P-440-JSL-CHEMICAL-52019

(Revision - 01)

SUMMARY OF ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT

FOR

ESTABLISHMENT OF 100 MT/D ACETIC ANHYDRIDE MANUFACTURING UNIT & 2 MW CAPTIVE POWER PLANT (CPP)

BY

JAKRAYA sugar Ltd.

JAKRAYA SUGAR LTD. (JSL)

A/P - WATWATE, TAL.: MOHOL, DIST.: SOLAPUR
STATE : MAHARASHTRA

PREPARED BY

EQUINOX™
Equinox Environments (India) Pvt. Ltd.

EQUINOX ENVIRONMENTS (I) PVT. LTD.

Environmental; Civil & Chemical Engineers, Consultants and Analysts, Kolhapur (MS)

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An ISO 9001 : 2015 & QCI - NABET Accredited Organization

January - 2020

Chairman
Adv. Birappa B. Jadhav (B.Sc. Agri.,LL.B.)
Managing Director
Sachin B. Jadhav (B.Sc. Agri.,M.B.A.)

JAKRAYA SUGAR LTD.

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Factory : At. Watwate, Tal - Mohol, Dist. Solapur - 413 253
Phone : 02189 - 259498, 259499, Fax : 02189 - 259497

Ref. No. JSL/Dist/159/2019-20 Date : 28/12/2019

To,
The Member Secretary
Maharashtra pollution Control board (MPCB),
3rd & 4th Floor, kalpataru point,
Sion Circle Sion (E),
Mumbai- 400022

Sub.: Application for **'Public Hearing'** to be conducted for Proposed Synthetic Organic Chemicals Manufacturing Unit with capacity 100 MT/D & 2 MW Captive Power Plant (CPP) by Jakraya Sugar Ltd located at Watwate, Tal: Mohol, Dist: Solapur, MS.

Dear Sir,

This has reference to an online Form- I application submitted for grant of ToRs to MoEFCC; New Delhi on 09.09.2019. The same was in respect of Proposed Synthetic Organic Chemicals Manufacturing Unit with capacity 100 MT/D & 2 MW Captive Power Plant.

Subsequently, Standard ToRs has been granted by MoEFCC on 18.10.2019. Now, in order to conduct Public Hearing, we hereby are submitting all the relevant documents and information to your office.

Along with the Public Hearing application, a draft EIA Report as per the generic structure stipulated in MoEF Notification No. S.O.1533 (E) dated 14.09.2006 as amended vide Notification No. 3067 (E) dated December 01, 2009 and Executive Summary Report in two languages (English and Marathi) are enclosed separately; the same contains details of Pollution Control Facilities, Production Processes and Raw Materials as well as Finished Products and Environmental Management Plan (EMP) etc. regarding the existing and proposed unit.

'Twenty Sets' of various documents, as mentioned above and equivalent number of soft copies of same have been submitted for your information and necessary further action. Also, a Demand Draft of Rs. **25000/- (Rs.Twenty Five Thousand Only) bearing No.098180 dated 27-12-2019** drawn on Union Bank of India towards the Public Hearing charges, as decided by the govt., has been presented herewith.

Please do the needful and oblige.

Thanking you.

Yours faithfully

Shri Sachin B. Jadhav
(Managing Director)

Encl.: 1. Executive Summary of Project
2. A Draft EIA Report
3. A D.D. bearing No.098180 dated 27-12-2019 drawn on Union bank of India

यूनियन बैंक ऑफ इंडिया Union Bank of India

क्रम सं.
Sr. No.

D D M M Y Y Y Y

Print Statement 33098180 NDD532169

मांगने पर अदा करें
ON DEMAND PAY

SOLAPUR MAIN 27-12-2019

को या उनके आदेश पर
OR ORDER

****** Not Over INR. 25,000.00 ******

रुपये RUPEES

THE SUB REGIONAL OFFICER MAHARASHTRA
POLLUTION CONTROL BOARD SOLAPUR
Twenty Five Thousand only

प्राप्त मूल्य के लिए
FOR VALUE RECEIVED

₹ 25,000/-

BC. No. 33098180

प्रति यूनियन बैंक ऑफ इंडिया
To Union Bank of India

कृते यूनियन बैंक ऑफ इंडिया For Union Bank of India

Purchaser: JAKRAYA SUGAR LTD

PAYABLE AT PAR AT ALL OUR BRANCHES IN INDIA.

EM/PD/W

(532169)Valid for 3 months only from the date of issue

प्राधिकृत हस्ताक्षरकर्ता
Authorised Signatories

Please sign above

Key:OHJ217796

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जारी करने की तारीख से तीन माह के लिए वैध
VALID FOR THREE MONTHS FROM THE DATE OF ISSUE

MANIPAL TECHNOLOGIES LTD., MANIPAL / CTS - 2010

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Summary of Draft EIA Report for

Establishment of Synthetic Organic Chemical Manufacturing Unit (Acetic Anhydride Plant of 30000 MT/A) and & 2 MW Captive Power Plant (CPP) in the Existing Premises of

Jakraya Sugar Limited (JSL)

A/P - Watwate, Tal: Mohol, Dist.: Solapur, Maharashtra.

1) THE PROJECT

Jakraya Sugar Limited (JSL) is located at Watwate, Tal: Mohol, Dist.: Solapur, Maharashtra State. The Industrial site is towards South-West of Solapur, at a distance of about 36 Km from city. Existing cane crushing capacity of the sugar factory is about 4900 TCD and Co-generation plant capacity is 11 MW & 30 KLPD Distillery. First crushing season for sugar factory and co-gen plant was done in year 2011. Now the management of JSL have plan to go for establishment of Synthetic Organic Chemical Manufacturing Unit (Acetic Anhydride Plant of 30000 MT/A) and 2 MW Captive Power Plant (CPP).

As per the Environmental Impact Assessment (EIA) Notification No. S. O. 1533 (E) dated 14.09.2006 and amendments thereto issued by the Ministry of Environment, Forest and Climate Change (MoEFCC) New Delhi; This JSL project comes under activities 5 (f), i.e. Synthetic Organic Chemical Manufacturing Unit. However, applicability of "General Conditions" (i.e. GIB sanctuary located within 5 Km of Project site) and due to project location in non - notified industrial area, the proposal is treated as Category 'A'. Moreover, the proposed project also needs to undergo public hearing as Industry will establish in non - notified industrial area.

