P-387-SHARAYU-SUGAR-22019
(Revision - 01)

SUMMARY ENVIRONMENTAL IMPACT ASSESSMENT

(EIA) REPORT

(IN ENGLISH AND MARATHI)

FOR

PROPOSED EXPANSION MOLASSES BASED DISTILLERY FROM 60 KLPD TO 120 KLPD

BY

SHARAYU AGRO INDUSTRIES LTD.

POST KAPSHI, TAL.: PHALTAN,
DIST.: SATARA, MAHARASHTRA

PREPARED BY

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AN ISO 9001 : 2015 & QCI - NABET ACCREDITED ORGANIZATION

NOVEMBER - 2019

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Summary of Draft EIA Report
for
Expansion of Molasses based Distillery from 60 KLPD to 120 KLPD in the Existing Premises of
Sharayu Agro Industries Ltd.

Located at Post Kapshi, Tal.: Phaltan, Dist.: Satara, Maharashtra.

1) THE PROJECT

Sharayu Agro Industries Ltd. (SAIL) is located at Post Kapshi, Tal.: Phaltan, Dist.: Satara, Maharashtra state. The Industrial site is towards North - East of Phaltan, at a distance of about 19.87 Km from site. Existing cane crushing capacity of the sugar factory is about 5000 TCD and Co-generation plant capacity is 30 MW and Distillery is 60 KLPD. First crushing season for sugar factory and co-gen plant was done in year 2015-16. Now the management of SAIL have plan to go for expansion of molasses based distillery from 60 KLPD to 120 KLPD (expansion by 60 KLPD).

This report is made in the overall context of 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 Project type 5 (g). Accordingly, Form 1 application is submitted to MoEFCC; New Delhi and Standard ToRs granted on 18.10.2019. The amendment was done in EIA Notification of 2006 on 13.06.2019 [Notification No. S.O. 1960 (E)]. As per the amendment project comes under **Category A.**

Table 1 Project Investment Details

Sr. No.	Industrial unit	Capital Investment (Rs. Cr.)		
		Existing	Expansion	Total
1.	Sugar Factory, Co-gen Plant	246.61	-	246.61
2	Distillery	92.84	46.55	139.39
	Total	**339.45**	**46.55**	**386.00**

2) THE PLACE

Total land area acquired by the SAIL is 30.75 Ha. Proposed expansion of distillery shall be carried out at existing premises of SAIL. Total built up area under existing sugar factory, co-gen plant & distillery is 6.09 Ha. Proposed built-up area for expansion of distillery is 0.2 Ha. A no objection certificate for the expansion project has been obtained from the Kapshi Grampanchayat. Refer Appendix – A of EIA report for plot layout plan of SAIL. Detailed area break-up is presented at table –

Table 2 Area Break up

No.	Description	Area (Sq. M)
1	Total Plot Area	3,07,500.00
2	Total Built up Area after expansion of Distillery	62,938.35
3	Total Open Area after expansion	1,36,639.17
4	Total Green Belt - 35 % of Total Plot Area	1,07,922.48
	Existing Green Belt Area (6% of Total Plot Area)	18,747.48
	Proposed Green Belt Area under Expansion (29% of Total Plot Area)	89,175.00

3) THE PROMOTERS

SAIL promoters are well experienced in the field of Sugar, Co-gen & Distillery 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	Hon. Shrinivas A. Pawar	Chairman
2	Hon. Amarsinh P. Patil	Executive Director
3	Mr. Ravindra D. Patil	General Manager
4	Mr. Shankar Zanje	Environmental Officer

4) THE PRODUCTS

Details of products that are manufactured under existing as well as expansion project are presented in Table 4.

