EXECUTIVE SUMMARY

EXPANSION OF SUGARCANE CRUSHING CAPACITY FROM 2500 TCD TO 8000 TCD, ESTABLISHMENT OF 40 MW CO-GENERATION POWER PLANT AND 110 KLPD DISTILLERY TO PRODUCE 110 KLPD RECTIFIED SPIRIT/110 KLPD EXTRA NEUTRAL ALCOHOL/105 KLPD ETHANOL BASED ON "C"/"B" HEAVY MOLASSES/ SUGARCANE JUICE/SYRUP/GRAINS

AT

NAGEWADI, TALUKA. KHANAPUR, DISTRICT. SANGLI, MAHARASHTRA

BY

YASHWANT SUGAR AND POWER PRIVATE LIMITED

Report Prepared By:

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1 INTRODUCTION

Yashwant Sugar and Power Private Limited (YSPPL) is a registered company in the state of Maharashtra under the Companies Act, 1956 on 19th June 2012 Vide Registration Number U15422PN2012PTC143740.

The registered office of YSPPL is located at Plot No. 350, VasantdadaMarket Yard, Sangli, Maharashtra-416415 and the project site is located at post Nagewadi, Tal. Khanapur, Dist. Sangli, Maharashtra-415311. YSPPL has existing sugar factory of 2500 TCD. The command area is rich in sugarcane cultivation and has excellent irrigation facilities.

The registered office of Yashwant Sugar and Power Private Limited (YSPPL) is located at Kakabhavan, Madhavnagar Road, Sangli, Maharashtra- 416416 and the project site is located at post Nagewadi, Tal. Khanapur, Dist. Sangli, Maharashtra- 415311. YSPPL has existing sugar factory of 2500 TCD. The command area is rich in sugarcane cultivation and has very good irrigation facilities.

Considering the Sugarcane cultivation potential and the availability of sugarcane in the command area YSPPL, proposes to expand its sugarcane crushing capacity from 2500 TCD to 8000 TCD. In order to meet the requirements of steam and power the industry propose to establish 40 MW Co-generation power plant. The industry also proposes to establish 110 KLPD distillery to consume the available molasses from its own sugar unit and utilize sugarcane juice/syrup/'C'/'B' heavy Molasses/grains for the production of 110 KLPD RS/110 KLPD ENA/105 KLPD Ethanol. In the command area, the availability of Grains is also abundant and as such Grains based distillery unit is also proposed of the same capacity of 110 KLPD for production of 110 KLPD RS/110 KLPD ENA/105 KLPD Ethanol as per demand.

1.1 PROJECT LOCATION

The salient features of the project site are

Table 1-1 Salient features of the project site

Sr. No.	Features	Description	Directions w.r.t. site
1.	latitude	Latitude: 17°20'10.83"N	
2.	Longitude	Longitude: 74°31'35.56"E	
3.	Elevation above MSL	692 m	
4.	Nearest highway	NH 4 (40 km)	WSW
5.	Nearest railway station	Karad (40 Km)	WSW
6.	Nearest air port	Kolhapur (80 Km)	SSW
7.	Nearest town	Vita (7 km)	SSE
8.	Nearest human settlement	Nagewadi. (2 km)	NW
9.	Nearest port	Jawaharlal Nehru Port (250 km)	NW
10.	Nearest water body	Bhagyanagar lake (3.5 Km)	NE
11.	Protected Area	None within 10 km	
12.	Reserved Forests	None within 10 km	

Sr. No.	Features	Description	Directions w.r.t. site
13.	Wildlife Sanctuary	None within 10 km	
14.	Archeological site	None within 10 km	
15.	State boundary	None within 10 km	
16.	Defense installations	None within 10 km	
17.	Average Rainfall	600 mm	

2 PROJECT DESCRIPTION

The details about the maufacturing capacity of existing unit as well as after the proposed expansion are given in table below

Table 2-1 Existing and Proposed Products manufacturing quantities

Sr. No.	Description	Unit	Existing Capacity	Proposed Capacity	Total	Remark
1.	Sugar Unit	TCD	2500	5500	8000	
2	Co-generation Power	MW	0	40	40	
3.	Distillery Unit	KLPD	0	110	110	
	Rectified Spirit or	KLPD		110	110	Only one product at a time
	Extra Neutral Alcohol or			110	110	
	Ethanol			105	105	

2.1 RESOURCE REQUIREMENT AND INFRASTURE FACILITIES

A) Land use Details

The total area available with the factory is **36.55 Hectares** Out of which, **12.08 Hectares** will b**e** utilized for green belt development. A detailed area breakup is given below.

Table 2-2 Landuse breakup

Sr. No.	Description	Total Area in m2	% of Total Area
1	Total Built-Up Area	20590.73	5.63
2	Green Belt Area	124479.63	34.06
3	Vacant Land Area	63333	17.33
4	Parking Area	25214.29	6.90
5	Area Under The Road	37550	10.27
6	Remaining Area	94332.35	25.81
Total Plot Area		**365500**	**100**

B) Power requirement

At present, the power requirement by the industry is 3.0 MW, which is taken from MSEDCL and 1*125KVA DG sets are installed for power back up. After the proposed expansion additional 11.5 MW of power will be required. Therefore total power requirement after the proposed expansion will be 14.5 MW, which shall be fulfilled from the proposed 40 MW co-generation power plant, 30 TPH distillery boiler and 2*500 KVA DG Sets for power back-up purpose. Excess electricity produced will be supplied to the state electricity grid.

C) Water Consumption details

Industrial Purpose:

The Bhagyanagar Lake is the nearest water body of 3.5 km away from the factory site, which is the main source of water.

Sugar Division - The sugar unit works on zero water requirements and co-generation power plant water requirement met from excess condensate available from sugar unit and another 290m3/day of fresh for boiler make up purpose. Detailed water budget of the Sugar division is shown in **Table 2.3.**

Distillery Division – water requirement for distillery division shall be 664 m3/day only due to recycle of evaporator condensate. Detailed water budget of the distillery unit is shown in **Table 2.4 to Table 2.7.**

Domestic Purpose:

At present water requirement is 100m3/day, no additional water requirement after the proposed expansion

Thus, the net fresh water requirement of the industry is 1054KLD (Industrial 954 KLD, Domestic 100 KLD). The required water is sourced from Bhagyanagar Lake. The necessary permission from the state irrigation department is already obtained.

Water balance calculations:

Sugar and cogeneration division

Table 2-3 Water Budget -Sugar and Co-generation Power Plant

Sr. No.	Details	Water Requirement (m3/day)			Consumption/Losses (m3/day)			Reuse / Recovery (m3/day)			Waste Generation (m3/day)		
		E	**P**	**T**	**E**	**P**	**T**	**E**	**P**	**T**	**E**	**P**	**T**
Domestic Purpose													
1	Domestic	100	--	100	20	--	20				80	--	80
Industrial Purpose													
1	Boiler 1*200 TPH	--	4510	4510	--	200	200	--	4260	4260	--	50	50
2	DM Plant	--	**290****	**290****	--	250	250	--	--	--	---	40	40
3	Process water	90	180	270	11	31	42	--	--	--	79	149	228
4	Washing of equipment	30	40	70	--	--	--	--	--	--	30	40	70
5	Air compressors & pumps	40	40	80	05	05	10	35	35	70	--	--	--
6	Condenser Water	--	--	--	--	--	--	500	1100	1600	All the condenser water shall be treated in proposed CPU of capacity 2000m3/day and recycled as process water.		
7	Spray pond blow-down	500	1100	1600	250	550	800	--	--	--	250	550	800
8	Cooling tower blow-down	--	150	150	--	80	80	--	--	--	--	70	70
9	Colony fire fighting& Gardening	250	--	250	250	--	250	--	--	--	--	--	--
10	Recycling of Excess Condensate	--	--	--	--	--	--	500	1100	1600	--	--	--
Total		**910**	**6310**	**7220**	**516**	**1116**	**1632**	**1035**	**6495**	**7530**	**359**	**899**	**1258**

Where,

E – Present 2500TCD
P – Expansion of 4500 TCD & Establishment of 40 MW Co-generation unit.
T - Total 8000 TCD & 40MW.

Note:

1. At present there are two boilers of 2*17.5 TPH capacities each shall be abandoned and one boiler of 1*200 TPH capacity with a pressure of 110 kg/cm2 and temperature of 540^0C shall be installed. For co-generation power plant 40 MW turbo-generator set with a pressure of 105 kg/cm2 and temperature of 535^0C shall be installed.

2. The fresh water requirement for DM plant only **290**** m3/day and 100m3/day for domestic purpose. Thus total fresh water requirement would be 390m3/day.

- The consumption/losses and final wastewater generated is amounting (1632 + 1258) = 2890 m3/day
- The excess condensate and condensers water available is 3200 m3/day. Thus the excess water available for reuse would be around 3200 – 2890 = 310 m3/day.

Net Water saving would be:

i) Industrial Purpose: 7220 – 7530 = -310 m3/day.

Due to excess condensate available from Sugar unit, there shall not be any water requirement for sugar unit. For Co-generation 290 m3/day fresh water shall be taken as DM plant water for boiler make-up. Fresh water requirement for domestic purpose shall be 100m3/day. Thus the total requirement of fresh water would be 390m3/day for sugar and co-generation unit.

Excess amount 310 m3/day is saved, which shall be used for gardening, irrigation and in distillery operation etc. and remaining water shall be stored in proposed tank to be used during off season.

ii) Domestic Purpose: At present water requirement is 100m3/day, no additional water requirement after the proposed expansion.