Table 1 Project Investment Details

No.	Industrial unit	Capital Investment (Rs. Cr.)		
		Proposed	Existing	Total
1	Existing Sugar Factory, Co-gen & Distillery Unit	--	161.52	161.52
2	Proposed Chemical Manufacturing Unit	40	--	40
	Total	**40**	**161.52**	**201.52**

2) THE PLACE

The proposed establishment of Acetic Anhydride plant shall be carried out at existing set up of JSL. The total land acquired by the industry is **2, 25,133 Sq. M. (22.51Ha.)** The total built up area of proposed plant will be **1,445 Sq. M. (0.145 Ha)**. No objection certificate for the proposed project activity is obtained from Grampanchayat Watwate.

Table 2 Area Break up

No	Units	Area Details (Sq. M.)
1	**Existing Built - Up Area – Sugar, Co-gen & Distillery including roads & other amenity**	**31,000**
2	**Area reserved for future expansion of existing unit**	**21,100**
3	**Proposed Built - Up Area – Chemical plant**	**2,380**
	i. Process Plant	600
	ii. Tank Farm	1,440
	iii. Furnace Section	160
	iv. Control Room/ MCC Room	180
4	**Open Space Available**	**90,667**

No	Units	Area Details (Sq. M.)
5	**Existing Green Belt Area (32% of total plot area)**	**73,200**
6	**Proposed Green Belt (3% of total plot area)**	**6,753**
	Total Plot Area	**2,25,100**

Refer **Appendix – A** for plot layout plan of JSL

3) THE PROMOTERS

JSL promoters are well experienced and have made a thorough study of entire project planning as well as implementation schedule. The names and designations of the promoters are as under-

Table 3 List of Promoters

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

4) THE PRODUCTS

The details of products that would be manufactured under proposed Acetic Anhydride plant are represented in table 4 and those being manufactured under existing sugar factory, co-gen plant & distillery are represented in tables 5.

Table 4 List of Products for Proposed Project

Industrial unit	Product & By-product	Quantity	
		MT/D	MT/M
Chemical Plant	Acetic Anhydride	100	3000

Table 5 List of Products for Existing Units

Industrial unit	Product& By-product	Existing Quantity	
		MT/D	MT/M
Sugar Factory (4900 TCD)	White Sugar	588	17,640
	By-product		
	Molasses	196	5,880
	Bagasse	1470	44,100
	Press mud	196	5,880
Co-Gen (11 MW)	Electricity (MW)	264 MW	7920 MW
Distillery (30 KLPD)	Rectified Spirit /ENA	30	900
	CO_2 Gas	22	660

Details of manufacturing process and flow chart for proposed unit & existing sugar factory, co-gen plant and distillery are given in Chapter 2 of the EIA Report.

5) THE PURPOSE

The acetic anhydride market is anticipated to register a CAGR of more than 4% during the forecast period, 2019-2024. The market is majorly driven by the growing usage of acetic anhydride in laundry detergents and increasing demand from the pharmaceutical industry for

acetic anhydride as an intermediate. The growing usage of TAED in the laundry detergent segment has driven the market for acetic anhydride.

6) ENVIRONMENTAL ASPECTS

JSL has implemented an effective 'Environmental Management Plan' and various aspects of the same are as follows:-

A. Water Use, Effluent Generation and its Treatment

a. Water Use

Water consumption for proposed projects is presented at table 6 and details about water requirement for integrated complex re given in Table 7.

Table 6 Water Consumption in Chemical Plant

No.	Description	Water Consumption (M^3/Day)
1	Domestic	#6
2	Industrial	
	a. Processing	#2.5
	b. Acid Recovery Plant	#39
	c. Washing	#2
	d. R&D Lab, QC Lab & Pilot Plant	#2
	e. Cooling	450 (#385+*65)
	f. Boiler Feed	#40
	g. Scrubber	#2
	h. Other utility operations	#0.5
	i. DM backwash for boiler	#2
	Industrial Total	**540 (#475 + *65)**
3	Gardening	*55 (*50+$5)
	Grand Total	**601 (# 481+ *115+ $5)**

Note- # - Fresh water taken from Bhima river, *-Recycled water from proposed ETP,
$ - Recycled water from proposed STP

b. Total Water Requirement in JSL Integrated Complex

Table 7 Water Requirement for Integrated Complex

No	Activity	Description	Fresh Water Consumption (M^3/Day)	Treated effluent / Condensate (M^3/Day)	Total water (M^3/Day)
1	**Sugar** (4900 TCD) & **Co-gen** (11 MW)	Domestic	50 (100%)	0	50 (100%)
		Industrial & gardening	310 (13%)	2135(87%)	2445 (100%)
2	**Distillery** (30 KLPD)	Domestic	10 (100%)	0	10 (100%)
		Industrial & gardening	188 (54%)	162 (46%)	350 (100%)
	Total		**558 (20%)**	**2297 (80%)**	**2855(100%)**

Water requirement for proposed Chemical plant is to the tune of 601 CMD. Out of 601 CMD; 475 CMD will be fresh water, 115 CMD will be recycled water from proposed ETP & 5 CMD will be treated water from proposed STP For domestic purpose total 6 CMD fresh water will be used.

Water requirement for existing industrial activities of sugar factory & co-gen plant is to the tune of 2495 CMD. Out of this total water 2160 CMD will be Condensate from sugarcane will be recycled in process and 335 CMD fresh water taken from Bhima River.

For existing distillery operations total 360 CMD water is required. Out of this 162 CMD will be CPU treated water, 198 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.

b. Effluent Treatment

i) Domestic Effluent-

The domestic effluent from proposed chemical unit will be to the tune of 5.5 M^3/ Day; same will be treated in to proposed STP under integrated project complex. Treated water from proposed STP will be forwarded to green belt.

ii) Industrial Effluent-

The effluent generated from the proposed industrial activities comprise of effluents from process – 22 CMD, Acid Recovery plant -39 CMD, washing- 2 CMD & R & D Lab and QC Lab & Pilot plant - 2 CMD will be treated in proposed stream – I ETP further cooling tower BD- 45 CMD, Boiler BD- 4 CMD, Scrubber- 0.5 CMD, Other utility operations 0.5 & DM backwash for boiler- 2 CMD. This effluent would be treated in Stream -II ETP and reused in Process. Thereby, achieving '**Zero Liquid Discharge'** of the effluent.

Details of effluents generated from proposed chemical plant and existing units of sugar factory, co-gen plant and distillery are presented in following table.