Table 4 Product & By-product of for integrated Complex

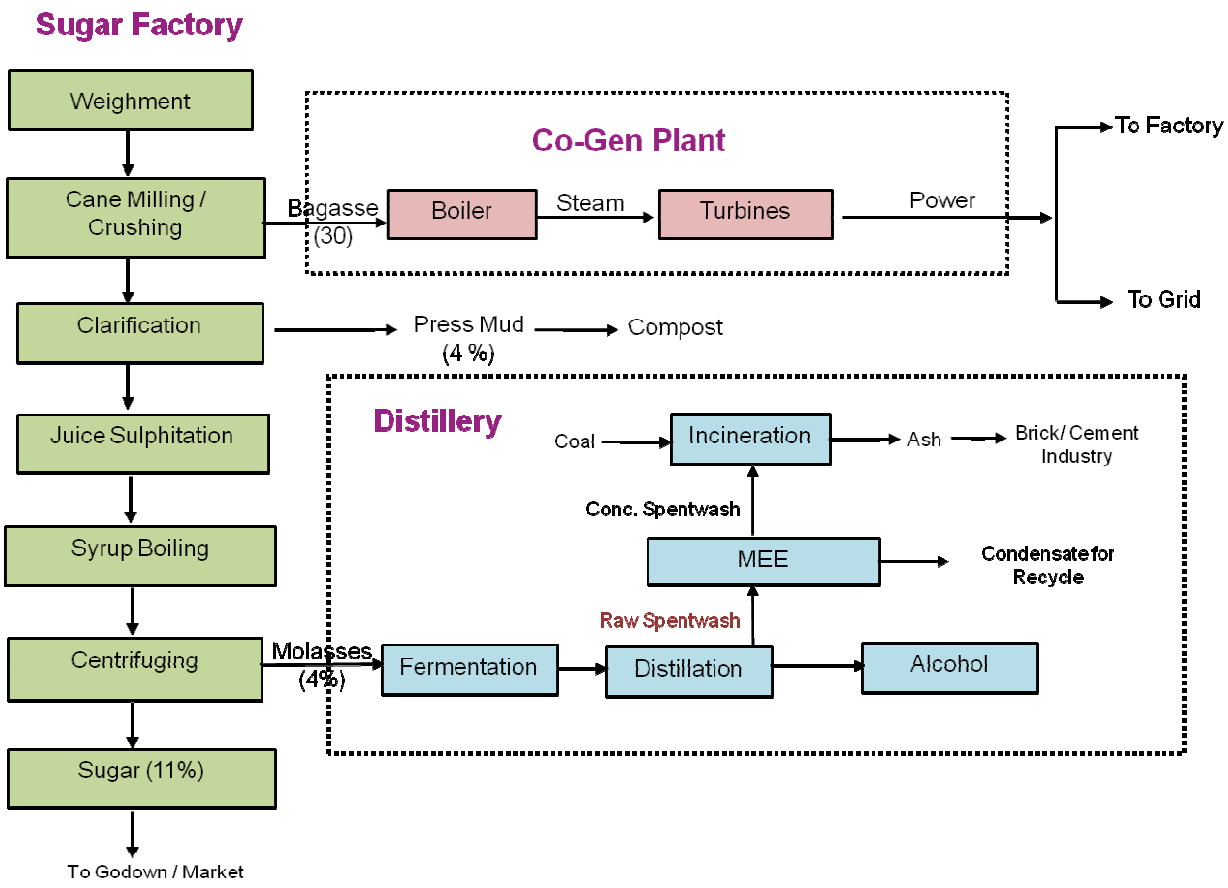
Industrial Unit	Product	Quantity		
		Existing - 60 KLPD	**Expansion -** 60 KLPD	**Total -** 120 KLPD
Distillery (KLPD)	Rectified Spirit (RS)/ Extra Neutral Alcohol (ENA) / Ethanol	60	60	120
	By-products			
	CO_2	46 MT/D	46 MT/D	92 MT/D
	Fusel Oil	0.12 MT/D	0.12 MT/D	0.24 MT/D
Sugar Factory (MT/ M)	**Product**	**Existing -** 5000 TCD	**-**	**Total -** 5000 TCD
	Sugar (12 %)	16,500	--	16,500
	By-products			
	Molasses (4 %)	6,000	--	6,000
	Bagasse (30%)	45,000	--	45,000
	Pressmud (4%)	6,000	--	6,000
Co-gen (MW)	**Product**	**Existing -** 30 MW	**-**	**Total -** 30 MW
	Electricity	30	--	30

5) THE PURPOSE

Alcohol has assumed very important place in the Country's economy. It is a vital raw material for a number of chemicals and also a renewable source of energy. It has been a source of a large amount of revenue by way of excise duty levied by the Govt. on alcoholic liquors. It has a potential as fuel in the form of power alcohol for blending with petrol. Also, the fermentation alcohol has great demand in countries like Japan, U.S.A., Canada, Sri Lanka etc., as the synthetic alcohol produced by these countries, from naphtha of petroleum crude, is not useful for beverages. Considering the above facts as well as availability of raw material, management of SAIL decided for expansion of distillery.

6) MANUFACTURING PROCES

Figure 1 Integrated Manufacturing Process Operations



7) ENVIRONMENTAL ASPECTS

SAIL 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 required for distillery after expansion will be 1283 CMD. Out of this 305 CMD will be fresh water taken from NRBC Canal @KM No.30/570 @ Tadwal, 963 CMD will be treated water from distillery CPU and 15 CMD will be STP treated water. Total 76% recycle water will be used in distillery.

For existing sugar factory total 2854 CMD water is required. Out of this 480 CMD is fresh water taken from NRBC Canal @KM No.30/570 @ Tadwal, 2344 CMD is recycled water from sugarcane condensate and 30 CMD is STP treated water. More details about water budget are presented in EIA report at Chapter 2.

Table 5 Details of Water Consumption in Distillery of SAIL

Description	Existing 60 KLPD (M^3/day)	Total Expansion 120 KLPD (M^3/day)
I. Domestic	**#10**	**#20**
II. Industrial		
a. Process	*476	*953
b. Cooling makeup	#105	# 210
c. Boiler Makeup	#60	# 60
d. Lab & Washing	#3	*5
e. DM Backwash	#10	# 10
f. Ash Quenching	#2	Ω2
Industrial Use (a+b+c+d+e+f)	**656 (#180 + *476)**	**1240 (#285+*953 + Ω2)**
III. Gardening	# 5	23 (Ω13 + *10)
Grand Total (I + II+III)	**671 (#195 + *476) (71% Recycle)**	**1283 (#305 + *963 + Ω15) (76% Recycle)**
Fresh Water Consumption (Industrial Use) Norm: 10 KL/KL of Alcohol	**3 KL/KL**	**2.37 KL/KL**

Note: # - Water taken from NRBC Canal @KM No.30/570 @ Tadwal, * - Treated water from Distillery CPU, Ω- STP treated water used for flushing