Effluent Generation:

i. Industrial - 1258 m3/day out of which sugar effluent - 298 m3/day, spray-pond effluent – 800 m3/day and co-generation power plant effluent 160 m3/day (Co-gen effluent-160 m3/day, out of which 50 m3/day boiler blow-down, 70 m3/day cooling tower blow –down and 40 m3/day of DM plant reject).

ii. Domestic – 80m3/day.

Distillery division

I. Based on "C"Molasses

Table 2-4 Water Budget for Distillery Division (based on "C"Molasses)

Sr. No.	Details	Water Requirement (m3/day)	Consumption /Losses (m3/day)	Reuse / Recovery (m3/day)	Waste Water Generation and treatment		
					Waste water Generation	Wastewater treated in CPU	Wastewater
1.	Boiler 30 TPH	665	35	620	10	--	10
2.	DM Plant	**55****	45	--	10	10	
3	Process Water	1100	--	**Evaporator Condensate**	Spentwash - 176	--	176
					Spentlees – 220	220	00
4	Cooling Tower Make-up Water	210	155	--	55	55	00
5	Fermenter Washing	20	--	--	20	20	00
6.	Miscellaneous such as pump and gland cooling etc.	40	--	40	--	-	--
7.	**Evaporator Condensate**	--	--	**704**	--	--	--
8	ENA	100	100	--	--	--	--
9	Condensate Polishing Unit	--	--	305			
Total		**2190**	**335**	**1669**	**491**	**305**	**186**

Note:

1*30 TPH boiler @ 45 kg/cm2 shall be installed for the proposed 110 KLPD distillery.

Remark: 176 m3/day of concentrated spentwash shall be generated after anaerobic digester followed by MEE. (Raw spentwash quantity - 880)

Solids content in raw spentwash shall be around 12 – 14 % by its weight, hence convert to 5% to 6% in anaerobic digester and finally it's converted to 30% by its weight after MEE.

The consumption/losses and final wastewater generated is amounting (335 + 186) = 521 m3/day.

Net Water Requirement: 2190 –1669 = 521m3/day.

Effluent Generation: 491 m3/day out of which spentwash - 176 m3/day, spentlees – 220 m3/day, DM plant wastewater generation-10m3/day, fermenter washing waste-20 m3/day, boiler blow-down wastewater-10m3/day and cooling tower wastewater generation – 55m3/day.

All the effluent except concentrated spentwash and boiler blow-down shall be treated in proposed CPU and treated effluent shall be recycled in process.

Concentrated spentwash shall be converted to dry powder/granules (potash rich powder/manure).

II. Based on "B" Heavy Molasses

Table 2-5Water Budget for Distillery Division (based on "B" Heavy Molasses)

Sr. No.	Details	Water Requirement (m3/day)	Consumption /Losses (m3/day)	Reuse / Recovery (m3/day)	Waste Water Generation and treatment		
					Waste water Generation	Wastewater treated in CPU	Wastewater
1.	Boiler 30 TPH	665	35	620	10	--	10
2.	DM Plant	**55****	45	--	10	10	
3	Process Water	880	--	**Evaporator Condensate**	Spentwash - 110	--	110
					Spentlees – 220	220	00
4	Cooling Tower Make-up Water	210	155	--	55	55	00
5	Fermenter Washing	20	--	--	20	20	00
6.	Miscellaneous such as pump and gland cooling etc.	40	--	40	--	-	--
7.	**Evaporator Condensate**	--	--	**550**	--	--	--
8	ENA	100	100	--	--	--	--
9	Condensate Polishing Unit	--	--	400			
Total		**1970**	**335**	**1515**	**425**	**305**	**120**

Note:

1*30 TPH boiler @ 45 kg/cm2 shall be installed for the proposed 110 KLPD distillery.

Remark: 110 m3/day of concentrated spentwash shall be generated after anaerobic digester followed by MEE. (Raw spentwash quantity - 660)

Solids content in raw spentwash shall be around 8 – 10 % by its weight, hence convert to 4% to 5% in anaerobic digester and finally it's converted to 30% by its weight after MEE.

The consumption/losses and final wastewater generated is amounting (335 + 120) = 455 m3/day.

Net Water Requirement: 1970 –1515 = 455 m3/day.

Effluent Generation: 425 m3/day out of which spentwash - 110 m3/day, spentlees – 220 m3/day, DM plant wastewater generation-10m3/day, fermenter washing waste-20 m3/day, boiler blow-down wastewater-10m3/day and cooling tower wastewater generation – 55m3/day.

All the effluent except concentrated spentwash and boiler blow-down shall be treated in proposed CPU and treated effluent shall be recycled in process.

Concentrated spentwash shall be converted to dry powder/granules (potash rich powder/manure)

III. Based on Sugarcane juice / concentrated sugarcane juice

Table 2-6Water Budget for Distillery Unit (based on Sugarcane juice / concentrated sugarcane juice)

Sr. No.	Details	Water Requirement (m3/day)	Consumption/ Losses (m3/day)	Reuse / Recovery (m3/day)	Waste Water Generation and treatment		
					Waste water Generation	Wastewater treated in CPU	Wastewater
1	30 TPH Boiler	665	35	620	10	--	10
2	Process Water for fermentation	715	--	**Evaporator Condensate**	114(Spentwash)	--	114
					143(Spentlees)	143	--
3	Soft water Cooling Tower Make Up and sealing	150	110	--	40	40	--
4	DM plant	**55****	45	--	10	10	
5	Washing water	40	--	--	40	40	--
6	ENA	100	100	--			
7	**Evaporator Condensate**	--	--	458	--	--	--
8	Condensate Polishing Unit			233			
Total		**1725**	**290**	**1311**	**357**	**233**	**124**

Note:

1*30 TPH boiler @ 45 kg/cm2 shall be installed for the proposed 110 KLPD distillery.

Remark: 114 m3/day of concentrated spentwash shall be generated after MEE. (Raw spentwash quantity - 572)

The consumption/losses and final wastewater generated is amounting (290 + 124) = 414 m3/day.

Net Water Requirement: 1725 –1311 =414 m3/day.

Effluent Generation: 357m3/day out of which spentwash - 114 m3/day, spentlees – 143 m3/day, DM plant wastewater generation-10m3/day, fermenter washing waste-40 m3/day, boiler blow-down wastewater-10m3/day and cooling tower wastewater generation – 40m3/day.

All the effluent except concentrated spentwash shall be treated in proposed CPU and treated effluent shall be recycled in process.

Concentrated spentwash shall be converted to dry powder/granules.

IV. Based on Grains

Table 2-7 Water Budget for Distillery Unit (based on Grains)

Sr. No.	Details	Water Requirement (m3/day)	Consumption /Losses (m3/day)	Reuse / Recovery (m3/day)	Waste Water Generation and treatment		
					Waste water Generation	Wastewater treated in CPU/MEE	Wastewater
1	30 TPH Boiler	665	35	620	10	--	10
2	Process & dilute water	908	110	**In MEE**	**633**	**Decanter where 116 MT/day Wet cake & 517 m3/day thin slops to MEE**	116
					165	**165 to MEE**	--
3	Cooling water	150	110	--	40	40	--
4	Washing Requirement	45			45	45	--
6	DM plant	**55****	45	--	10	10	
7	ENA	100	100	--			
8	**Evaporator Condensate**		83	544	55	--	55
	Condensate Polishing Unit			95			
	Total	**1923**	**483**	**1259**	**958**	**95**	**181**

Remark: Final Waste generation shall be 181m3/day out of which 116 m3/day of wet cake, 10m3/day of boiler blow-down and 55 m3/day of MEE wastewater shall be generated after MEE. (Raw process wastewater quantity – 798m3/day).

Note:

The consumption/losses and final wastewater generated is amounting (483 + 181) = 664 m3/day.

Net Water Requirement: 1923 –1259 = 664 m3/day.

Effluent Generation: 958 m3/day out of which process and dilute wastewater - 798 m3/day, DM plant wastewater generation-10m3/day, fermenter washing waste-45 m3/day, boiler blow-down wastewater-10m3/day, MEE wastewater generation-55 and cooling tower wastewater generation – 40m3/day.