Table 8 Effluent Generation in Chemical Plant

No.	Description	Effluent Generation (M^3/D)	Remark
1	**Domestic**	5.5	Proposed STP
2	**Industrial**		
	a. Processing	22	65 M^3/D - Stream – I.
	b. Acid Recovery plant	39	
	c. Washing	2	
	d. R & D Lab, QC Lab & Pilot plant	2	
	e. Cooling Tower blow down	45	52 M^3/D - Stream –II
	f. Boiler blow down	4	
	g. Scrubber	0.5	
	h. Other utility operations	0.5	
	i. DM backwash for boiler	2	
	Total	**117**	

Table 9 Effluent generation from for Integrated Complex

No	Activity	Effluent Generation	Disposal Method
1	**Sugar (**4900 TCD) & **Co-gen** (11 MW)	Domestic - 48	Treated in Septic tank
		Industrial - 520	Treated in well designed upgraded Effluent Treatment Plant (ETP)

No	Activity	Effluent Generation	Disposal Method
2	**Distillery** (30 KLPD)	Domestic - 10	Treated in Septic tank
		Raw Spentwash - 246 Conc. Spentwash-100 Other Effluent-255.5	The effluent generated from 30 KLPD distillery is in the form of raw spentwash. Raw spentwash is treated in bio-methanation plant followed by concentration in MEE. This spentwash were used for bio-composting.

B. Air Emissions

Under existing activities, 2 boilers of 70 TPH & 8TPH capacity is already installed in Sugar, Co-gen & Distillery. Fuel used for 70 TPH boiler is bagasse (30 MT/Hr) and Biogas (2900 M^3 /Hr) and for 8 TPH boiler biogas of 350 M^3 /Hr is used. 70 TPH boiler is provided with wet scrubber as APC equipment followed by stack of 72 M height and 8 TPH boiler is provided with stack 25 M. Also, two D.G. sets of 625 KVA each are installed in existing unit which are only used during power failure. Following table gives details of proposed boiler & DG Set.

Table 10 Details of Boiler and Stack

No.	Description	Proposed	
1	**Attached to**	**Boiler**	**DG Set**
2	Capacity	15 TPH	500 KVA
3	Fuel Type	Baggase	Diesel
4	Fuel quantity	7.0 MT/Hr	70-80 Ltr/Hr
5	Material of construction	MS	MS
6	Shape	Round	Round
7	Height, M	36	5 M (ARL)
8	Diameter	1.2	0.15 M
9	APC equipment	Bag filter	-

C. Noise Pollution Aspect

1. Sources of Noise

In the proposed plant noise generating sources generally are the boiler, reactors, compressors, and D.G. Set. & from existing units of Sugar factory, co-gen and distillery; noise generating sources generally are the boiler house, turbine rooms etc. The expected noise levels in these sections would be in the range of 60 to 65 dB (A). All preventive measures such as regular operation & maintenance of pumps, motors, and compressors would be carried out and enclosures would be provided to abate noise levels at source.

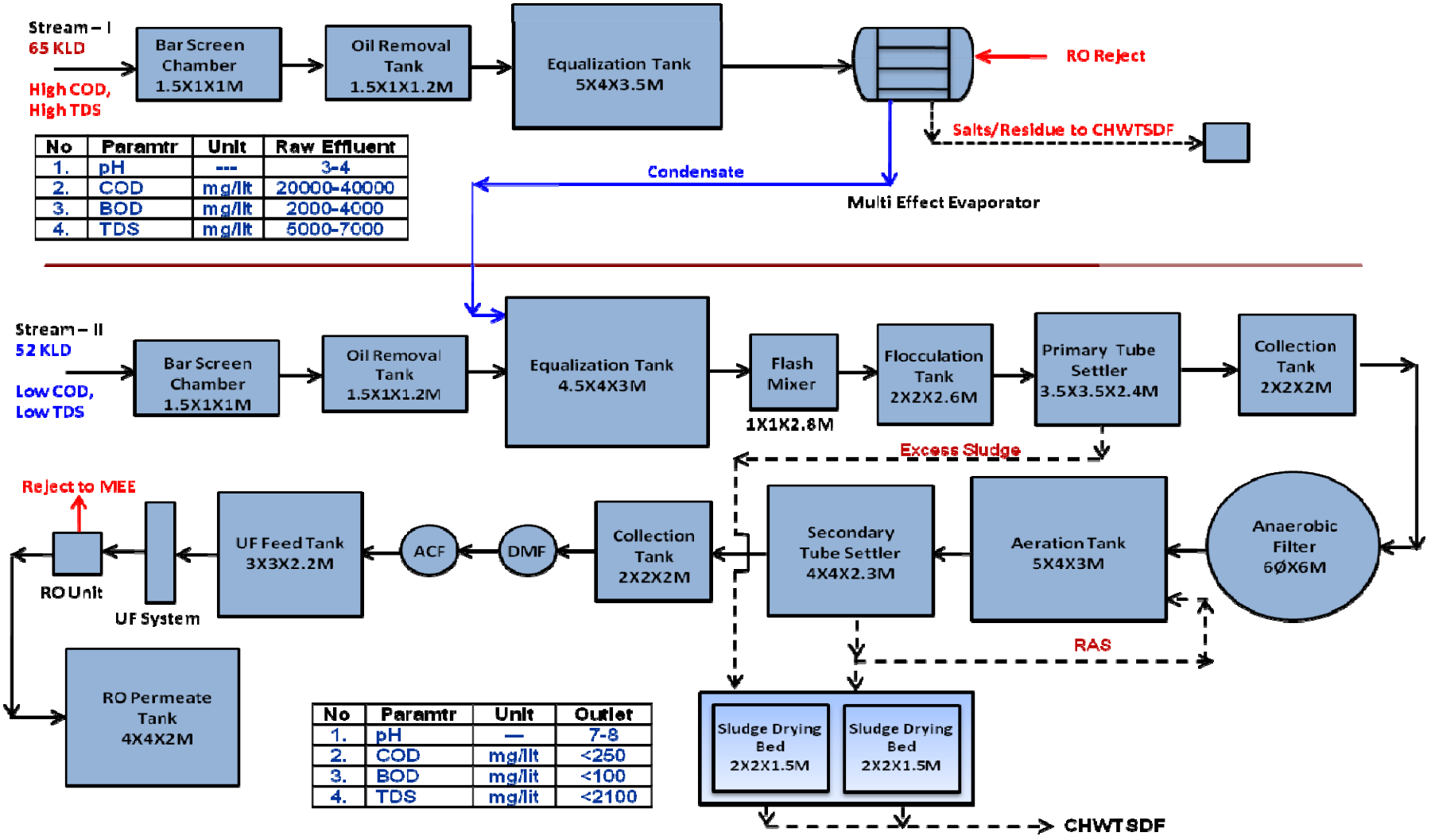
2. Control Measures

Isolation, separation and insulation techniques to be followed, PPEs in the form of earmuffs, earplugs etc. would be provided to workers. D.G. Sets are enclosed in a separate canopy to reduce the noise levels.

D. Hazardous Waste

Hazardous waste being generated from proposed chemical plant & existing operations and their disposal method is presented in table 11 and 12 respectively.