Table 6 Water Consumption & Effluent Generation Sugar Factory & Co-gen Plant

No.	Description	Water Consumption (M^3/D)	Effluent Generation (M^3/D)	Treatment
1	**Domestic**	**#40**	**35**	Proposed STP
2	**Industrial**			
	a. Process	*1454	290	Treated in ETP; used for irrigation
	b. Cooling Makeup	*885	85	
	c. Boiler Makeup	#380	35	
	d. DM Backwash	#50	50	
	e. Lab & Washing	*5	4	
	f. Ash Quenching	#10	0	
	Industrial Use (a+b+c+d+e+f)	**2784 (#440+*2344)**	**464**	
3	**Gardening & Green belt**	Ω30	**0**	
	Grand Total (1+2+3)	**2854 (#480+*2344+Ω30) (83 % Recycle))**		
	Fresh Water Consumption (100 Lit/ MT of Cane Crushed)	88 Lit. / MT		
	Effluent Generation (200 Lit/ MT of Cane Crushed)		92.8 Lit./MT	

Note: # -Water taken from NRBC Canal @KM No.30/570 @ Tadwal, * - Sugarcane Condensate water, Ω - Treated water from STP

b. Effluent Treatment

i) Domestic Effluent

Quantity of domestic effluent generated from existing sugar factory and co-gen plant was 35 M^3/D. Moreover, domestic effluent generated after distillery expansion would be 16 M^3/D. Previously, the domestic effluent was treating in septic tank followed by soak pit. After expansion of distillery, total domestic effluent will be treated in proposed Sewage Treated Plant (STP).

ii) Industrial Effluent

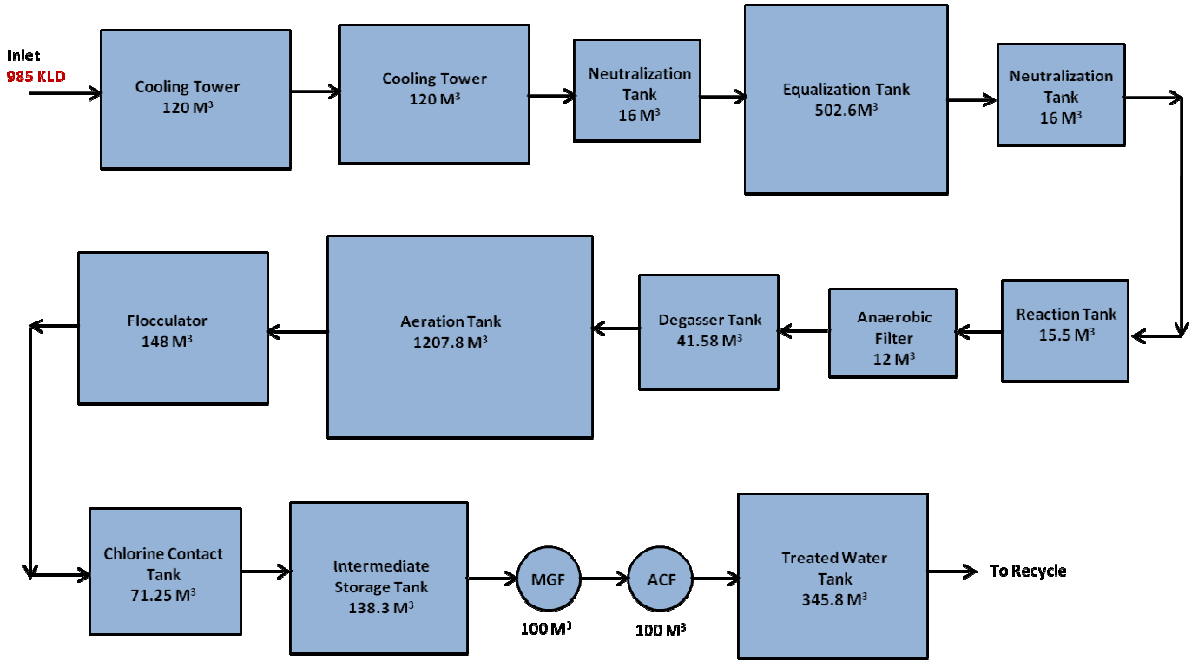
Effluent generated from proposed expansion of distillery would be in the form of spentwash, Spent Lees, MEE Condensate, Other effluents such as -cooling b/d, Boiler b/d, effluent from lab & washing. Raw spentwash – 960 M^3/D (8 KL/KL of alcohol) will be concentrated in Multiple Effect Evaporator (MEE). Concentrated spentwash – 192 M^3/D (1.6 KL/KL of alcohol) will be incinerated in incineration boiler along with coal. Spentlees - 170 M^3/D, condensate - 768 M^3/D and other effluents (cooling b/d, Boiler b/d, effluent from lab & washing, DM backwash) – 47 M^3/D will be treated in proposed Condensate Polishing Unit (CPU). Treated water from CPU will be recycled and hence ZLD is achieved. Flow chart of proposed CPU is presented at figure 2.

Total trade effluent generated from existing sugar and co-generation activities is 464 M^3/D. Treated effluent will be given to farmers for irrigation as per their demand. Flow chart of sugar factory ETP is presented at figure 4.