Table 2-8 Water Requirement and wastewater generation of the factory

<table>
<tr><th>Sr. No.</th><th>Water Requirement m3/day</th><th colspan="2">Wastewater generation m3/day</th></tr>
<tr><td>1.</td><td colspan="3">Sugar Division</td></tr>
<tr><td rowspan="4"></td><td rowspan="4">Zero water requirement for sugar division except DM plant water requirement of 290 and domestic water requirement of 100. Thus total water requirement shall be 390.
Water Saved – 310 (due to excess condensate from sugarcane juice)</td><td colspan="2">1258</td></tr>
<tr><td>Sugar effluent</td><td>298</td></tr>
<tr><td>Spray-pond effluent</td><td>800</td></tr>
<tr><td>Co-generation power plant effluent</td><td>160</td></tr>
<tr><td>2.</td><td colspan="3">Distillery Division</td></tr>
<tr><td rowspan="5">A.</td><td colspan="3">Based on “C” Molasses</td></tr>
<tr><td>521</td><td colspan="2">491</td></tr>
<tr><td rowspan="3"></td><td>Concentrated spentwash</td><td>176</td></tr>
<tr><td>Spentlees</td><td>220</td></tr>
<tr><td>Other dilute effluent</td><td>95</td></tr>
<tr><td></td><td colspan="3">OR</td></tr>
<tr><td rowspan="5">B.</td><td colspan="3">Based on “B” Heavy Molasses</td></tr>
<tr><td>455</td><td colspan="2">425</td></tr>
<tr><td rowspan="3"></td><td>Concentrated spentwash</td><td>110</td></tr>
<tr><td>Spentlees</td><td>220</td></tr>
<tr><td>Other dilute effluent</td><td>95</td></tr>
<tr><td></td><td colspan="3">OR</td></tr>
<tr><td rowspan="5">C.</td><td colspan="3">Based on “Sugarcane Juice/Syrup”</td></tr>
<tr><td>414</td><td colspan="2">357</td></tr>
<tr><td rowspan="3"></td><td>Concentrated spentwash</td><td>114</td></tr>
<tr><td>Spentlees</td><td>143</td></tr>
<tr><td>Other dilute effluent</td><td>100</td></tr>
<tr><td></td><td colspan="3">OR</td></tr>
<tr><td rowspan="4">D.</td><td colspan="3">Based on “Grains”</td></tr>
<tr><td>664</td><td colspan="2">958</td></tr>
<tr><td rowspan="2"></td><td>Process and diluted wastewater</td><td>798</td></tr>
<tr><td>Other diluted effluent</td><td>160</td></tr>
<tr><td colspan="4">Note:
A. Other diluted effluent consist of DM plant wastewater, fermenter washing waste, boiler blow-down wastewater and cooling tower wastewater generation.
B. Spentwash Storage Ponds:
1. - Concentrated Spentwash (176m3/day) - 30 days storage capacity i. e. 176*30 = 5280 say 5300 m3.
2. – Raw Spentwash (880m3/day) – 7 days storage capacity i.e. 880*7 = 6160 say 6200 m3.</td></tr>
</table>

Table 2-9 Details of Bio-gas production for various configurations

Sr. No.	Description of Spentwash	Spentwash Quantity m^3/day	COD Concentration (mg/l)	COD Removal in Anaerobic Digester	Kg of COD Removal	Bio-gas Production Rate	Total Bio-gas Production in M3/day
1	Raw Spentwas-based on 'C' Molasses **OR**	880	1,20,000	80,000	70,400	0.50 m^3 of Bio-gas/kg of COD Removal.	35,200
2	Raw Spentwas-based on 'B' Heavy Molasses **OR**	660	75,000	50,000	33,000		16,500
3	Raw Spentwas-based on Sugarcane juice/Syrup	572	35,000	25,000	14,300		7,150

Fuel consumption:

During season-

Note: For season raw material used as sugarcane juice/syrup, hence quantity of bio-gas production will be 7,150m^3/day say 7,000m3/day.

The quantity of bagasse required for the proposed co-generation for 1*200 TPH boiler shall be 1850 MT/day (i.e 55500MT/M)

Bagasse requirement for 1*30 TPH distillery boiler shall be 280 MT/day (8400 MT/M)

Calorific value of Bagasse – 2270 Kcal/Kg of Bagasse

Calorific value of Bio-gas – 5000 Kcal/m^3 of Bio-gas

Bio-gas equivalent in bagasse = 5000/2270

=2.2

Therefore, 1 m3 of Bio-gas equivalent to 2.2 kg of bagasse, hence reduction of bagasse requirement shall be around 15.4 MT/day say 15 MT/day due to the use of bio-gas as a fuel. Thus, the bagasse requirement would be 265 MT/day instead of 280 MT/day, during season.

During off season-

Note: For off season raw material used as 'B' heavy molasses, hence quantity of bio-gas production will be 16,500m^3/day say 16,000m^3/day.

Coal consumption during off season shall be 150 MT/day for 1*30 TPH boiler.

Calorific value of coal – 5000 Kcal/kg of coal

Calorific value of Bio-gas – 5000 Kcal/m^3 of Bio-gas.

Therefore, 1 kg of coal equivalent to 1 m3 of bio-gas, hence reduction of coal requirement shall be around 16 MT/day due to the use of bio-gas as a fuel. Thus, the coal requirement would be 134 MT/day instead of 150 MT/day, if bagasse is not available as fuel during off season.

D) Air Emission Management

Bagasse and bio-gas will be used as fuel in 1*200TPH and 1*30 TPH Boilers during season. The bagasse requirement of the proposed unit will be 2115 MT/D and 7000m3/day of bio-gas during season. Coal and bio-gas will be used as fuel for both boilers during off season, the coal requirement at 134MT/day and bio-gas of 16000m3/day will be used in case of shortage of bagasse for distillery boiler during off season.

Common stack of 80 meters height and electrostatic precipitator (ESP) as APC equipment will be provided to control the dispersion of pollutants releasing due to combustion of fuel.

Table 2-10 Details of boilers and its APC equipment for existing as well as proposed

Sr. No.	Stack attached to		Types of Fuel	Height in meter	APC System	Remark
Present Installation						
1	Boiler 2*17.5 TPH		Bagasse	45	Wet Scrubber	Wet scrubber shall be abandoned after proposed expansion.
Proposed Installation						
1	1*200 TPH Boiler	Sugar & Cogeneration Division	Bagasse	Common Stack of 80 m	ESP	Common Stack as well as common ESP shall be provided for both boilers.
2	Boiler 30 TPH	Distillery Division	Bagasse, Bio-gas or Coal			

E) Solid waste Management

a) Non Hazardous solid wastes details

Table 2-11 Details of non-hazardous waste generated and its disposal

Sr. No.	Description of waste	Quantity	Mode of Collection and Disposal
	Bagasse as fuel for both the boilers		
1.	Fly/ Boiler Ash	1*200 TPH Boilers- 666 MT/M	Ash generated shall be sold to to brick manufacturer/ Mixed with pressmud and sold as manure
		30 TPH Boiler- 96 MT/M	
2	Bottom Ash	1*200 TPH Boilers – 166.5 MT/M	
		30 TPH Boiler- 24 MT/M	
	Coal as fuel for 30 TPH Distillery Boiler		
	Fly/ Boiler Ash	482.4 MT/M	Ash generated shall be sold to to brick manufacturer/ Mixed with pressmud and
	Bottom Ash	120.6 MT/M	

Sr. No.	Description of waste	Quantity	Mode of Collection and Disposal
			sold as manure
3.	ETP Sludge	300 MT/A	ETP Sludge and Pressmud shall be sold as manure.
4.	Pressmud	320 MT/D	
Other Solid Wastes			
1.	Paper waste	0.01 MT/M	Manually collected and stored in a designated area and sold to scrap vendors
2.	Plastic waste	0.01 MT/M	
3.	Municipal Solid waste		
	Non-Biodegradable	3 MT/M	Manually collected and sold to scrap vendors
	Bio-degradable	5 MT/M	Used as manure.

Note:

The industry is negotiating with fertilizer manufacturers whereby dried spentwash shall be used as potash rich manure; in such an event anaerobic digester shall not be installed. The raw spentwash shall be concentrated in MEE and dried in spray drier.

b. Hazardous Waste

Table 2-12 hazardous waste generated and its disposal

Sr. No.	Category	Description of waste	Quantity	Mode of Collection and Disposal
1.	5.1	Used Oil	1.01 KL/A	Shall be collected in Leak Proof Containers and utilized as lubricant for bullock carts

3 BASELINE ENVIRONMENTAL STATUS

3.1 AIR ENVIRONMENT

Ambient air monitoring was carried out at 8 locations (two inside the factory premise and 6 within study area) 24 hours a day, twice a week at each location over/for a period of three months (December 2019 to February 2020) to determine background concentrations. The Maximum concentrations of each pollutant observed are considered as a background concentration of the respective location, the summary of the results is given below.

1. Particulate Matter (PM_{10})

The maximum, minimum, average and 98th percentile concentrations for PM_{10} were recorded in the study area in the range of 39.7 to 72.5µg/ m^3. The maximum 98th Percentile concentration is 68.8µg/ m^3 were recorded at Vita-Mayni Road -Vita (location -3). The concentrations of PM_{10} are well below the CPCB standard of 100µg/ m^3.

2.Particulate Matter (PM2.5)

The maximum, minimum, average and 98th percentile concentrations for Particulate Matter ($PM_{2.5}$) monitored in the study area were 21.3– 42.5µg/m^3. Highest 98th percentile value is 41.7µg/m^3 which was observed at factory near Main Gate (Location-1). The concentration of $PM_{2.5}$ is well below the prescribed limit of 60µg/m^3.

3. Sulfur Dioxide (SO_2)

The Minimum, maximum, average and 98th percentile value of Sulphur dioxide in the study area from the monitored data was in the range of 8.4 – 30.4µg/ m^3. Maximum 98th Percentile value of Sulfur dioxide is 29.3µg/ m^3obtained at Devnagar (Location-5). The concentration of SO_2 is well below the prescribed limit of 80µg/m3.

4.Oxides of Nitrogen (NOx)

The Minimum, maximum, average and 98th percentile value of Oxides of Nitrogen (NOx) in the study area from the monitored data was in the range of 12.0– 31.2µg/ m^3. Maximum 98th Percentile value of Oxides of Nitrogen (NOx) is 30.9µg/ m^3obtained at Devnagar (Location-5). The concentration of NOx is well below the prescribed limit of 80µg/m^3.

5. Carbon Monoxide (CO)

The maximum, minimum, average and 98th percentile concentrations for Carbon Monoxide (CO) monitored in the study area were 0.2 – 1.2 mg/m^3respectively. Highest 98th Percentile value is 1.2 mg/ m^3 was recorded at Vita-Mayni-Road Vita (Location-3). The concentration of CO is well below the prescribed limit of 4 mg/ m^3.

The ambient air quality monitoring results indicates that the overall air quality in the study area is within permissible standards prescribed by NAAQ Standards.