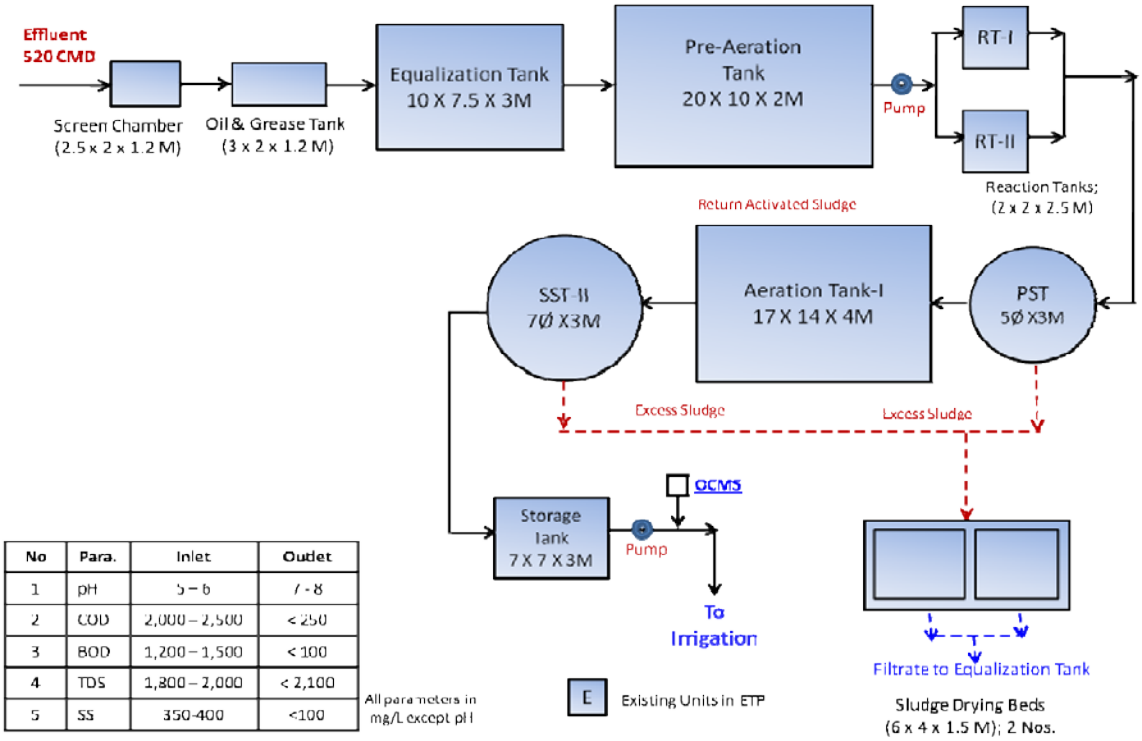
Figure 2.4 Flow Chart of ETP (Proposed Unit)



No	Paramtr	Unit	Raw Effluent
1.	pH	---	3-4
2.	COD	mg/lit	20000-40000
3.	BOD	mg/lit	2000-4000
4.	TDS	mg/lit	5000-7000

No	Paramtr	Unit	Outlet
1.	pH	—	7-8
2.	COD	mg/lit	<250
3.	BOD	mg/lit	<100
4.	TDS	mg/lit	<2100

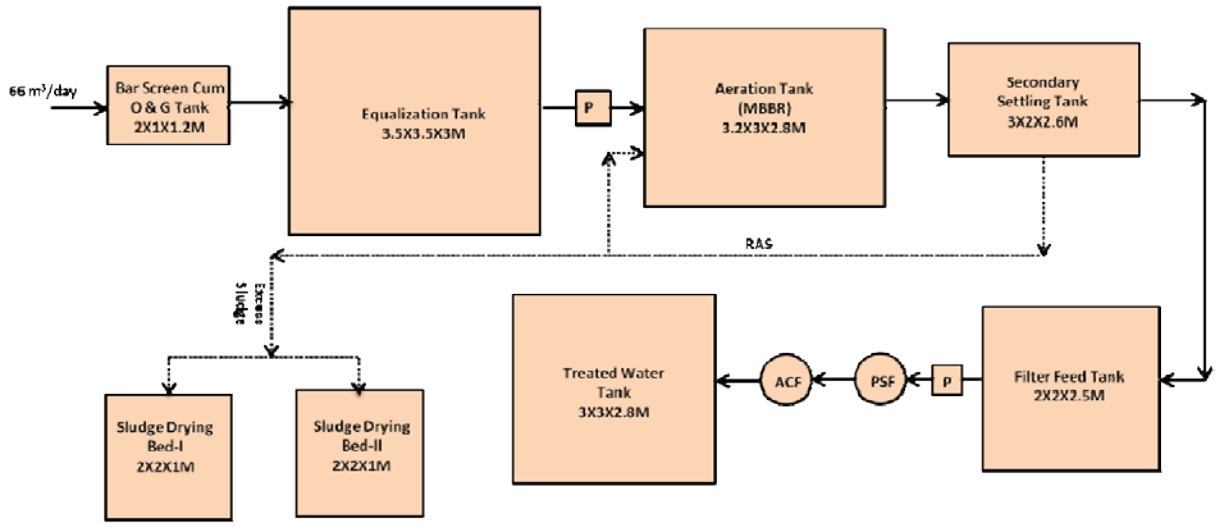
Figure 2.5 Flow Chart of Sugar Factory ETP (Existing)



No	Para.	Inlet	Outlet
1	pH	5 – 6	7 - 8
2	COD	2,000 – 2,500	< 250
3	BOD	1,200 – 1,500	< 100
4	TDS	1,800 – 2,000	< 2,100
5	SS	350-400	<100

All parameters in mg/L except pH

Figure 2.6 Flow Chart of Proposed STP



No	Parameters	Unit	Inlet	Outlet
1.	pH	—	6.5 – 7.5	7.2 – 7.5
2.	COD	mg/lit	500 - 600	< 30
3.	BOD	mg/lit	250 - 300	< 10
4.	TSS	mg/lit	250 - 400	< 5
5.	O & G	mg/lit	25 - 50	< 10

PSF – Pressure Sand Filter
ACF – Activated Carbon Filter
RAS – Return Activated Sludge
P – Pump

Flow Line
Recirculation Line

Table 11 Details of Hazardous Waste from Proposed Unit

No.	Description	Cat	**Proposed** (MT/M)	Disposal
1	Process Residue	28.1	19.8	Forwarded to CHWTSDF
2	ETP Sludge	35.3	4	Forwarded to CHWTSDF
3	Empty Containers & Drums	33.1	500 No.	Authorized recycler
4	Contaminated cotton rags/other cleaning material	33.2	0.06	Forwarded to CHWTSDF

Table 12 Details of Hazardous Waste from Existing Units

No.	Hazardous Waste	Cat	Existing Quantity (MT/ M)	Disposal
1	Used Oil	5.1	1.48	Burnt in boiler.