Table 7 Details of Effluent Generation in Distillery of SAIL

Description	Existing 60 KLPD (M^3/day)	Total Expansion 120 KLPD (M^3/day)	Treatment
I. Domestic	8	16	Proposed STP
II. Industrial			
a. Process			
Raw Spent wash	480	960	Raw spentwash shall be concentrated in MEE. Conc. Spentwash (1.6 KL/KL) shall be burnt in incienration boiler along with coal.
conc. spentwash	96	192	
MEE condensate	384	768	Other effluent viz. MEE condensate, spentlees, cooling b/d, boiler b/d, effluent from lab & washing, DM backwash shall be forwarded to existing distillery CPU. Treated effluent shall be fully recycled in process to achieve ZLD.
Spent lees	85	170	
b. Cooling Blow down	10	20	
c. Boiler Blow down	12	12	
d. Lab; Washing	3	5	
e. DM Backwash	10	10	
Total	Conc. Sp wash- 96 Other Effluent- 504	Conc. Sp wash – 192 Other Effluent - 985	
Effluent Generation (Spentwash) Norm: 8 KL/KL of Alcohol	8 KL/KL	8 KL/KL	

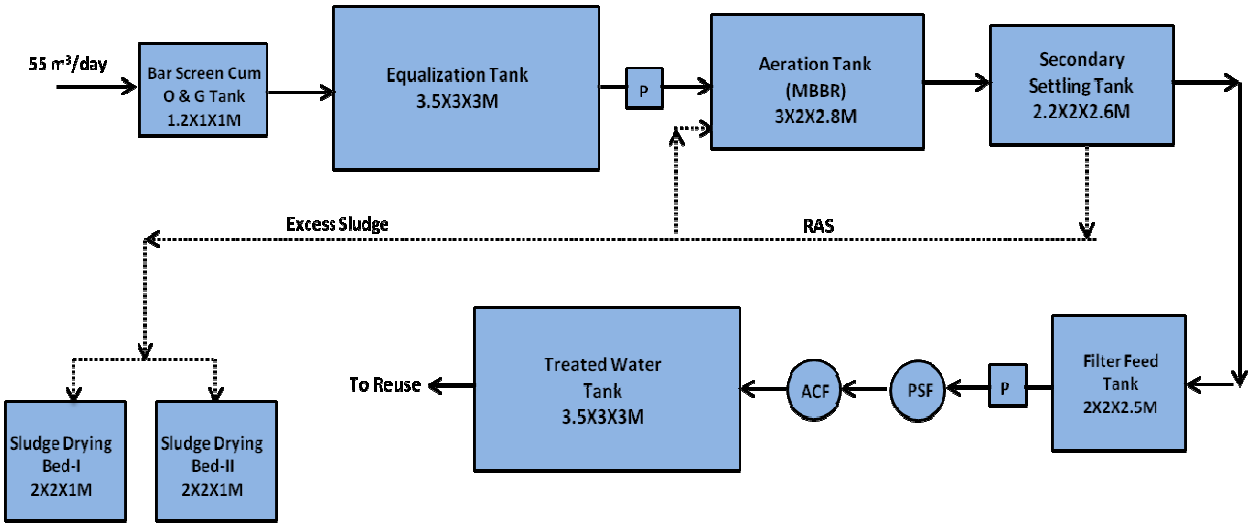
Figure 2 Flow Chart of Existing Distillery CPU



No	Parameters	Unit	Inlet	Outlet
1.	pH	—	5-6	7–8
2.	COD	mg/lit	3500-4000	<100
3.	BOD	mg/lit	1500-2000	<50
4.	TDS	mg/lit	2000-2500	<100
5.	SS	mg/lit	400-500	<50

MGF– Multi Grade Filter
ACF– Activated Carbon Filter

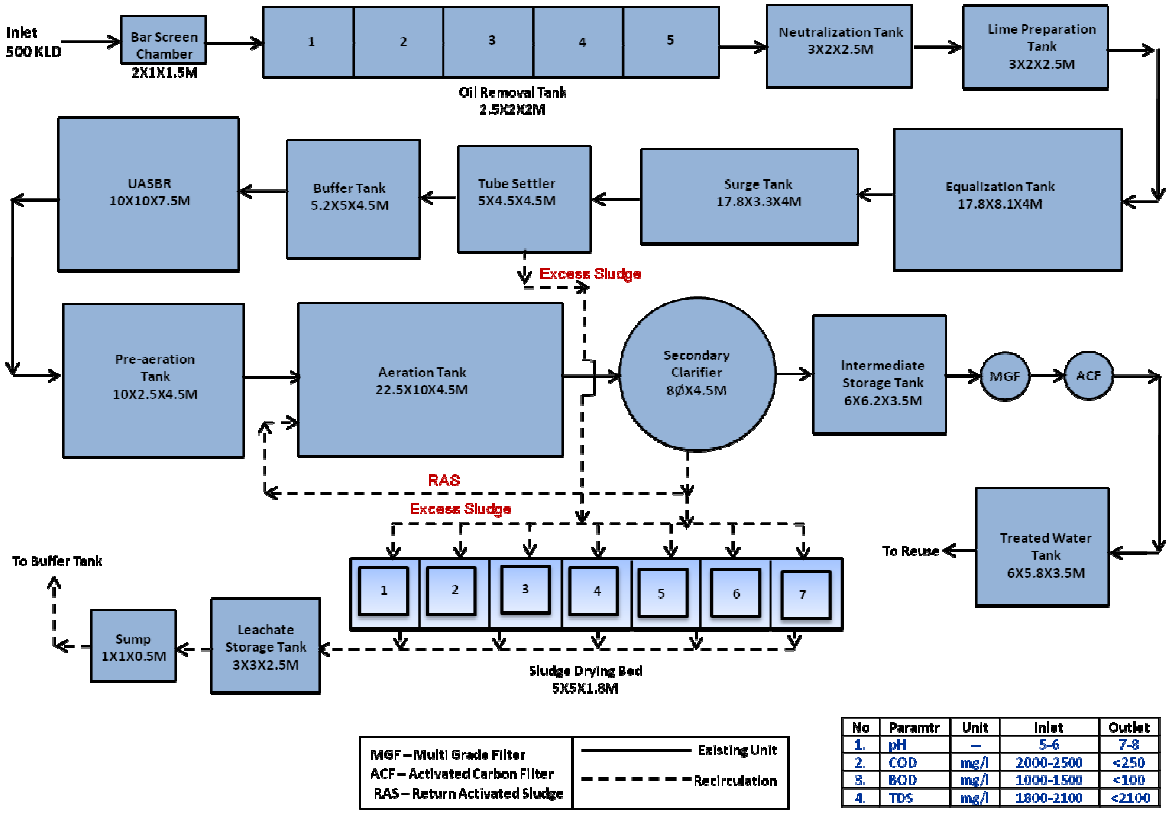
Figure 3 Flow Chart of Proposed STP



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
Proposed Unit
Recirculation Line