Table 3-1 Receptor Summary

Sr. No.	Description of Receptor	Receptor/Village	Latitude	Longitude	Distance (in meter) from stack	Angle w. r. t. stack-
Factory Location			17°20'10.83"N	74°31'36.15"E	--	--
1	--	Stack	17°20'12.44"N	74°31'38.88"E	--	--
2	AAQ-1	Factory (Main Gate)	17°20'10.60"N	74°31'32.40"E	200	254
3	AAQ -2	Factory (Near Molasses tank)	17°20'5.34"N	74°31'42.32"E	240	155
4	AAQ -3	Vita mayni road-Vita	17°17'28.27"N	74°32'2.89"E	5100	72
5	AAQ -4	Wasumbe	17°17'44.08"N	74°35'48.26"E	8660	122
6	AAQ -5	Devnagar	17°19'23.92"N	74°34'58.02"E	6070	104
7	AAQ -6	Salshinge	17°20'38.18"N	74°34'1.25"E	4280	79
8	AAQ -7	Kanharwadi	17°22'7.28"N	74°29'35.07"E	5080	314
9	AAQ -8	Bhikawadi khurd	17°20'3.19"N	74°26'36.11"E	6390	258

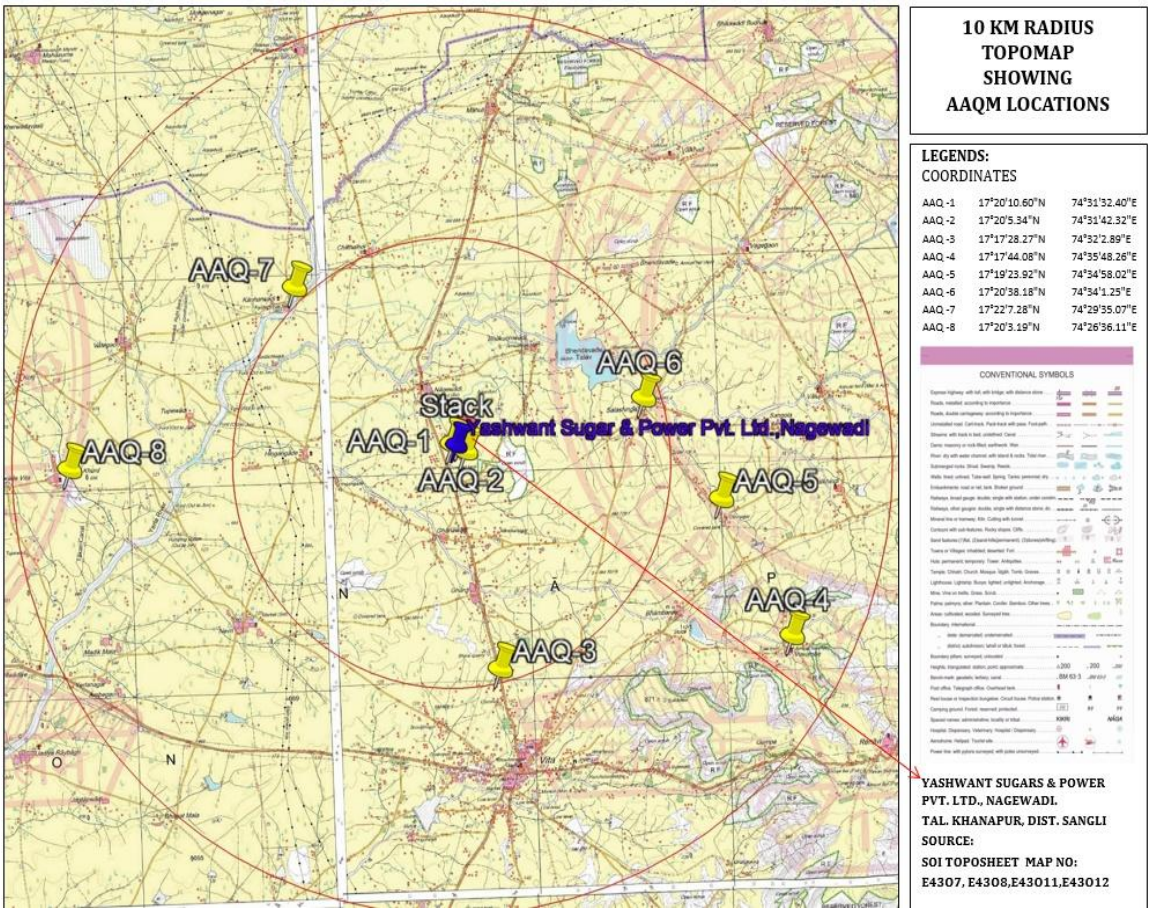


Figure 3.110 km. radius study area map indicating air quality monitoring locations

3.1.1 IMPACT ON AIR QUALITY DUE TO PROPOSED ACTIVITY

At present there are two boilers of 2*17.5 TPH capacity each, these boilers shall be abandoned and new boilers of 1*200 TPH for sugar division and 1*30 TPH for distillery division shall be installed (i.e. after expansion).Considered the all boilers working at full load conditions to estimate the GLC of PM_{10}, $PM_{2.5}$, SO_2 and NO_x due to the proposed expansion of the industry under the prevailing conditions of meteorology and emission data set, air quality modeling is performed for Yashwant Sugar and Power Private Limited, Nagewadi, Tal Khanapur, Dist Sangli. Incremental concentrations are worked out for 8 receptor locations, at which ambient air quality monitoring was carried out. Total concentrations are computed considering background (Ambient Air Monitoring) concentrations and incremental concentrations (AERMOD) due to the proposed expansion. Results are compared with the Ambient Air Quality Standards (AAQS).

Table 3-2 Stack Inventory

Sr. No.	Particulars	Description	
A. Point Source (Stack attached to boiler)			
1	Stack attached to	Power generation boiler	Distillery boiler
2	Capacity	1*200 TPH	30 TPH
3	Fuel type	Bagasse	Bagasse or Coal
4	Total fuel quantity requirement	1850 MT/day	Bagasse -265 MT/day or Coal-134 MT/day
5	Stack height	80 m.	
6	Stack diameter	4.0 m.	
7	Flue gas temp.	120^0 - 135^0C	
8	Flue gas velocity	7.5 – 11.0 m/s	
9	Controlling equipment	ESP – 99% removal efficiency	
10	Emission rate	(g/sec)	
	i. TPM	2.94	
Based on Observed Conc.& Fuel			
	ii. NOx		
	based on assumed max emission standards	7.6	
	iii. SO_2		
	Based on Fuel - Bagasse - 0.02% or Coal – 0.6%	Bagasse - 9.8 & Coal – 18.61	
	based on assumed max emission standards	7.121	
11	Ash content	31.75 MT/day	
13	Ash below grate	6.35 MT/day (20 % of the total ash)	
14	Remaining Ash	25.40 MT/day (80 % of the total ash)	
15	Ash going to stack, QPM (with ESP removal efficiency of 99%)	0.254 MT/day (Consider 99% ESP Efficiency)	
16	Ambient temperature	30^0C	

Sr. No.	Particulars	Description
B. Line Source (Vehicular emission)		
	Average time of movement of vehicle inside the premises	5 min
	Distance travelled by the vehicles inside premises	0.2 km
	Q_{PM} (g/sec)	0.1045
	Q_{NOx} (g/sec)	1.1349
	Q_{CO} (g/sec)	0.5857

3.1.1.1 Results of the AERMOD software for air quality predictions for proposed expansion of the factory

The proposed expansion of Sugarcane crushing capacity from 2500 TCD to 8000 TCD, establishment of distillery 110 KLPD and co-generation power plant of 40 MW. The AERMOD software was developed by US-EPA and American Meteorological Society (AMS) to compute dispersion of air pollutants in the ambient air due to the various sources. In this study, emissions from proposed stack are coupled with the subsequent meteorological data by using AERMOD 8.0.5 air quality model. Also, dispersion patterns are studied by the output of concentration isopleths plotted by the software. Incremental concentration values for selected receptors are added in the background concentration values.

Table 3-3 PM_{10}& $PM_{2.5}$- 24 hr. Concentrations, computed by AERMOD 8.0.5

Sr. No.	Receptor /Village	PM_{10}- 24 hour concentration (µg/m3)			$PM_{2.5}$- 24 hour concentration(µg/m3)		
		Background	Incremental	Total	Background	Incremental	Total
1	Factory (Main Gate)	67.1	0.06	67.16	42.5	0.04	42.54
2	Factory (Near Molasses tank)	66.4	0.16	66.56	40.2	0.10	40.3
3	Vita Mayni Road-Vita	72.5	0.01	72.51	38.6	0.01	38.61
4	Wasumbe	64.1	0.03	64.13	35.8	0.02	35.82
5	Devnagar	65.1	0.07	65.17	39.4	0.05	39.45
6	Salshinge	53.3	0.08	53.38	28.3	0.05	28.35
7	Kanharwadi	59.2	0.02	59.22	36.3	0.02	36.32
8	BhikawadiKhurd	62.3	0.05	62.35	41.5	0.03	41.53
NAAQ Standards (24 hr)		**100 (µg/m^3)**			**60 (µg/m^3)**		