E. Solid Wastes

Table 13 Solid Waste Generation & Disposal from Proposed Unit

No.	Type of Waste	**Quantity** (MT/D)	Disposal
1	Plastic & paper waste	0.8 MT/M	By Sale as scrap
2	Boiler Ash	126 MT/M	Brick /Cement Industry

*Agreement with brick manufacturer shall be done under proposed expansion.

Table 14 Solid Waste Generation & Disposal from Existing Units

No	Type of Waste	Existing MT/D	Disposal
1	Boiler Ash (Co-gen-Bagasse)	22	Given to brick manufacturers or manure
2	Yeast Sludge	5	Used as Manure
3	ETP sludge	0.16	Sludge is utilized as manure.
4	CPU sludge	0.16	Used as Manure

F. Odour Pollution

There are different odour sources in a chemical plant, which include raw material & product storage places, process operations, loading/unloading sections etc. which could give rise to smell nuisance. To abate the odour problems, the industry shall take following steps and actions-

1. All the feed, loading & unloading pumps for products and raw materials to be fitted with mechanical seals instead of glands to reduce leakages through pumps.
2. The products and raw materials loading & unloading area shall be provided with fumes extraction system comprising of circulation pump with blower and scrubber. The bulk storage tanks will be connected to scrubbers for taking care of fumes coming out from vent. Adoption of Good management practices (GMPs).
3. Arranging awareness and training camps for workers. Provision and use of PPE like masks by everybody associated with odour prone areas.
4. Installation of appropriate, adequate and efficient exhaust and ventilation system to remove and control odour from work zone areas.

G. Compliance with the Norms

All the relevant acts, rules and guidelines with respect to effluent treatment and disposal, solid & hazardous wastes handling and disposal as well as in respect of emission handling

and disposal, wherever applicable, as specified by the Maharashtra Pollution Control Board (MPCB) or any other concerned authority are strictly followed in the existing set up. Same practice shall be continued in implementation of proposed project.

H. Environmental Management Cell (EMC)

JSL is already having an EMC functioning under its Sugar factory, co-gen projects & Distillery. Members of the EMC are well qualified and experienced in their concerned fields. This cell shall be further augmented suitably under establishment. Existing and proposed EMC members are as under.

Table 15 Environmental Management Cell of JSL

No.	Name of Member	Designation	Number of Working Person(s)
1	Mr. S. B. Jadhav	Managing Director	1
2	Mr. K. C. Kotkar	General Manager (Distillery)	1
3	Mr. N. M. Kumbhar	Chief Chemist	1
4	--	Representative of Env. Consultant	1
5	Mr. G.D. Yadav	Environmental Officer	1
6	Mr. P. J. Pawar	Lab Incharge	1
7	Mr. V. S. Jadhav	Industrial Health & Safety Officer	1

The capital as well as O & M cost towards environmental aspects under the proposed & existing activities would be as follows –

Table 16 Capital As Well As O & M Cost (Proposed & Existing)

No.	Description	Cost Component (Rs. Crores)	
		Capital	Annual O & M
A	**Proposed**		
2	APC system (Bag filter + Stack (Height 36 M) Online Continues Monitoring System (OCMS)	1.50	0.15
3	Proposed ETP Stream - I & Stream - II & STP, OCMS	2.60	0.25
4	Noise Pollution Control	0.25	0.01
5	Environmental Monitoring & Management	0.25	0.02
6	Occupational Health & Safety	0.30	0.03
7	Green Belt Development & Rain Water Harvesting	0.30	0.04
8	Proposed CER (for 5 years after implementation)	0.8	-
	Total (15 % of Capital investment)	**6.0**	**0.5**
B	**Existing**		
1	APC system (Wet Scrubber + Stack (Height 72M) for Co-gen Boiler, Online Monitoring System.	1.35	0.10
2	Existing Sugar Factory CPU & ETP, MEE, Biomethanation	3.50	0.37
3	Noise Pollution Control	0.25	0.06
4	Environmental Monitoring & management	0.25	0.02
5	Occupational Health & Safety	0.50	0.05
6	Green Belt Development & Rain Water Harvesting	0.50	0.10
7	Existing CER	0.40	-
	Total	**6.75**	**0.7**
	Grand Total (A + B)	**12.75**	**1.2**

I. Rainwater Harvesting Aspect

- Total area of Plot – 2,25,133 M^2
- Total Open space – 1,92,655 M^2
- Average annual rainfall in the area = 625 mm.

➢ Rooftop Harvesting

- Roof Top harvesting area of 32,445 M^2
- Roof Top harvesting yield is – 16,355.28 M^3

➢ Surface Harvesting

- Surface Harvesting area of 1,92,655 M^2
- Surface harvesting yield is – 60,204.69 M^3

Hence, the total water becoming available after rooftop and surface harvesting would be 50 ML

$$16352.28 + 60,204.69 = 76,557\ M^3 \text{ i.e. } 77\ ML$$

J. The Green Belt

Table 17 Area Details

No	Units	Area Details (Sq. M.)
1	Existing Built - Up Area – Sugar, Co-gen & Distillery including roads & other amenity	31,000
2	Area reserved for future expansion of existing unit	21,100
3	Proposed Built - Up Area – Chemical plant	2,380
4	Open Space Available	90,667
5	Existing Green Belt Area (32% of total plot area)	73,200
6	Proposed Green Belt (3% of total plot area)	6,753
	Total Plot Area	**2,25,100**

Criteria for Green Belt Development Plan

Emission of SPM, SO_2 is the main criteria for consideration of green belt development. Green belt development is provided to abate effects of the emissions of SPM & SO_2. Moreover, there would also be control on noise from the industry to surrounding localities as considerable attenuation would occur due to the barrier of trees in proposed green belt.

K. Socio-Economic Development

Socio economic study was carried out in 13 villages out of 24 villages within 10 Km radius of the study area was carried out with the help of an interview schedule. 30 questions in Marathi, which was drafted prior to and employed during the survey. Schedule was administered in month of December, 2018. Refer Socio – economic profile in Chapter 3 of EIA report for detailed information of socio economic aspect.

- The villages in the study area have basic facilities like drinking water, preliminary educational infrastructure, toilets and electricity. However, most villages lacked good roads, drainage and solid waste management system and PHC.
- Major crops grown in area are sugarcane, Sorghum, Wheat and millets. However, after the installation up of the sugar factory the earlier food crops are replaced by sugarcane as cash crop.