Figure 4 Flow Chart of Existing Sugar Factory ETP



B. Air Emissions

Under expansion of distillery, existing incineration boiler of capacity 25 TPH will be used. Coal blended with conc. spentwash will be used as fuel to the same. ESP is installed as APC along with stack of 65 M height. Under existing distillery DG sets (3 no.) of 500 KVA each and under existing sugar factory one DG set of 500 KVA is already installed. No new boiler and DG set will be installed under distillery expansion. Under existing sugar factory, 160 TPH bagasse based boiler is in operation. Boiler is provided with ESP as APC followed by stack height of 85 M AGL.

Table 8 Details of Boiler and Stack in SAIL

No	Description	Boilers		D. G. Sets	
		Distillery	Sugar &Co-gen	Distillery	Sugar & co-gen
1	Capacity	25 TPH	160 TPH	500 KVA (3 No)	500 KVA
2	Fuel type & Quantity MT/H	Spentwash-7.5 + Coal- 3.7	Bagasse - 62	HSD - 72.5 Lit./Hr. each	HSD - 72.5 Lit./Hr.
3	Height of Stack, M	65	85	3	3
4	Material of construction	RCC	RCC	MS	MS

C. Noise Pollution Aspect

1. Sources of Noise

i. In the distillery, very high noise generating sources would not exist. Expected noise levels in the section would be about 70 dB(A) or so. Adequate noise abatement measures like silencer & maintenance of pumps, motors, and compressors would be carried out and

enclosures would be provided to abate noise levels at source. Moreover, enclosures to the machinery would be provided wherever possible.

ii. The existing sugar factory and co-gen; noise generating sources are the boiler house, turbine rooms, cane crushing section and mill house, etc.

iii. Fermentation section & distillation section would be the other minor noise generating sources. The expected noise levels in these sections would be in the range of 70 to 80dB(A).

iv. Adequate green belt would be augmented in phase wise manner in and around the industry. So that it would further attenuate the noise levels.

2. Control Measure

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 Wastes

Sugar & Co-gen

Table 9 Details of Hazardous Waste

No.	Category	Quantity (MT/M)	Disposal
1	Spent Oil – Cat.5.1	0.3	Burnt in boiler

No any hazardous waste will be generated from proposed expansion of distillery.

E. Solid Wastes

Table 10 Solid Waste Generation & Disposal

No.	Industrial Unit	Type	Quantity (MT/M)		Disposal
			Existing	After Expansion	
1	Distillery	Yeast Sludge	300	600	Burnt in Incineration Boiler
		CPU Sludge	15	27	
		Boiler Ash(Coal+Sp.wash)	810	1620	Given to Brick / Cement Industry
2	Sugar Factory & Co-gen Plant	Boiler Ash (Bagasse)	471	-	
		ETP Sludge	1	-	Used as Manure

F. Odor Pollution

There are number of odour sources such as molasses handling and storage, fermentation and distillation, secondary effluent treatment, and storage of effluents, stale cane, bad mill sanitation, bacterial growth in interconnecting pipes & unattended drains. Measures adopted under existing unit for controlling same are proper housekeeping, sludge management in biological ETP units, steaming of major pipe lines, regular use of bleaching powder in the drains, efficient handling, prompt & proper disposal of press mud. Under proposed expansion project of distillery, spentwash shall be carried through closed pipeline for spentwash storage and handling activity shall be entirely eliminated.

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 after expansion as well as implementation of proposed project.

H. Environmental Management Cell (EMC)

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

Table 11 Environmental Management Cell of SAIL

No.	Name of Member	Designation	Number of Working Person(s)
1	Hon. Shrinivas A. Pawar	Chairman/Managing Director	1
2	Hon. Amarsinh P. Patil	Exicutive Director	1
3	Mr. Ravindra D. Patil	General Manager	1
4	--	Representative of Env. Consultant	1
5	Mr. Prakash S. Sutar	Project Coordinator	1
6	Mr. Sunil R. Dalavi	Chief Chemist	1
7	Mr. Rajesh G. Mandhana	Co-gen Plant Manager	1
8	Mr. Jayant A. Patil	Distillery Manager	1
9	Mr. Shankar Zanje	Environmental Officer	1
		Total	**9**

Details of capital as well as O & M costs towards environmental aspects under the existing as well as proposed expansion setup are as follows –

Table 12 Capital as well as O & M Cost (Existing & Expansion)