Table 3-4SO_2& NO_X-24 hr. Concentrations, computed by AERMOD 8.0.5

Sr. No.	Receptor /Village	SO_2 - 24 hour concentration (µg/m3)			NOx - 24 hour concentration (µg/m3)		
		Background	Incremental	Total	Background	Incremental	Total
1	Factory (Main Gate)	24.6	0.83	25.43	27.5	0.34	27.84
2	Factory (Near Molasses tank)	24.1	2.20	26.3	24.8	0.90	25.7
3	Vita mayni Road-Vita	22.7	0.23	22.93	26.7	0.09	26.79
4	Wasumbe	19.5	0.43	19.93	27.9	0.18	28.08
5	Devnagar	30.4	1.02	31.42	31.2	0.42	31.62
6	Salshinge	19.3	1.07	20.37	19.6	0.44	20.04
7	Kanharwadi	22.9	0.36	23.26	25.8	0.15	25.95
8	BhikawadiKhurd	22.9	0.60	23.5	29.1	0.24	29.34
NAAQ Standards (24 hr)		**80 (µg/m^3)**			**80 (µg/m^3)**		

From the results, it can say that,

- At the selected 8 receptor locations, surrounded in 10 km radius around Yashwant Sugar & Power Pvt. Ltd., Nagewadi, Tal Khanapur, Dist Sangli, GLCs are well within the limits of AAQS. Results of the Ambient Air monitoring are enclosed in the **Annexure II.**
- Under the working conditions of 1*200 TPH and 1*30 TPH boilers, PM_{10}GLCs at all the 8 receptor locations are in the range of **53.38µg/m3** to **72.51µg/m3** which are within the limits of AAQS.
- Similarly, $PM_{2.5}$ GLCs for those receptors are in the range of **28.35µg/m3** to **42.54µg/m3** which is within the limits of AAQS.
- For SO_2, GLCs are in the range of **19.93µg/m3** to **31.42µg/m3**which is within the limits of AAQS.
- NO_x GLCs are in the range of **20.04µg/m3** to **31.62µg/m3**which is within the limits of AAQS.

It can be inferred that there shall not be any adverse effect on Ambient Air Quality due to the proposed expansion/establishment project.

3.2 WATER ENVIRONMENT

Water sampling and subsequent analysis was carried out to determine both the groundwater and surface water quality of the study area. Ground water & Surface water samples were collected at 8 locations & 3 locations respectively within study area. These samples were analyzed for physical and chemical parameters to ascertain the Baseline status in the existing surface water and ground water bodies.

Table 3-5Details of the ground water quality monitoring sampling locations

Sr. No.	Description of samples	Sampling location Village Name	Latitude	Longitude
Ground Water				
1	GW-1	Well – Bhagnyanagar	17°20'48.00"N	74°32'31.07"E
2	GW-2	Borewell – Nevari	17°18'34.54"N	74°28'48.84"E
3	GW-3	Well – Mahuli	17°24'49.09"N	74°31'45.82"E
4	GW-4	Well – Chikhalhol	17°22'34.75"N	74°31'41.66"E
5	GW-5	Well – Bhikwadikhurd	17°19'56.54"N	74°26'35.77"E
6	GW-6	Well – Sangole	17°20'31.31"N	74°35'21.59"E
7	GW-7	Well – Nagewadi	17°21'20.02"N	74°31'8.14"E
8	GW-8	Well – Kanharwadi	17°22'13.03"N	74°29'41.11"E

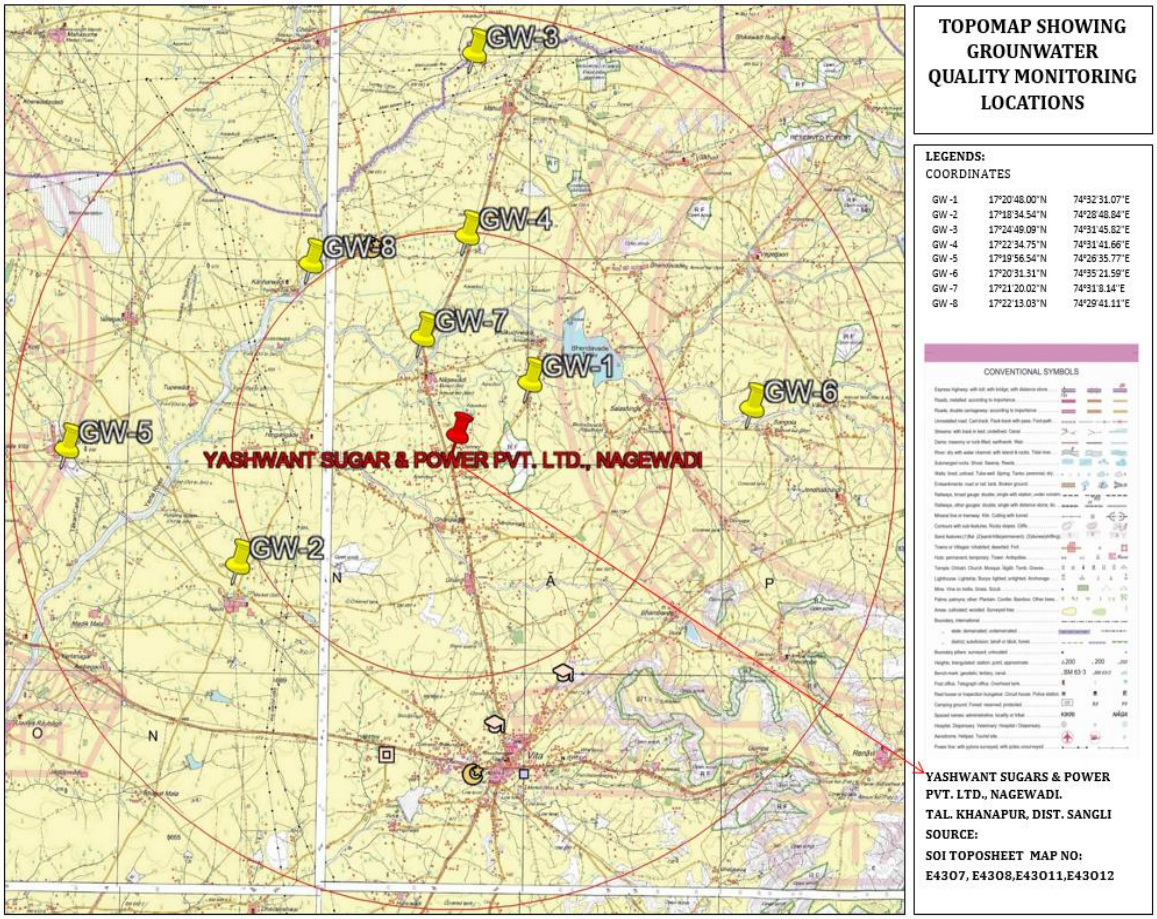


Figure 3.210 km. radius study area map indicating groundwater sampling location

Table 3-6 Details of the surface water quality monitoring sampling locations

Sr. No.	Description of samples	Sampling location Village Name	Latitude	Longitude
Surface Water				

1	SW-1	Odha Water- BhagyanagarOdha	17°20'48.53"N	74°32'30.82"E
2	SW-2	Lake Water- Bhagyanagar Lake	17°21'21.97"N	74°32'57.01"E
3	SW-3	Canal Water – Tembhu Canal	17°24'47.65"N	74°31'46.84"E
4	SW-4	River water- Yerla River	17°22'13.05"N	74°29'42.81"E