7) ENVIRONMENTAL MONITORING PROGRAMME

Reconnaissance of the study area was undertaken in the month of September 2018. Field monitoring for measuring meteorological conditions, ambient air quality, water quality, soil quality and noise levels was initiated in October 2018. Report incorporates the data monitored during the period from October 2018 to December 2018 and secondary data collected from various sources which include Government Departments related to ground water, soil, agriculture, forest etc.

A. Land Use

Land use study requires data regarding topography, zoning, settlement, industry, forest, roads and traffic etc. Collection of this data was done from various secondary sources viz., Census books, Revenue records, State and Central Government Offices, Survey of India toposheets as well as high resolution satellite image and through primary field surveys.

B. Land Use/ Land Cover Categories of Study Area

Table 18 Land Use/ Land Cover

No.	Land Use Land Cover	Area (Ha)	Percentage (%)
1	Built Up Area	563	1.79
2	Crop Land	14120	44.95
3	Fallow Land	8319	26.48
4	Water Bodies	51	0.16
5	River	430	1.37
6	Scrub	7932	25.25
	Total	**31415**	**100.00**

C. Meteorology

Methodology adopted for monitoring surface observations is as per the norms laid down by Bureau of Indian Standards (BIS) and the India Meteorology Department (IMD). On-site monitoring was undertaken for various meteorological variables in order to generate the data. Further, certain secondary meteorological data like temperatures, relative humidity, rainfall intensity etc. have been taken from IMD, Solapur.

Meteorological parameters were monitored during the period October 2018 to December 2018. Details of parameters monitored, equipments used and the frequency of monitoring have been given in Chapter 3 of the EIA report. Hereunder, details of predominant wind directions and wind categories are given.

D. Air Quality

This section describes the selection of sampling locations, includes the methodology of sampling and analytical techniques with frequency of sampling. Presentation of results for February 2018 to April 2018 survey is followed by observations. All the requisite monitoring assignments, sampling and analysis was conducted through the laboratory of Green Enviro safe Engineers & Consultant Pvt. Ltd Pune. The Lab has received NABL accreditation and has been approved by MoEF; New Delhi. Further, same has received certifications namely ISO 9001 – 2008 and ISO 9001 – 2004.

Ambient air monitoring was conducted in the study area to assess the quality of air for PM_{10}, $PM_{2.5}$, SO_2, NO_x and CO. The various monitoring stations selected are shown in following table.

Table 19 Ambient Air Quality Monitoring (AAQM) Locations

Section code	Location	Direction from site	Distance from site (In Km)	Justification
A 1	Project site	--	--	--
A 2	Watwate	E	1.0	Nearest habitation
A 3	Jamgaon Bk	E	4.15	Upwind
A 4	Yenaki	NW	2.22	Downwind
A 5	Arbali	SW	4.0	
A 6	Inchgaon	NW	5.75	
A 7	Miri	S	3.33	Crosswind
A 8	Wagholiwadi	N	4.59	

Table 20 Summary of the AAQ Levels for Monitoring Season [October 2018 to December 2018]

Parameter		Location							
		Project Site	Watwate	Jamgaon Bk.	Yenaki	Arbali	Inchgaon	Miri	Wagholiwadi
PM_{10} $\mu g/M^3$	Max	63.32	63.94	62.11	62.13	61.03	62.27	62.38	61.17
	Min	56.21	55.98	55.11	56.36	55.21	56.03	57.23	54.93
	Avg	59.58	60.01	58.45	59.19	57.83	58.10	58.80	57.04
	98%	63.27	63.59	62.03	62.11	61.01	62.14	62.00	61.05
$PM_{2.5}$ $\mu g/M^3$	Max	23.77	25.01	22.27	26.02	24.52	23.81	25.64	22.31
	Min	18.04	18.66	16.54	18.66	17.16	18.73	19.17	17.23
	Avg	20.69	21.01	19.18	21.76	19.97	20.53	21.82	19.06
	98%	23.60	24.55	22.10	25.56	24.06	23.35	25.50	21.87
SO_2 $\mu g/M^3$	Max	28.18	29.98	27.68	28.68	28.18	27.18	28.01	26.68
	Min	17.16	15.60	16.66	16.46	15.57	16.16	15.99	15.66
	Avg	21.74	13.87	21.20	22.50	21.63	20.68	21.10	20.28
	98%	27.81	29.61	27.31	28.45	27.95	26.92	27.53	26.43
NOx $\mu g/M^3$	Max	31.77	33.04	31.37	32.09	31.69	30.97	32.42	30.57
	Min	25.47	28.51	25.47	26.54	26.14	24.84	25.80	24.44
	Avg	28.81	30.54	28.45	29.42	28.86	28.05	28.72	27.70
	98%	31.62	32.78	31.22	31.81	31.41	30.82	32.33	30.42
CO mg/M^3	Max	0.150	0.150	0.140	0.140	0.130	0.130	0.130	0.120
	Min	0.050	0.050	0.050	0.050	0.040	0.050	0.040	0.020
	Avg	0.071	0.070	0.070	0.081	0.069	0.068	0.071	0.049
	98%	0.141	0.141	0.131	0.135	0.125	0.121	0.126	0.111

Note:

- PM_{10}, $PM_{2.5}$, SO_2 and NO_x are computed based on 24 hourly values.
- CO is computed based on 8 hourly values.

Table 21: National Ambient Air Quality Standards (NAAQS) Specified By Central Pollution Control Board Notification (New Delhi, The 18th November, 2009)

		Zone Station	
		Industrial and mixed use zone	**Residential and rural zone**
PM_{10} $\mu g/M^3$	24 Hr	100	100
	A.A.	60	60
$PM_{2.5}$ $\mu g/M^3$	24 Hr	60	60
	A.A.	40	40
SO_2 $\mu g/M^3$	24 Hr	80	80
	A.A.	50	20
NOx $\mu g/M^3$	24 Hr	80	80
	A.A.	40	30
CO mg/M^3	8 Hr	2	2
	1Hr	4	4

Note: A.A. represents "Annual Average

Water Quality

Sampling and analysis of water samples for physical, chemical and heavy metals were also undertaken through the laboratory of Green Enviro safe Engineers & Consultant Pvt. Ltd Pune. Eight locations for surface water and nine locations for ground water were selected. Same are listed below

Table 22 Monitoring Locations for Surface Water

Station Code	Name of the Station	Distance from Site Km	Direction from Site	Justification
SW1	Nala - Near Yenaki	1.0	W	--
SW2	Vadpur	4.12	S	Downstream
SW 3	Nala - Near Compost yard (South side)	1.45	S	--
SW 4	Siddhapur (River)	4.92	S	Downstream
SW5	Arali (River)	9.72	S	
SW6	Arbali (River)	5.0	SW	Upstream

Table 23 Monitoring Locations for Ground Water

Village / Well location	Latitude	Longitude	Water Level in M from msl	Direction from Site
GW1	17°33′46.64"N	75°38′53.03"E	437	S
GW2	17°33'43.42"N	75°38'53.16"E	333	S
GW3	17°33'38.80"N	75°39'1.14"E	329	SE
GW4	17°33'14.68"N	75°38'54.31"E	428	S
GW5	17°34'40.91"N	75°38'43.83"E	429	NW
GW6	17°34'25.19"N	75°38'35.15"E	435	W
GW7	17°34'23.79"N	75°38'33.56"E	431	W
GW8	17°34'7.93"N	75°39'17.46"E	432	E

Results observed after monitoring from above locations are well within the limits as per IS10500:2012. Refer draft EIA report of JSL, Chapter 3.