No.	Description	Cost Component (Rs. Cores)	
		Capital	Annual O & M
	Existing Project		
1	Air Pollution Control [ESP for co-gen boiler – 1 Nos. (Stack height 85 M) & distillery incineration boiler ESP - 1 Nos. (Stack height 65 M)]	11.00	1.10
2	Water Pollution Control (ETP& CPU)	10.88	1.08
3	Noise Pollution	0.30	0.02
4	Occupational Health and Safety	0.08	0.05
5	Environmental Monitoring & Management	0.25	0.02
6	Green Belt Development	0.50	0.15
7	Provision towards CER	0.42	-
	Total (6.9 % of Capital Investment of Rs. 339.45 Cr)	**23.43**	**2.42**
	Expansion Project		
1	Water Pollution Control -Installation of STP	0.20	0.02
2	Noise Pollution Control	0.05	0.01
3	Occupational Health & Safety	0.05	0.03
4	Environmental. Monitoring	0.04	0.01
5	Green Belt Augmentation & Rain Water Harvesting Plan	0.50	0.05
6	Provision towards CER amount (for 5 years after expansion)	0.50	0.00
	Total (6.74 % of Capital Investment of Rs. 46.55 Cr)	**1.34**	**0.12**
	Grand Total (6.9 % of Capital Investment of Rs. 386 Cr)	**24.77**	**2.54**

I.Rainwater Harvesting Aspect

- Total area of Plot – 3,07,500 M^2
- Total Open space – 1,36,639.17 M^2
- Average annual rainfall in the area = 486 mm.

➢ Rooftop Harvesting

- Roof Top harvesting area of 33,753.65 M^2
- Roof Top harvesting yield is – 12,360 M^3

➢ Surface Harvesting

- Surface Harvesting area of – 1,70,837 M^2
- Surface harvesting yield is – 4,98,161 M^3

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

12,360 M^3+ 4,98,161 M^3= 5,10,521 M^3 i.e. 510.5 ML

J. Green Belt

Table 13 Area Details

No.	Description	Area (Sq. M)
1	Total Plot Area	3,07,500.00
2	Total Built up Area after expansion	62,938.35
3	Total Open Area after expansion	1,36,639.17
4	Total Green Belt - 35 % of Total Plot Area	1,07,922.48
	Existing Green Belt Area (6% of Total Plot Area)	18,747.48
	Proposed Green Belt Area under Expansion (29% of Total Plot Area)	89,175.00

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 14 villages within 10 Km radius of the SAIL was carried out with the help of an interview schedule. 32 questions in Marathi, which was drafted prior to and employed during the survey. Schedule was administered in month of March – April, 2019. Refer Socio – economic profile in Chapter 3 of EIA report for detailed information of socio economic aspect.

1 It was observed that most of the villages are having basic facilities like drinking water, preliminary educational infrastructure, toilets and electricity. However, most of the villages lacked availability good roads & gutters, drainage system, solid waste management system and sanitation practices. Unfiltered water is used for drinking purpose.
2 Respondents from all villages are dependent on agriculture and allied activities for their livelihood. Major crops grown in the area Sugarcane, Jowar and Ginger. A majority of the population within the sample size had considerable income which is mostly due to farming.

7) ENVIRONMENTAL MONITORING PROGRAMME

Reconnaissance of the study area was undertaken in the month of March 2019. Field monitoring for measuring meteorological conditions, ambient air quality, water quality, and soil quality and noise levels was initiated in March 2019. Report incorporates the data monitored during the period from March 2019 to May 2019 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 14 Land Use/ Land Cover

No.	Classes	Area in Ha.	Percentage
1	Built Up Area	959	3.05
2	Crop Land	7703	24.52
3	Fallow Land	3825	12.18
4	Water Bodies	390	1.24
5	Forest Area	3295	10.49
6	Barren Land	12531	39.89
7	Scrub Land	2712	8.63
	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, Satara.

Meteorological parameters were monitored during the period March 2019 to May 2019. Details of parameters monitored, equipment's 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 March 2019 to May 2019survey is followed by observations. All the requisite monitoring assignments, sampling and analysis was conducted through the laboratory of Green Envirosafe Engineers & Consultant Pvt. Ltd., Pune which is NABL accredited and MOEFCC; New Delhi approved organization. Further, same has received certifications namely ISO 9001– 2015 and OHSAS 18001–2007 from DNV. 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 table 15.

Table 15 Ambient Air Quality Monitoring (AAQM) Locations

AAQM Station Code	Station Location	Name of the Station	Distance (Km)	Direction
A1	-	Industrial Site	-	-
A2	Nearest Habitation	Kapshi	0.97	SW
A3	Upwind	Dhangarwada	5.16	SSW
A4		Anandgaon	6.81	NE
A5	Downwind	Ghadgewadi	3.07	NNE
A6		Bibi	2.25	S
A7	Crosswind	Motechiwadi	1.30	N
A8		Aljapur	2.88	S

Table 16 Summary of the AAQ Monitoring Results for Season [March – April –May 2019]

		Location							
		Industrial Site	Dhangarwada	Anandgaon	Motechiwadi	Aljapur	Kapshi	Ghadgewadi	Bibi
PM_{10} ($\mu g/M^3$)	Max	68.20	57.50	58.80	62.50	59.80	59.80	59.80	59.80
	Min	58.30	50.50	47.80	51.20	51.50	50.10	49.50	52.30
	Avg	62.04	53.80	55.14	56.08	56.48	55.38	56.15	56.45
	98%	68.02	57.50	58.71	61.17	59.66	59.66	59.66	59.25
$PM_{2.5}$ ($\mu g/M^3$)	Max	24.60	19.80	19.60	19.80	19.80	19.80	19.60	20.50
	Min	15.20	15.40	15.40	14.60	14.30	14.70	14.50	14.40
	Avg	18.87	17.30	17.23	17.16	16.57	17.49	16.41	17.55
	98%	23.59	19.71	19.55	19.75	19.66	19.80	19.09	20.18
SO_2 ($\mu g/M^3$)	Max	29.50	20.50	20.50	20.70	20.30	20.80	19.70	20.60
	Min	20.20	15.00	15.20	16.40	15.40	15.50	15.50	15.30
	Avg	26.87	12.67	17.70	18.95	17.74	18.48	17.82	17.79
	98%	29.36	20.45	20.18	20.65	20.07	20.66	19.61	20.23
NOx ($\mu g/M^3$)	Max	35.70	25.60	25.60	24.80	26.50	25.80	25.80	25.60
	Min	30.50	21.40	20.50	20.50	22.10	21.20	21.20	21.50
	Avg	32.99	23.86	23.26	22.97	23.75	23.99	23.78	23.41
	98%	35.61	25.55	25.60	24.66	26.22	25.80	25.34	25.55
CO (mg/m^3)	Max	0.900	0.090	0.090	0.080	0.090	0.090	0.090	0.090
	Min	0.400	0.020	0.040	0.020	0.020	0.010	0.020	0.020
	Avg	0.675	0.068	0.068	0.058	0.059	0.049	0.054	0.050
	98%	0.900	0.085	0.090	0.080	0.090	0.085	0.090	0.085