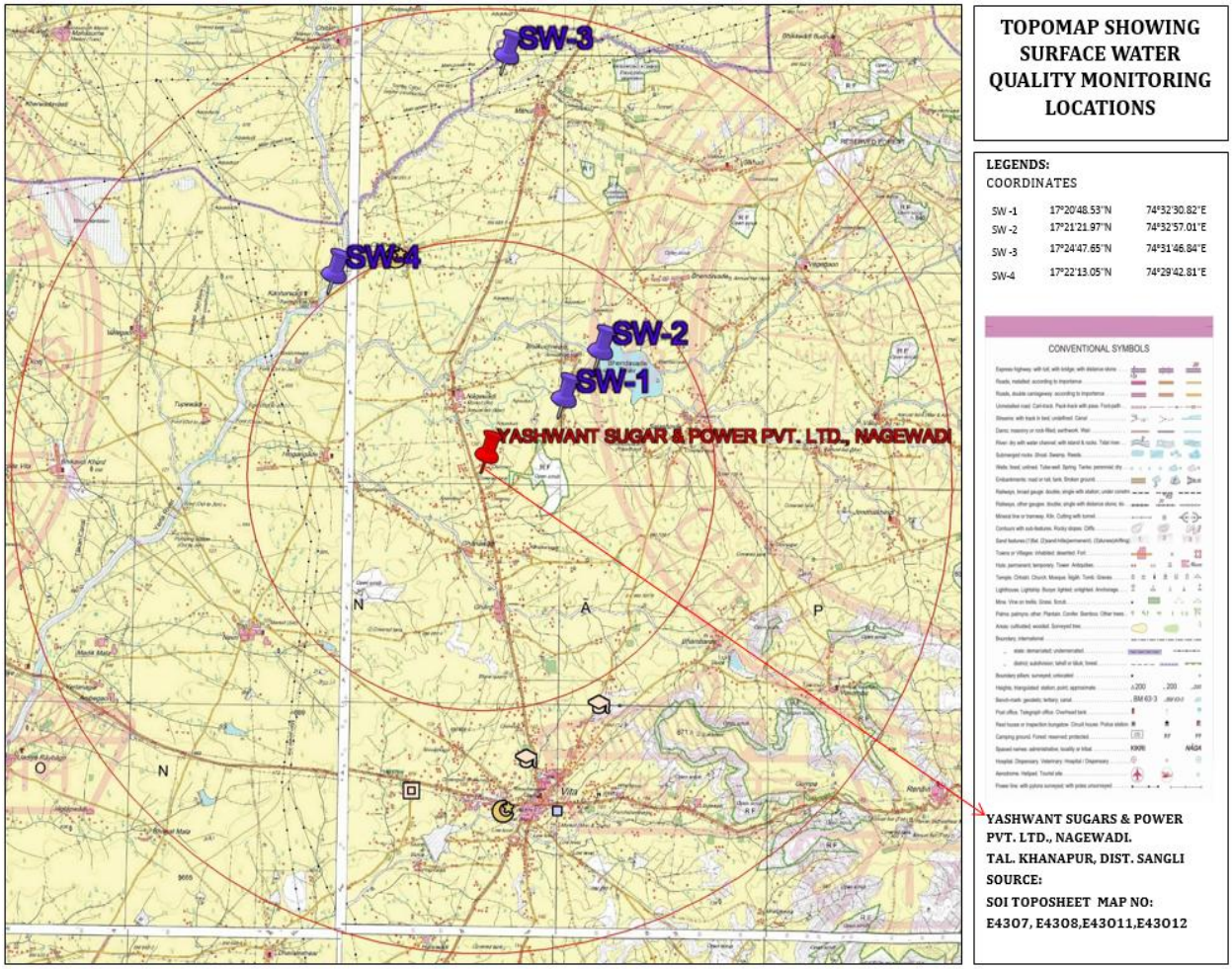


Figure 3.310 km. radius study area map indicating surfacewater sampling location

Table 3-7 Water Analysis Results

Sr. No	Parameters	Ground water		Surface water		Desirable	Permissible
		Min	Max	Min	Max	IS 10500:2012 Standards	
1.	pH	6.80	8.10	6.94	7.90	**6.5-8.5**	**No relaxation**
2.	Dissolved Solids (mg/l)	372	1024	514	614	**500**	**2000**
3.	Total Hardness (mg/l)	316	595	422	498	**200**	**600**
4.	Chlorides (mg/l)	78.8	609.2	78.9	162.4	**250**	**1000**
5.	Fluoride (mg/l)	0.38	0.64	0.44	0.61	**1**	**1.5**
6.	Sulphates (mg/l)	28	46	26	41	**200**	**400**

Ground water and surface water samples were collected and analyzed as per the Standard methods and the water quality of the study area is found within the permissible limits of IS: 10500- 2012. Except Fluoride concentrations observed are lower than the required concentration.

Groundwater quality is found to be good, which can be directly used for irrigation purpose. However, ground water used for drinking purpose after the appropriate treatment.

Surface water quality is found to be good, which can be directly used for irrigation purpose. However, for drinking purpose, conventional treatment suggested.

3.3 SOIL ENVIRONMENT

Table 3-8Details of the soil sampling locations

Sr. No.	Description of samples	Sampling location Village Name	Latitude	Longitude
1	S-1	Soil – Factory	17°20'8.80"N	74°31'33.20"E
2	S-2	Soil - Bhagnyanagar	17°20'48.28"N	74°32'31.35"E
3	S-3	Soil– Nevari	17°18'33.14"N	74°28'49.25"E
4	S-4	Soil – Mahuli	17°24'49.08"N	74°31'44.95"E
5	S-5	Soil – Chikhalhol	17°22'35.67"N	74°31'40.61"E
6	S-6	Soil – Bhikwadikhurd	17°19'56.69"N	74°26'36.56"E
7	S-7	Soil– Sangole	17°20'31.83"N	74°35'20.67"E
8	S-8	Soil -Nagewadi	17°21'20.32"N	74°31'7.36"E

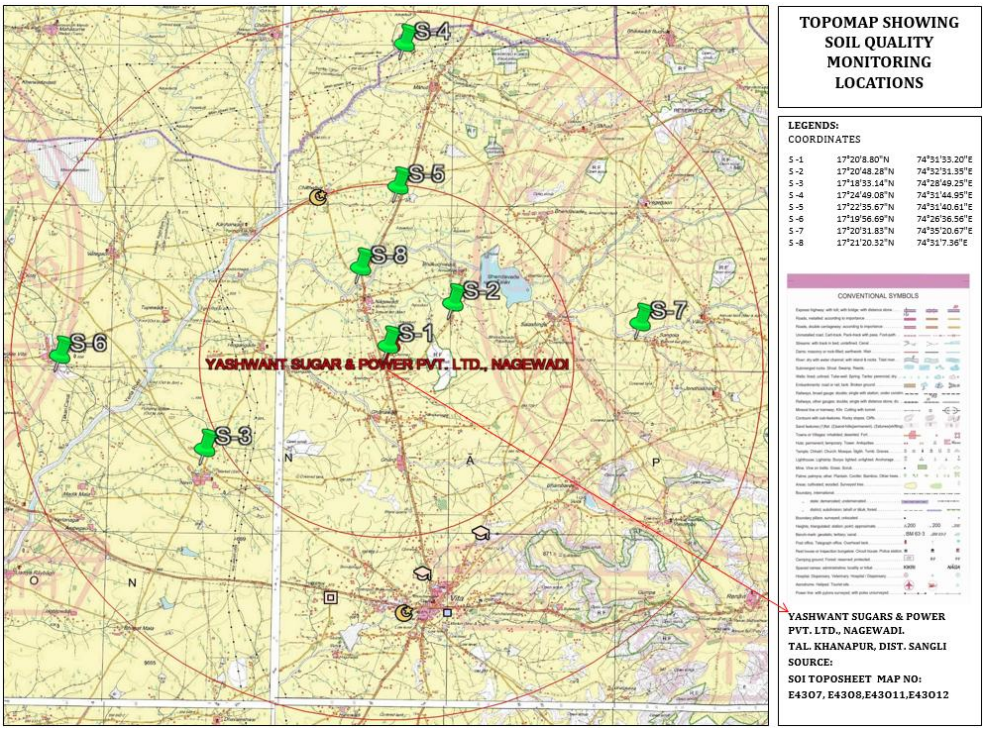


Figure 3.410 km. radius study area map indicating soil sampling location

Table 3-9Soil Analysis report within 10 km radius of the study area

Sr. No.	Test Parameter	Unit	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	Standards
1	pH	--	7.12	6.91	7.28	8.01	7.64	7.92	7.81	8.12	6.5 – 8.5
2	Conductivity	mmhos/cm	0.31	0.42	0.28	0.24	0.34	0.39	0.37	0.22	0.2 – 0.5
3	Available Nitrogen	Kg/ha	242	271	212	268	314	276	282	258	>200
4	Available Phosphorus	Kg/ha	54	48	52	46	44	56	42	40	40 – 60
5	Available Potassium	Kg/ha	298	452	378	496	388	484	414	372	>280
6	Organic Carbon	%	0.79	0.76	0.82	0.91	1.02	0.97	0.92	0.89	>0.75
7	Sodium (as Na)	%	0.006	0.005	0.006	0.004	0.004	0.005	0.005	0.007	< 5
8	Calcium (as Ca)	%	0.24	0.20	0.28	0.26	0.17	0.31	0.34	0.30	---
9	Magnesium (as Mg)	%	0.06	0.04	0.05	0.06	0.07	0.03	0.05	0.05	---
10	Cation Exchange Capacity	meq/100gm	17.93	14.43	19.22	19.49	15.22	19.36	22.22	20.48	>30
11	Water Holding Capacity	%	58	46	57	42	45	43	44	56	---
12	Particle Size Distribution										
12a	Sand	%	21	22	21	23	21	22	23	22	---
12b	Silt	%	23	24	24	26	25	26	24	23	---
12c	Clay	%	56	54	55	51	54	52	53	55	---

The soil monitoring was carried out at 8 locations in the study area, and analyzed for chemical and physical characteristics; the summary of the results is as under

- Soil in the area is mainly clayey in nature hence good water holding capacity.
- The finding of the study reveals that pH of soil in the range of 7.12to 8.12, which is an indicative of the **neutral** to **slightly alkaline** soil.
- The values for Nitrogen at all locations varied between 212 to 314 kg/ha. Maximum concentration of nitrogen was observed at location S-5.
- The concentration of phosphorus was estimated to be between 40 to 56 kg/ha. The highest concentration can be observed at location S-6, while the lowest concentration can be observed at location S-8.
- It is important to note that the concentration of potassium was found to be high at all locations ranging between 298to 496 kg/ha.

Based on the above findings it can be concluded that the soil samples can be classified as per soil classification given by Tondon H.L.S. (2005). The samples fall under **medium to high** fertile soils.

3.4 NOISE ENVIRONMENT

In order to assess the noise levels in the study area, monitoring was carried out at eleven different locations within 10 km radius of the study area.

Note: Industry is not working state from August 2016.

