 (1444.4* + 143.6[#])	856 (752.7* + 103.3[#])	2444 (2197.1* + 246.9[#])

Note-

[#] - Fresh water

*-Recycled

Table 8 Water Requirement of Distillery

Description	Existing M³/day	Expansion M³/day	Total M³/day
Domestic	10[#]	--	10[#]
Industrial			
a. Fermentation dilution	83 [#] + 162*	80 [#] + 1263*	163 [#] + 1425*
b. Cooling tower replenishment	70 [#]	484 [#]	554 [#]
c. Boiler make up	07 [#]	149 [#]	156 [#]
d. Lab; Wash	05 [#]	00 [#]	05 [#]
Industrial Use (a+b+c+d)	327 (162* + 165[#])	1976 (1263* + 713[#])	2303 (1425* + 878[#])
Grand Total	337 (162* + 175[#])	1976 (1263* + 713[#])	4289 (1425* + 888[#])

Note: [#] - Fresh water * - Recycled

➤ **Power**

Power required for construction work would be taken from existing Power plant.

➤ **Fuel**

Steam required for existing sugar factory, co-gen & Distillery plant is taken from existing 70 TPH boiler. Under expansion of sugar factory, co-gen & distillery plant two new boilers of 90 TPH & 50 TPH will be installed. Bagasse to the tune of 61.83 MT/Hr is used as fuel for each boiler.

➤ **Manpower**

Under the proposed expansion project, about 272 skilled workers and 232 unskilled workers will be employed. While selecting manpower preference would be given to persons from local area thereby creating better employment opportunities.

2.9 Environmental Aspects under the Project

A) Effluents Generation

i) Domestic Effluent-

From existing activities domestic effluent to the tune of 48 TCD is generated. Same is treated in septic tank followed by sock pits. After expansion of sugar factory & distillery total domestic effluent to the tune of 60 TCD would be generated. Same would be treated separately in proposed STP.

ii) Industrial Effluent-

Industrial effluent generated from existing sugar factory & co-gen plant to the tune of 465 CMD. Same is treated in existing ETP. After expansion of sugar factory & co-gen plant total effluent generated to the tune of 694 CMD. Same will be treated in existing ETP.

Effluent generated from proposed distillery activities would be mainly in the form of spent wash, spentlees & other effluents namely – boiler & cooling blow downs, effluents from lab & washings etc. Raw spentwash to the tune of 240 CMD will be concentrated in MEE. Conc. Spentwash to the tune of 48 CMD. Spentlees to the tune of 42 CMD, MEE condensate to the tune of 192 CMD and other effluents to the tune of 10 CMD will be treated in proposed CPU. Treated water from the CPU shall be then reused for industrial operations. Thereby achieving Zero Liquid Discharge (ZLD) of process effluent. Concentrated spent wash will be dried in spray dryer to get powder form in expansion activity. Effluent generation details are as follows -

Table 9. Effluent Generation at Sugar Factory & Co-gen Plant

Description	Existing M ³ /day	Expansion M ³ /day	Total M ³ /day	Disposal
Domestic	48	12	60	Treated in proposed STP
Industrial				
a. Process	330	150	480	Treated in well designed upgraded Effluent Treatment Plant (ETP).
b. Cooling blowdown	10	5	15	
c. Boiler blowdown	20	24	44	
d. Lab; Wash & DM	90	50	140	
Industrial Use (a+b+c+d)	450	229	679	

Table 10 Effluent Generation at Distillery

Purpose	Existing M ³ / day	Expansion M ³ / day	Total M ³ /day	Disposal Method
Industrial				
Process				Raw spent wash shall be treated in Bio-methanation Plant followed by Concentration in Multiple Effect Evaporator (MEE) and used for bio-composting.
Fermentation	Raw Spent wash- 240	Raw Spent wash- 1360	Raw Spent wash- 1600	
dilution	Conc. Spentwash 48	Conc. Spentwash 272	Conc. Spentwash 320	
	Condensate 192	Condensate 1088	Condensate 1280	
	Spent lees – 42	Spent lees – 241	Spent lees – 283	Treated in Condensate Polishing Unit (CPU) and recycled back in process
Cooling Blow down	70	414	484	
Lab; Washing	5	0	5	
Domestic	10	--	10	Treated in proposed STP

B) The Emissions

Steam required for existing sugar factory, co-gen & distillery plant is met from 70 TPH Bagasse fired boiler. Wet scrubber is provided as APC along with a stack of 72 M height.

During expansion of sugar factory & co-gen plant requirement of steam will be met from proposed 90 & 50 TPH boiler. Same will be provided with Wet scrubber along with adequate height of stack.