Notes: 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 17 National Ambient Air Quality Standards (NAAQS) by CPCB

(Notification No. S.O.B-29016/20/90/PCI-L by MOEFCC; New Delhi dated 18.11.2009)

Zone Station	PM_{10} $\mu g/M^3$		$PM_{2.5}$ $\mu g/M^3$		SO_2 $\mu g/M^3$		NOx $\mu g/M^3$		CO mg/M^3	
	24 Hr	A.A.	24 Hr	A.A	24 Hr	A.A.	24 Hr	A.A.	8 Hr	1 Hr
Industrial, Rural & Residential Area	100	60	60	40	80	50	80	40	4	4
Eco-sensitive Area Notified by Govt.	100	60	60	40	80	20	80	30	4	4

Note: A.A. represents Annual Average

E. 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 18 Monitoring Locations for Surface Water

Station Code	Name of the Station	Distance (Km)	Direction
SW – 1	Nallah near project site	0.30	SW
SW – 2	Nallah	2.50	NE
SW – 3	River near Neera	8.15	NNW
SW – 4	Nallah near Vitthalwadi	2.85	N
SW – 5	Nallah Near Ghadgemala	4.87	NNE
SW – 6	Nallah & river confluence	12.18	NNW
SW – 7	Near river Neera	9.85	NE
SW – 8	Nallah near Alijpur	1.95	NE

Table 19 Monitoring Locations for Ground Water

Station Code	Name of the Station	Geographical Location		Distance (Km)	Direction
		Longitude	Latitude		
GW1	Near Phaltan Satara Road	17°56'28.00"N	74°14'54.67"E	1.14	SW
GW2	Near Phaltan Satara road SE	17°58'01.88"N	74°17'06.82"E	0.57	SSE
GW3	Near Phaltan Satara road SE	18°04'40.44"N	74°15'46.47"E	0.76	E
GW4	Near Ghadgewadi	17°59'22.83"N	74°15'11.68"E	1.45	NNE
GW5	Near Saswad road	18°00'15.37"N	74°18'33.13"E	1.84	NE
GW6	West site of Saswad	18° 07'08.86"N	74° 08'55.21"E	1.16	N
GW7	Near Aljapur Road	18° 05'14.35"N	74°20'03.64"E	0.92	N
GW8	Near Aljapur Road	17°54'35.56"N	74°15'00.16"E	0.54	NW
GW9	Near Aljapur Road	17°56'28.00"N	74°14'54.67"E	1.08	SW

Results observed after monitoring ground water and surface water are mentioned in chapter 3 of EIA report.

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 20 Noise Sampling Locations

Station Code	Name of the Sampling Point	Distance (Km)	Direction
N1	Project Site	-	-
N2	Takobachiwadi	2.06	NW
N3	Hingangaon	3.75	NNW
N4	AdarkiBudruk	4.37	SW
N5	Kapashi	0.97	SW

Station Code	Name of the Sampling Point	Distance (Km)	Direction
N6	Alajapur	2.88	S
N7	Bedi	2.25	S
N8	Ghadgewadi	3.07	NNE

Table 21 Ambient Noise Levels

No.	Location	Average Noise Level in dB(A)					
		L_{10}	L_{50}	L_{90}	$L_{eq(day)}$	$L_{eq(night)}$	L_{dn}
1	N1	49.7	51.5	56.8	65.2	52.3	66.5
2	N2	41.1	41.6	42.9	52.3	41.7	52.4
3	N3	40.5	42.1	43.7	52.3	42.3	52.7
4	N4	40.9	41.4	43.1	52.1	41.5	51.8
5	N5	41.0	42.3	43.5	52.5	42.4	51.9
6	N6	40.8	42.4	44.0	52.3	42.6	51.9
7	N7	40.3	41.5	43.2	51.6	41.6	52.4
8	N8	41.0	41.9	42.8	53.3	42.0	52.4

G. Socio-Economic Profile

Socio-economic status of the population is an indicator for the development of the region. Any developmental project of any magnitude will have a bearing on the living conditions and on the economic base of population in particular and the region as a whole. Chapter 3 may be referred for details of this aspects.

H. Ecology

Ecological survey for expansion of distillery by SAIL was carried by questionnaire study in 14 villages from 10 KM radius study area. 9 villages within 5 km radius and 5 villages between 5 to 10 km radius. Chapter 3, Section 3.12 may be referred for details of this aspects.