F. Noise Level Survey

Study area of 10 Km radius with reference to the proposed project site has been covered for noise environment. four zones viz. Residential, Commercial, Industrial and Silence Zones

have been considered for noise monitoring. Some of the major material roads were covered to assess the noise due to traffic. Noise monitoring was undertaken for 24 hours at each location. Details of noise monitoring stations are given in following table-

Table 24 Noise Sampling Locations

Station Code	Name of the Sampling Point	Distance from Site Km	Direction from Site
N1	Project site	--	--
N2	Watwate	1.0	E
N3	Jamgaon Bk	4.15	E
N4	Yenaki	2.22	NW
N5	Arbali	4.0	SW
N6	Ichgaon	5.75	NW
N7	Miri	3.33	S
N8	Wagholiwadi	4.59	N

Table 25 Ambient Noise Levels

Sr. No.	Location	Average Noise Level in dB(A)					
		L_{10}	L_{50}	L_{90}	$L_{eq(day)}$	$L_{eq(night)}$	L_{dn}
1	N1	59.46	62.60	68.02	65.3	62.3	69.7
2	N2	44.13	46.35	48.37	51.5	42.0	51.7
3	N3	44.32	46.50	48.53	51.2	42.6	51.8
4	N4	44.74	46.80	48.48	50.8	43.4	52.0
5	N5	45.04	47.10	49.14	51.5	43.4	52.3
6	N6	44.59	47.15	49.18	51.2	44.5	52.7
7	N7	44.95	47.00	48.71	50.4	44.2	52.2
8	N8	44.45	45.90	48.20	49.8	42.5	51.0

G. Socio-Economic Profile

The survey of 13 villages, selected out of 24 villages, taking the reference of census 2011, within the 10 Km radius of JSL, was carried out with the help of a structured close ended interview schedule prepared for the exercise, comprising of 30 questions in Marathi. Chapter 3 may be referred for details of this aspect.

H. Ecology

Ecological survey for proposed activity was conducted from early morning till evening on 4 days (i.e. 24 to 27 December 2018).

During EB study Topo sheet (surveyed in 1967-68 and updated during 2005-06), IRS LISS IV satellite imagery and LULC maps based on them were used. Similarly relevant data from Solapur District Census (2011) and District Gazetteer, and other relevant literature were referred. In Ecology study ground truthing was done during field visits by confirming the LULC maps to learn major macro and micro habitats in the study area. The representative terrestrial habitat locations such as grassland, scrub, agriculture and in wetland habitats streams, water tanks and rivers were identified in the vicinity of the study villages.

Observations

1. The area being situated on the Deccan plateau makes the study area relatively plane with average elevation of 470 m above MSL.

2. The terrain of study area in the 10 Km radius from project site is predominantly flat terrain with dwarf scattered hills.
3. Birds are considered as good indicators of habitat health condition, avifauna was given more attention during the EB field study visits.

8) ADDITIONAL STUDIES & INFORMATION

Risks Assessment –

Risk to human health is inherent. It is safe only when the installation is dismantled at the end of its useful life. The following principles should be used as guidelines for the selection of risk criteria -

1. Increase in risk, caused by the presence of the plant to local community (i.e. neighboring public) should be negligible in comparison to the risk they already have in their daily life.
2. Work force on the plant should be expected to accept a potentially greater risk than members of the local community since the work force have been trained to protect themselves from the possible hazards and thus reducing the actual risk to themselves.

Risk criteria considered by Green A.G. (1982) are given as below:

1. Risk to Plant: This risk is to be given priority only when it is proved beyond doubt that the risk to life is so low that reducing this risk may not be justified. Under this consideration, the risk to economic damage may be considered.
2. Risk to Public and Employees: The scale used for risk to employee and public is Fatal Accident Rate (F.A.R.) or more commonly Fatal Accident Frequency Rate. (F.A.F.R.). The F.A.R. and F.A.F.R. is defined as number of deaths from industrial injury expected in a group of 1000 men during their working period.

For more details w.r.t. this aspect, Chapter 7 may be referred.

9) ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Impact on Topography

No major topographical changes are envisaged in the acquired area as it is establishment of acetic anhydride plant. In acquired area, the changes would be due to the manmade structures, like distillery structure and ancillary units. The industrial activity would invite positive benefits in the form of land leveling and tree plantation in the plant vicinity and other premises

B. Impact on Climate

Impact on the climate conditions due to the proposed establishment activity is not envisaged, as emissions to the atmosphere, of flue gases with very high temperatures are not expected.

C. Impact on Air Quality

A study area of 10 km radius is considered for determination of impacts

i. Baseline Ambient Air Concentrations

24 hourly 98^{th} percentile concentrations of PM_{10}, $PM_{2.5}$, SO_2 and NOx in Ambient Air, recorded during the field study conducted for the season October-November-December 2018 are considered as baseline values. They represent impact due to operations of existing nearby industries on this region. Average concentrations of above mentioned parameters, at this location, are considered to be the 'Baseline Concentrations' to determine the impact of

proposed industrial operation on ambient air quality. Existing baseline concentrations are summarized in following table and the GLC of the same is included in 4th chapter of EIA report.

Table 26 Baseline Concentrations

Parameter	98 Percentile Concentration	NAAQS	Remark
PM_{10}	63.27µg/m^3	100 µg/m^3	The baseline concentrations for all parameters monitored are well within the limits.
$PM_{2.5}$	23.60µg/m^3	60 µg/m^3	
SO_2	27.81µg/m^3	80 µg/m^3	
NO_X	31.62µg/m^3	80 µg/m^3	
CO	0.141mg/m^3	4 mg/m^3	

ii. Air Polluting Source

Under existing activities, 2 boilers of 70 TPH & 8TPH capacity is already installed in Sugar, Co-gen & Distillery. Fuel used for 70 TPH boiler is bagasse (30 MT/Hr) and Biogas (2900 M^3 /Hr) and for 8 TPH boiler biogas of 350 M^3 /Hr is used. 70 TPH boiler is provided with wet scrubber as APC equipment followed by stack of 72 M height and 8 TPH boiler is provided with stack 25 M. Also, two D.G. sets of 625 KVA each are installed in existing unit which are only used during power failure. Following table gives details of proposed boiler & DG Set.