C) Noise Pollution Aspect

Noise would be generated in the proposed project from industrial activities. The probable sources shall be boiler, distillation assembly etc. Proper acoustic treatments wherever required would be provided to keep the ambient noise levels below the permissible limits as per CPCB standards. Expected noise levels in the section will be about 72 dB (A). All preventive measures such as regular operation & maintenance of pumps, motors, and compressors will be carried out and enclosures will be provided to abate noise levels at source. The workers would be provided with earmuffs and other Personal Protective Equipments (PPE) which would give the reduction of 30 dB (A).

3.0 SITE ANALYSIS

3.1 Connectivity:

Proposed activity is scheduled to commence at a site - Watwate, Tal.: Mohol, Dist.: Solapur, Maharashtra. Site is located at a village surrounding and its nearest railway station is Pakani, located at about 26Km and nearest airport is Solapur, located at about 39.3 Km from the proposed site.

3.2 Land Form, Land Use and Ownership:

Premises have a gentle terrain and no prime agricultural land is sacrificed. The project proponent has taken No Objection Certificate (NOC) from the Grampanchayat Watwate. Land for proposed project is solely owned by the project proponents.

3.3 Topography

District has a total area of 15,021 Square Kilometers which constitute 4.47 per cent of the total geographical area of Maharashtra state. Terrain of Solapur is basically flat and undulating where the low table land and small hills of Karmala and Madha Talukas act as a watershed between Sina and Bhima rivers.

3.4 Existing Land Use Pattern:

Existing land use pattern of the Mohol area is taken from Census Book of 2011; it has total area about 14167.3 Ha.

Name of Taluka	Geographical Area (Ha)	Forest (Ha)	Land under Cultivation (Ha)		Culturable Waste land (Ha)	Area Not available for Cultivation
			Irrigated	Non irrigated		
Mohol	14167.3	274.54	6562.19	3652.53	1666.32	877.55
Total	14167.3	274.54	6562.19	3652.53	1666.32	877.55
Percentage of total area (%)	100	1.93	11.76	6.19	46.31	25.77

3.5 Existing Infrastructure:

Total land acquired by JSL is 22.51 Hectors. Out of this, built up area of existing sugar factory, co-gen& distillery plant is 2.30 Ha. For expansion of sugar factory, co-gen& distillery plant, existing infrastructure would be used. Only some new machineries will be added during expansion. After procurement of Environmental Clearance (EC), developmental activities would be undertaken.

3.6 Soil Classification:

Soils in the study area are essentially derived from the trap rocks and fall under the following three main categories.

- a) Medium reddish brown to deep dark brown soil on the plane lands.
- b) Lighter soils on slopes and in the eastern parts of the district.
- c) Laterite soils in the hilly region in the western parts and on the small hillocks in the east

3.7 Climate:

The climate of this district is on the whole agreeable and is characterized by general dryness in the major part of the year. The cold season from December to about the middle of February is followed by the hot season which lasts up to the end of May. June to September is the south-west monsoon season. October and November constitute the post-monsoon or retreating monsoon season. Climate in Solapur district is extreme with large variations in the temperature. During summer the district experiences extreme heat while in the winter there is sudden temperature fall. The average annual rainfall in the district is 500-800 mm.

3.8 Social Infrastructure Available:

Area is served with infrastructural facilities such as road, water and electricity supply, and telecommunication facilities.

4.0 PLANNING BRIEF

4.1 Planning Concept:

Expansion of sugar factory, co-gen plant & distillery plant would be undertaken in existing manufacturing set-up so no major construction work w.r.t infrastructure facility would be needed.

4.2 Population Projection:

Proposed project comes under Tal. : Mohol, Dist.: Solapur. Population of the Watwate village is 1500 according to census 2011. Out of which, the male population is 746 whereas the female population is 754.

5.0 PROPOSED INFRASTRUCTURE

5.1 Industrial Area:

Total land acquired by the industry is about 22.51Ha. Existing built up area of sugar factory, co-gen plant is about 2.49 Ha. Total built-up area after proposed expansion will be 2.11Ha.

5.2 Greenbelt

Existing green belt developed on site is 7.32 Ha. which is 32% of total plot area. Under existing green belt 2000 trees are planted on site. Under proposed expansion of sugar factory, co-gen & distillery plant 0.1 Ha. will be developed under green belt. Total Green belt after expansion will be 7.42Ha. which will be 33% of total plot area.

5.3 Social Infrastructure:

Proposed area is provided with roads, water and power supply facilities.