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 of EIA 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 expansion &proposed distillery project. 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 expansion 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 98th percentile concentrations of PM_{10}, $PM_{2.5}$, SO_2 and NOx in Ambient Air, recorded during the field study conducted for the season March – April – May 2019are considered as baseline values. They represent impact due to operations of existing nearby industries on this region. Existing baseline concentrations are summarized in following table and the GLC of the same is included in 4th chapter of EIA report.

Table 22 Baseline Concentrations (98 Percentile)

Parameter	PM_{10}	$PM_{2.5}$	SO_2	NO_X	CO
98 Percentile	68.02µg/m^3	23.59µg/m^3	29.36µg/m^3	35.61µg/m^3	0.9 mg/m^3
NAAQS	100 µg/m^3	60 µg/m^3	80 µg/m^3	80 µg/m^3	4 mg/m^3

ii. Air Polluting Sources

As discussed above Under existing activity of sugar factory and co-gen operations, 1 boiler of 160 TPH capacity and 1 DG set of 500 KVA are installed on site.

Further, under existing distillery, an incinerator boiler of 25 TPH and 3 DG sets of 500 KVA each are installed on site. Under expansion activity; no new boiler and DG set would be installed.

D. IMPACT ON WATER RESOURCES

i. Impact on Surface Water Resources & Quality

Surface water along with recycled water will be used to meet water requirment of SAIL project complex. Effluent from distillery; raw spentwash will be concentraeted in MEE. Concentrated spentwash (192 CMD) will be burnt in existinng 25 TPH incineration boiler. spentlees (170 CMD), MEE condensate (768 CMD) and other effluents (47 CMD) will be treated in existing distillery CPU.

Industrial effluent from sugar factory & co-gen plant (464 CMD) is treated in existing ETP.

Total domestic effluent would be treated in proposed STP. Hence there will not be any impact on surface water resource. More details about water budget are presented at Chapter 2.

ii. Impact on Ground Water Resources& Quality

Ground water will not be a source of raw water for the expansion 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 as mentioned above, there will not be discharge of any untreated effluent on land. ESP is installed to existing boiler. Boiler ash from existing boiler is used as manure or given to brick manufacturer/cement industry. CPU sludge and yeast sludge from distillery will be incinerated in incineration boiler. 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. SAIL is not major noise producing industry. There shall be no any prominent effect due to vibration at the project site.

G. IMPACT ON LAND USE

Present use of the project land is Industrial wherein the sugar factory and cogeneration plant have already been established. Proposed expansion activity would be implemented in existing premises of sugar factory & co-gen plant. Also, an area was kept vacant for expansion of 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. In case of air pollution, the industry is going to contribute in SPM pollution load in the nearby area. This may have negative impact particularly on avifauna, surrounding crop yields and local population. The details in respect of impacts on ecology and biodiversity are described in Chapter 3.

I. IMPACT ON HISTORICAL PLACES

No historical places in study area. No major impact was observed during site visit.

10) SALIENT FEATURES OF EMP

The following routine monitoring programme as detailed in Table 23 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 23 Plan for Monitoring of Environmental Attributes in and around industry

No.	Description	Location	Parameters	Frequency	Conducted by
1	Air Emissions	Upwind-1, Downwind-2 (Near Cane Yard, Bagasse & Coal yard, Near Main gate, ETP.)	PM_{10}, $PM_{2.5}$, SO_2, NOx, CO	Monthly	MoEFCC & NABL Approved External Lab
		Study area - (Kapshi, Dhangarwada, Anandgaon, Ghadgewadi, Bibi, Motechiwadi, Aljapur)		Quarterly	
2	Work Zone Air Quality	4 Locations (Mill section, Fermentation section, Sugar bagging section, Distillation section)	PM_{10}, $PM_{2.5}$, SO_2, NOx, CO	Monthly	
3	Stack Emissions	Boiler – 2 Nos. (Distillery & 1 Co-gen boiler), D.G Sets	SPM, SO_2, NOx	Monthly	
4	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	Premises – 5 Nos (Mill section, Distillation section, Boiler, DG set, Turbine section)		Monthly	
5	Effluent	Treated, Untreated	pH, SS, TDS, COD, BOD, Chlorides, Sulphates, Oil & Grease.	Monthly	
6	Drinking water	Factory canteen / Residential Colony	Parameters as per drinking water Std IS:10500	Monthly	
7	Soil	8 locations within 5 Km (Ajapur, Malvadi, Ghadgewadi, Thakubachi Vadi, Taradgaon, Anandgaon, Adriki Budruk)	pH, Salinity, Organic Carbon, N, P, K	Quarterly	
8	Water Quality (Ground Water & Surface Water)	Locations in study area – (Ground Water- Near Phaltan Satara Road, Near Phaltan Satara road, Near Phaltan Satara road SE, Near Ghadgewadi, Near Saswad road, West site of Saswad, Near Aljapur Road.) Surface Water- (Nallah near project site, Nallah, River near Neera, Nallah near Vitthalwadi, Nallah Near Ghadgemala, Nallah &river confluence, Near river Neera, Nallah near Alijpur)	Parameters as per CPCB guideline for water quality monitoring – MINARS/27/2007-08	Quarterly	
9	Waste management	Implement waste management plan that Identifies and characterizes every waste associated with proposed and expansion 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 SAIL
10	Emergency Preparedness such as fire fighting	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	
11	Health Check up	Employees and migrant labour health check ups	All relevant health checkup parameters as per factories act.	Once in a Year	
12	Green Belt	Within Industry premises as well as nearby villages	Survival rate of planted sapling	In consultation with DFO.	
13	CER	As per activities	--	Six Monthly	