Table 3-10 Details of noise quality monitoring locations

Sr. no.	Description	Locations	Latitude	Longitude
Within Factory				
1	N-1	Factory (Main Gate)	17°20'10.60"N	74°31'32.40"E
2	N-2	Factory (Inside)	17°20'9.89"N	74°31'37.18"E
3	N-3	Factory (Near Quarters)	17°20'9.02"N	74°31'20.97"E
4	N-4	Factory (Near ETP)	17°20'5.46"N	74°31'50.78"E
5	N-5	Factory (Near Canteen)	17°20'14.70"N	74°31'36.18"E
Outside the Factory Premises (within 10 km radius)				
6	N-6	Vita mayni Road-Vita	17°19'1.67"N	74°31'47.94"E
7	N-7	Wasumbe	17°17'28.27"N	74°32'2.89"E
8	N-8	Devnagar	17°19'23.92"N	74°34'58.02"E
9	N-9	Salshinge	17°20'44.23"N	74°35'38.47"E
10	N-10	Kanharwadi	17°22'7.28"N	74°29'35.07"E
11	N-11	BhikawadiKhurd	17°20'3.19"N	74°26'36.11"E

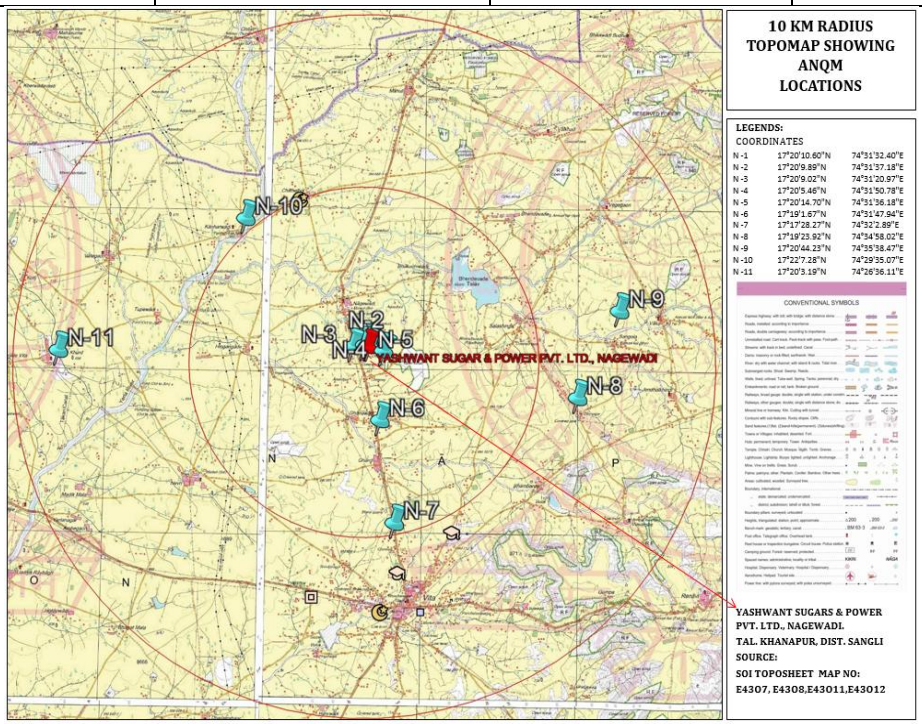


Figure 3.5km. radius study area map indicating noise location

Daytime Noise Levels $(Leq)_{day}$

Industrial Zone: The day time noise level at the Project site was found in the range of 46.5 – 50.7dB (A), which is well below the permissible limit of 75 dB (A), due to industry is not working state presently.

Residential Zone: The daytime noise levels in all the residential locations were observed to be in the range of 43.4 dB (A) to 50.5 dB (A), which is well below the permissible limit of 55 dB (A).

Night time Noise Levels $(Leq)_{night}$

Industrial Zone: The night time noise level in the Project site was observed in the range of 43.8– 46.1 dB (A), which is well below the permissible limit of 70 dB (A), due to industry is not working state presently.

Residential Zone: The night time noise levels in all the residential locations were observed to be in the range of 39.7 dB (A) to 44.6 dB (A), which is well below the permissible limit of 45 dB (A).

The industry is making all efforts to control the noise levels within the limits by providing acoustic measures and silencer pads etc. all the employees in these work places **shall be** provided with ear plugs / muffs.

Table 3-11 Noise levels of the study area

Sr. No.	Station	Standard Limit dB(A) Leq	Time	dB (A) Leq
Inside factory premises				
1.	Factory (Main Gate)	75	Day	50.7
		70	Night	45.2
2.	Factory (Inside)	75	Day	47.6
		70	Night	44.5
3.	Factory (Near Quarters)	75	Day	48.1
		70	Night	43.8
4.	Factory (Near ETP)	75	Day	46.5
		70	Night	44.3
5.	Factory (Near Canteen)	75	Day	47.5
		70	Night	46.1
Outside factory (within study area)				
1.	Vita mayni Road-Vita	55	Day	50.5
		45	Night	44.6
2.	Wasumbe	55	Day	43.4
		45	Night	40.8
3.	Devnagar	55	Day	48.3
		45	Night	42.1

Sr. No.	Station	Standard Limit dB(A) Leq	Time	dB (A) Leq
4.	Salshinge	55	Day	47.2
		45	Night	40.6
5.	Kanharwadi	55	Day	44.3
		45	Night	39.7
6.	BhikawadiKhurd	55	Day	45.4
		45	Night	41.2

3.5 LAND USE/LAND COVER OF THE STUDY AREA

Table 3-12 Change in General Land use/ Land cover of Study Area (2011 to 2017)

Landuse	Area in km2		% of Study Area	
	2011	**2017**	**2011**	**2017**
Water Bodies	1.83	4.20	0.46	1.05
Settlement	23.02	28.40	5.76	7.10
Open Scrub	72.61	52.57	18.15	13.14
Agriculture	137.35	160.19	34.34	40.05
Barren Land	129.40	115.24	32.35	28.81
Grazing	35.71	39.38	8.93	9.85
Total	399.93	399.98	100.00	100.00

- In the year 2011 water body area is about 1.83 km^2, whereas in the year 2017 is increased and it is 4.20km^2.
- It can be inferred that there is an increase in area of 8.54 % under water body, settlement, agricultural and grazing land whereas a decrease in area under open scrub and barren land is 8.54%.
- Increase in water body due to Tembhu Lift Irrigation Project.
- Increase in agricultural land due to improved irrigation facilities like drip/trickle irrigation instead of surface and subsurface irrigation techniques. Therefore barren land is converted into agricultural land.
- Increase in settlement due to an increase in industrial growth and migration of the people.

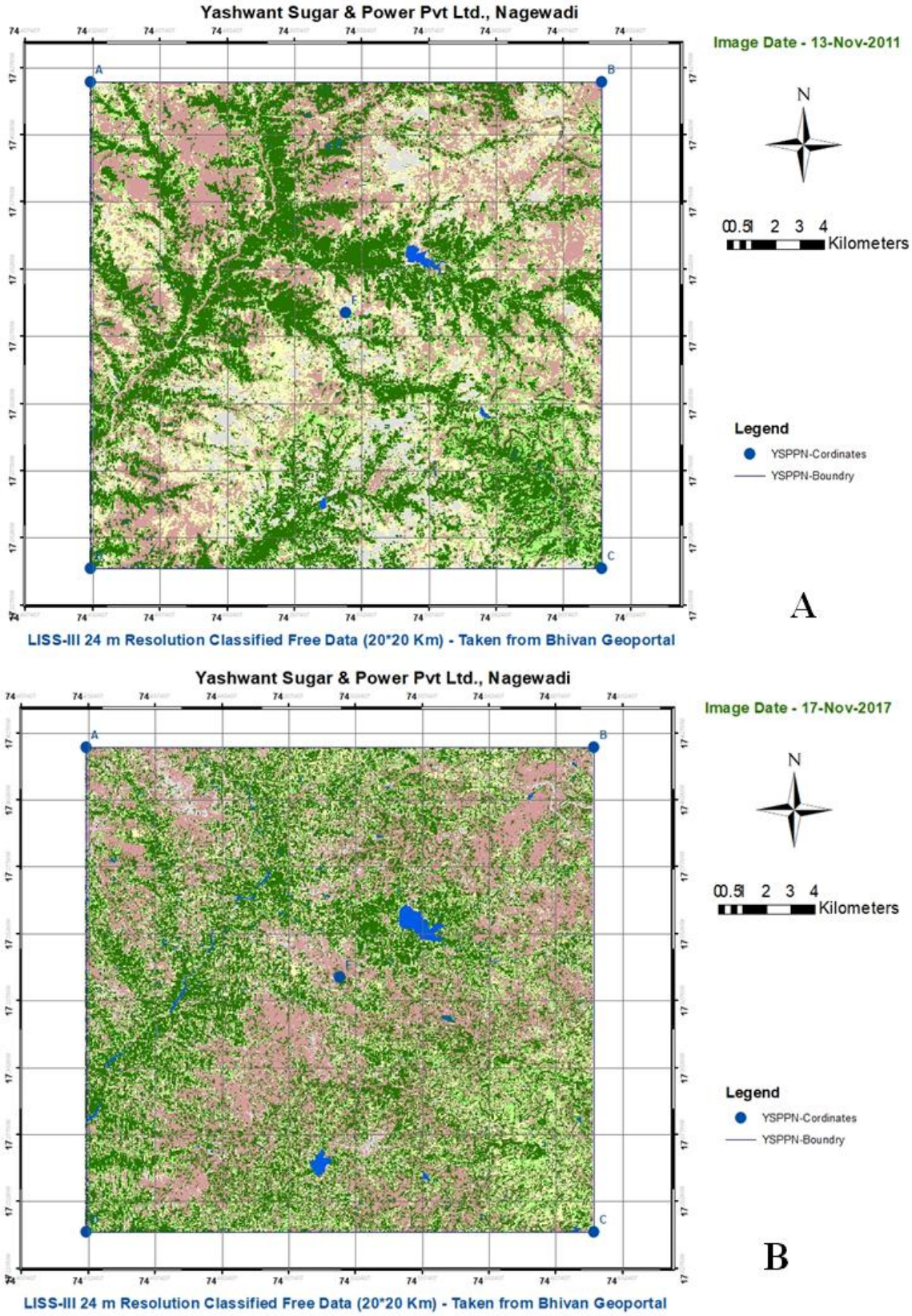


Figure 3.6 Landuse/Land cover map 1) 2011 & 2) 2017

3.6 ECOLOGY AND BIODIVERSITY

- The existing biodiversity in the study area was observed to be very low mainly due to the semi-rural and agrarian setting of the location. The project doesn't involve any clearance of trees as the project is expansion of existing facility and well connected to major and minor roads.
- Shannon Weiner Diversity Index of the core zone was 0.656 and buffer zone was 0.662 for herbs. The diversity of the location was found to be low as the herbs seen the region are mainly seasonal and are prevalent mainly during the wet season.
- All waste management practices should be identified and implemented right from the construction phase of the project and should be up-graded during the operational phase. The up gradation should be periodic and in match with improving technologies.
- A robust forestation and biodiversity plan should be formulated and practiced with a continuous check on its efficacy.
- The project activities should be carried out only after considering all possible secondary and tertiary impacts on the environment and mitigation measures should be incorporated such as to reduce any possibility of impact on the existing environment.