5.4 Connectivity:

Proposed project site is well connected by roads, rail and airport facilities. State Highway No. 149 (SH-149) is at 11.2 Km. Pakani railway station is at 26 Km and Solapur airport is at 39.3Km away from project site.

5.5 Drinking Water Management:

For the expansion as well as proposed establishment of project; river water will be source of water.

5.6 Sewerage System:

Domestic effluent would be treated separately in proposed sewage treatment plant.

5.7 Industrial Waste Management:

- **Industrial Effluent** –Industrial effluent generated from existing sugar factory & co-gen plant to the tune of 465TCD. Same is treated in existing ETP. After expansion of sugar factory & co-gen plant total effluent generated to the tune of 694TCD. Same will be treated in existing ETP which will be upgraded under expansion.
- Effluent generated from existing distillery activities would be mainly in the form of spent wash, spentlees & other effluents namely – boiler & cooling blow downs, effluents from lab & washings etc. Raw spentwash to the tune of 240 CMD will be concentrated in MEE. Conc. spentwash to the tune of 48 CMD. Spentlees to the tune of 42 CMD, MEE condensate MEE condensate to the tune of 192 CMD and other effluents to the tune of 10 CMD will be treat in proposed CPU. Treated water from the CPU shall be then reused for industrial operations. Thereby achieving Zero Liquid Discharge (ZLD) of process effluent.

Effluent generated from proposed expansion distillery activities would be mainly in the form of spent wash, spentlees & other effluents namely – boiler & cooling blow downs, effluents from lab & washings etc. Raw spentwash to the tune of 1600 CMD will be concentrated in MEE. Conc. spentwash to the tune of 320 CMD. Spentlees to the tune of

283 CMD, MEE condensate to the tune of 1280 CMD and other effluents to the tune of 20 CMD will be treated in proposed CPU. Treated water from the CPU shall be then reused for industrial operations. Spent wash from MEE will followed by dryer & will convert it into powder form. Dry powder will be sold as manure.

- **Emissions** –Source of emissions will be existing as well as proposed boilers in the form of SPM, NO_x, Sox etc. To control this emissions wet scrubber is installed to existing boiler. For boilers which installed under expansion unit, APC in the form of wet scrubber will be installed.
- **Hazardous Waste** –From existing sugar & co-gen Spent Oil (Cat. No. 5.1) –1.48 MT/M. Same is burnt in existing boiler. After expansion of sugar factory & co-gen plant Spent Oil will be generated to the tune of 0.79 MT/M will be generated. Total spent oil to the tune of 2.27 MT/M will be burnt in boiler. No any hazardous waste will be generated from distillery.
- **Solid Waste Generation & Management** –Details of solid waste is presented at following table –

Table 11 Details of Solid Waste Generated from Sugar & Co-gen

Type of Waste	Quantity (MT/M)			Disposal
	Existing	Expansion	Total	
Boiler Ash	666	340	1056	Sold to brick manufactures& used for compost production
ETP sludge	5	3	8	Used as manure

Table 12 Details of Solid Waste Generated from Distillery

Type of Waste	Quantity (MT/M)			Disposal
	Existing	Expansion	Total	
Yeast Sludge	150	390	540	Sale To Brick Manufacture
CPU sludge	5	5	10	Used as manure

5.9 Power Requirement & Supply / Source:

Power requirement of existing as well as expansion project will be met from own co-gen plant.

6.0 REHABILITATION & RESETTLEMENT (R&R) PLAN

There are no rehabilitation & resettlement issues involved.

7.0 PROJECT SCHEDULE & COST ESTIMATES

7.1 Date of Start:

Construction work w.r.t. proposed expansion project would be initiated after Grant of Environmental Clearance.

7.2 Estimated Project Cost:

Expected cost of the proposed expansion project of sugar, co-gen& distillery plant will be around Rs. 141 Cr. Existing cost of the project was Rs. 161.52 Cr.

8.0 ANALYSIS OF PROPOSAL

- Additional proposed activities would be implemented in the existing premises which support adequate equipments, allied infrastructure, water and electricity.
- Fresh water use will be minimized, as the condensate water will be available from cane juice evaporation from sugar factory as well as from MEE condensate from concentration of spentwash.
- Primary, Secondary and Tertiary treatment units provided in the existing ETP on site.
- Captive use of hazardous and solid waste generated.
- Provision of fire fighting system and fire hydrant system.
- Direct and indirect employment opportunities would be extended to the nearby resident.
- Fire protection and safety measures would be provided to take care of fire and explosion hazard. Proposed project would be implemented by adopting latest
- Technologies and equipments thereby minimizing the pollution load in Environment.