D. IMPACT ON WATER RESOURCES

i. Impact on Surface Water Resources & Quality

The total water required for various industrial processes and operations in the proposed project by JSL shall be to the tune of 601 CMD. Out of which **481** CMD shall be met from Bhima River. Industry has been granted permission for lifting 0.20 Million M^3water annually from the Irrigation Dept; Govt. of Maharashtra For details w.r.t water consumption refer Chapter 2, from EIA report. There will not be any significant impact in surface water resource. Refer **Appendix – C** for water permission letter from EIA report.

The effluent generated from the proposed industrial activities comprise of effluents from process – 22 CMD, Acid Recovery plant -39 CMD, washing- 2 CMD and R & D Lab and QC Lab & Pilot plant - 2 CMD will be treated in proposed stream – I ETP further cooling Tower BD- 45 CMD, Boiler BD- 4 CMD, Scrubber- 0.5 CMD, Other utility operations 0.5 & DM backwash for boiler- 2 CMD. This effluent would be treated in Stream -II ETP and reused in Process. Thereby, achieving **'Zero Liquid Discharge'** of the effluent.

ii. Impact on Ground Water Resources& Quality

Ground water will not be a source of raw water for the proposed as well as existing project. Moreover, there will not be any discharge of untreated effluent so there will not be any impact on ground water level and quality.

E. IMPACT ON SOIL

Impact on the soil characteristics is usually attributed to air emissions, wastewater discharges and solid waste disposal. Under existing sugar factory & co-gen plant, as mentioned above, there will not be discharge of any untreated effluent on land. Wet scrubber is installed to existing boiler. From proposed project Solid waste generated would be in the form of boiler ash and plastic and paper waste. Boiler ash is sold to farmers/brick manufacturers whereas plastic and paper waste will be sale as scrap. Domestic effluent would be treated in proposed

STP. Hence, there will not be any major increase in chemical constituents of soil through deposition of air pollutants/ discharge of waste water. Moreover, there will not be any process emissions worth mentioning, the impact on the soil characteristics will be nil.

F. IMPACT ON NOISE LEVELS

Workers could get annoyance and can lose concentration during operation. It can cause disturbance during working. People working near the source need risk criteria for hearing damage while the people who stay near the industry need annoyance and psychological damage as the criteria for noise level impact analysis. It is quite obvious that the acceptable noise level for the latter case is less than the former case. Ear of workers can get damage. In long exposure, workers can get nerves system affected due to noise.

G. IMPACT ON LAND USE

Present use of the project land is industrial wherein the sugar factory, cogeneration plant and distillery have already been established. Proposed establishment activity would be implemented in existing premises of sugar factory co-gen plant & distillery. Hence no change in the land use pattern is expected. Therefore the impact on land use is non-significant.

H. IMPACT ON FLORA AND FAUNA

Discharge of the untreated wastewater from the industry in surrounding area can also cause significant environmental impact on the aquatic habitats and affect dependent biodiversity. The details in respect of impacts on ecology and biodiversity are described in Chapter 3 at Section 3.12.

I. IMPACT ON HISTORICAL PLACES

No historical place is there within the study area and the impact is nil.

10) SALIENT FEATURES OF EMP

The following routine monitoring programme as detailed in Table 27 shall be implemented at site. Besides to this monitoring, the compliances to all Environmental Clearance conditions and regular permissions from CPCB /MoEFCC shall be monitored and reported periodically.

Table 27 Plan for Monitoring of Environmental Attributes in and around industry

No.	Description	Location	Parameters	Frequency	Conducted by
1	Ambient Air Quality	Upwind-1, Downwind-2 (Near Main ETP, Near Colony.)	PM_{10}, $PM_{2.5}$, SO_2, NOx, CO	Monthly	MoEFCC and NABL Approved External Lab
		Study area - (Villages namely –Project Site, Watwate, Jamgaon Bk., Yenaki, Arbali, Inchgaon, Miri, Wagholiwadi)		Quarterly	
2	Work Zone Air Quality	In manufacturing blocks	PM_{10}, $PM_{2.5}$, SO_2, NOx, CO, NH_3 , Benzene & VOC	Monthly	
3	Fugitive Emissions	Raw Material Storage Area, Packing Area	VOC	Monthly	
4	Stack Emissions	Boiler – 1 Nos. (15 TPH), D.G Sets	SPM, SO_2, NOx	Monthly	
5	Ambient Noise	5 Locations (Near main gate, Near ETP, near Sugar Godown ,Near Distillation section , Near fermentation section)	Spot Noise Level recording; Leq(n), Leq(d), Leq (dn)	Monthly	
	Work zone Noise	5 Locations - (Near reactor section, Distillation section, Boiler, DG set, Turbine section)		Monthly	
6	Effluent	Treated, Untreated	pH, SS, TDS, COD, BOD, Chlorides, Sulphates, Oil & Grease.	Monthly	
7	Drinking water	Factory canteen / Residential Colony	Parameters as per drinking water Std IS:10500	Monthly	
8	Soil	8locations within 5 Km (Villages - Industrial Site, Kusur, Antroli, Koravali, Wagholiwadi, Sohale, Inchgaon, Tamdardi)	pH, Salinity, Organic Carbon, N, P, K	Quarterly	
9	Water Quality (Ground Water & Surface Water)	Ground Water and Surface Water	Parameters as per CPCB guideline for water quality monitoring – MINARS/27/2007-08	Quarterly	
10	Waste management	Implement waste management plan that Identifies and characterizes every waste associated with proposed activities and which identifies the procedures for collection, handling & disposal of each waste arising	Records of Solid Waste Generation, Treatment and Disposal shall be maintained	Twice in a year	By JSL
11	Emergency Preparedness such as fire	Fire protection and safety measures to take care of fire and explosion hazards, to be assessed and steps taken for their prevention.	On site Emergency Plan, Evacuation Plan, fire fighting mock drills	Twice a year	

No.	Description	Location	Parameters	Frequency	Conducted by
	fighting				
12	Health Check up	Employees and migrant labour health check ups	All relevant health check-up parameters as per factories act.	Once in a Year	
13	Green Belt	Within Industry premises as well as nearby villages	Survival rate of planted sapling	In consultation with DFO.	
14	CER	As per activities	--	Six Monthly	