3.7 DEMOGRAPHIC OR SOCIO-ECONOMIC PROFILE

The project has a positive response from the public. The willingness to pay and the willingness to accept the project has positive an outcome. The ratio between this is around 1:10. It means the benefits are ten times greater than the loss. The losses due to the polluting agents are proposed to be diluted through various methods. The wastes and the pollutions can be reducing with some measures as suggested in the report. The social and cultural vulnerability index responds a very less and level of resilience is at the higher side. The sustained high growth rates and poverty reduction, however, can be realized only when the sources of growth are expanding, and an increasing share of the labour force is included in the growth process in an efficient way. From a static point of view, growth associated with progressive distributional changes will have a greater impact in reducing poverty than growth which leaves distribution unchanged. This is in fact expresses the inclusive growth of the region.

3.8 SITE PHOTOGRAPHS

Figure 3.7 Site photographs

4 IDENTIFICATION, PREDICTION AND MITIGATION MEASURES

Approx. 360 nos. of labours shall be employed during installation phase for the project which includes installing new machinery and units of the plant.

Table 4-1 Anticipated environment impacts its effect and mitigation measures during construction phase

Sr. No.	Impacts	Effects	Mitigation Measures
1	Dust	Respiratory diseases	All the internal Roads are tar felted Dust separation sprinkling water, use machinery meeting
2	Noise	Impairing, Hearing, Fatigue related Health issues	Provide acoustic measures and silencer pads to reduce noise level. Provide personal protective equipment to the workers.
3	Land	Reduction of vacant land	Utilize the existing infrastructures and adopt vertical expansion and maximize the operation schedules.
4	Top soil	Loss of fertility	Utilize for Green belt development.
5	Water	Additional water is required for construction activities and Drinking	Minimize the water requirements by adopting mechanical mixing and Drinking water in Bottles instead of Taps.
6	Wastewater	Improper disposal of waste water leads to contamination of water sources and soil	Domestic wastewater shall be treated based on Root zone technology and treated wastewater shall be used for gardening.

Anticipated environment impacts its effect and mitigation measures during operational phase are given in chapter 4.

5 ANALYSIS OF ALTERNATIVE (TECHNOLOGY AND SITE)

YSPPL has existing sugar factory of 2500 TCD. The command area is rich in sugarcane cultivation and has excellent irrigation facilities. Also the other location features are

- Required land is available at the project site and is owned by YSPPL
- The site is easily accessible by Road.
- The cane potential and irrigation facilities in the command area are adequate and will ensure sustained cane availability for the proposed project with the extensive experience of farmers in sugar cane cultivation.

- The season & off season fuel requirements for the conventional boiler can be easily met by own bagasse or in case of shortage of bagasse during of season coal shall be imported for 1*30 TPH distillery boiler.
- The evacuation of exportable surplus power from the co-gen plant will have to be made through the substation (110 kV) Mayani Substation, 10 Km fromsite.

Infrastructure:

- The site has easy access to latest communication and other social infrastructure facilities, including telecommunication, schools and colleges, medical & health facilities, commercial infrastructure, etc. at Khanapur, which is a Tehsil Headquarter.
- Environment-friendly zone as the habitation is remote and surrounded by Agricultural activities

In view of the above positive features of the existing site no alternative site is considered.

5.1 Analysis of alternative technology

It is proposed to adopt anaerobic digestion followed by concentration in MEE followed by drying in in order to make the valuable by-product from spentwash treatment.

For sugar unit the expansion may be incorporated in existing sugar mill by providing additional, Milling Tandem. At present the industry taken steam from existing 2*17.5 TPH low pressure boilers. It is proposed to demolish the existing low pressure boilers and add 1*200 TPH boiler and 1*30 TPH boiler for distillery in order to reduce the bagasse and steam requirement for the process. It is proposed to establish 40MW bagasse based co-generation power plant which will fulfill the power and stem requirement of proposed unit and excess power will be supplied to the state electricity grids.

6 ENVIRONMENT MONITORING PROGRAMME

Table 6-1Environment management progrmme

SR.NO	ITEM	PARAMETERS	FREQUENCY OF MONITORING	LOCATION
1.	Ambient Air quality at appropriate location for PM_{10}, $PM_{2.5}$, SO_2,andNO_x,	PM_{10}, $PM_{2.5}$, SO_2,andNO_x	24 hourly, Quarterly	5 Locations 1 @ Upwind and 2@ downwind directions from stack @ 120^0 to each other Near entry and exit gates
2.	Stationary Emission from Stack PM, SO_2, NOx	PM, SO_2, NOx	Monthly	1 DG set Stack, 2 Boiler Stack
3.	Water	Water quality parameters as per 10500:2012	Monthly	Drinking water locations
	Waste water quality (treated and Untreated)	pH, BOD, COD, TSS, Flow, TDS etc.	Monthly	ETP inlet and Outlet
4.	Noise	Day and Night levels Equivalent noise level- dB (A)	Quarterly or as often as required	6 Locations Upwind and downwind directions Near boilers and near main gate and ETP.
5.	Soil (Qualitative and quantitative testing/analysis to check the soil fertility,)	pH, Cation Exchange Capacity, Total Nitrogen, Phosphorous, Potassium, moisture, Permeability, Conductivity, Texture & structure, Organic carbon	Quarterly or as often as required	1 near Greenbelt 1 near ETP Composite sample shall be taken at each location
6.	Solid waste generation monitoring / Record Keeping	Manual record keeping	To be updated daily	
7	Greenbelt and plantation monitoring	Type of species shall be decided based on soil & climatic conditions. The number of trees would be 1500 per hectare, however; the number of trees would vary depending on the	Six Monthly	

SR.NO	ITEM	PARAMETERS	FREQUENCY OF MONITORING	LOCATION
		typeof soil		
8	Carbon and Water foot Print Monitoring	Maintain the data of raw materials consumption, steam consumption, vehicle frequency for transport of raw materials, effluent generation, air emissions, hazardous waste generation, and raw material recovery	Daily and Monthly	

7 ADDITIONAL STUDIES

7.1 RISK ASSESSMENT

HAZOP and Quantitative Risk Assessment studies are carried out for each product, distaster management plan, onsite and offsite emergency plan are prepared and given in Chapter 7 of the EIA Report

Consequence Analysis of Ethanol due to Storage Facility.

Scenario of Ethanol in different forms

SITE DATA:

Location: YASHWANT SUGAR & POWER PVT., INDIA

Building Air Exchanges Per Hour: 0.59 (unsheltered single storied)

Time: October 17, 2020 15.13 hours ST (using computer's clock)

CHEMICAL DATA:

Chemical Name: ETHANOL

CAS Number: 64-17-5 Molecular Weight: 46.07 g/mol

ERPG-1: 1800 ppm ERPG-2: 3300 ppm ERPG-3: N/A

IDLH: 3300 ppm LEL: 33000 ppm UEL: 190000 ppm

Ambient Boiling Point: 77.7° C

Vapor Pressure at Ambient Temperature: 0.088 atm

Ambient Saturation Concentration: 89,952 ppm or 9.00%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 3 meters/second from 269° true at 10 meters

Ground Roughness: open country Cloud Cover: 5 tenths

Air Temperature: 27° C Stability Class: C

No Inversion Height Relative Humidity: 50%

SOURCE STRENGTH:

Leak from hole in vertical cylindrical tank

Flammable chemical escaping from tank (not burning)

Tank Diameter: 16 meters Tank Length: 15 meters

Tank Volume: 3,016 cubic meters

Tank contains liquid Internal Temperature: 27° C

Chemical Mass in Tank: 1955 tons Tank is 75% full

Circular Opening Diameter: 2 inches

Opening is 10 centimeters from tank bottom

Ground Type: Concrete

Ground Temperature: equal to ambient

Max Puddle Diameter: Unknown

Release Duration: ALOHA limited the duration to 1 hour

Max Average Sustained Release Rate: 39.7 kilograms/min

(averaged over a minute or more)

Total Amount Released: 1,500 kilograms

Note: The chemical escaped as a liquid and formed an evaporating puddle.

The puddle spread to a diameter of 36 meters.

Type of Tank Failure: BLEVE tank explodes and chemical burns in afire ball

Potential hazards from BLEVE:

- Thermal radiation from fireball and poo lfire
- Hazards fragments and blast force from explosion
- Downwind toxic effects of fire by-products

BLEVE/Fire ball Scenario: The higher the internal tank pressure/temperature at the time of tank failure, the larger the fire ball. Any liquid not consumed by the fire ball will form a pool fire.

SOURCE STRENGTH:

BLEVE of flammable liquid in vertical cylindrical tank

Tank Diameter: 16 meters Tank Length: 15 meters

Tank Volume: 3,016 cubic meters

Tank contains liquid

Internal Storage Temperature: 27° C

Chemical Mass in Tank: 1,955 tons Tank is 75% full

Percentage of Tank Mass in Fireball: 100%

Fireball Diameter: 702 meters Burn Duration: 33 seconds

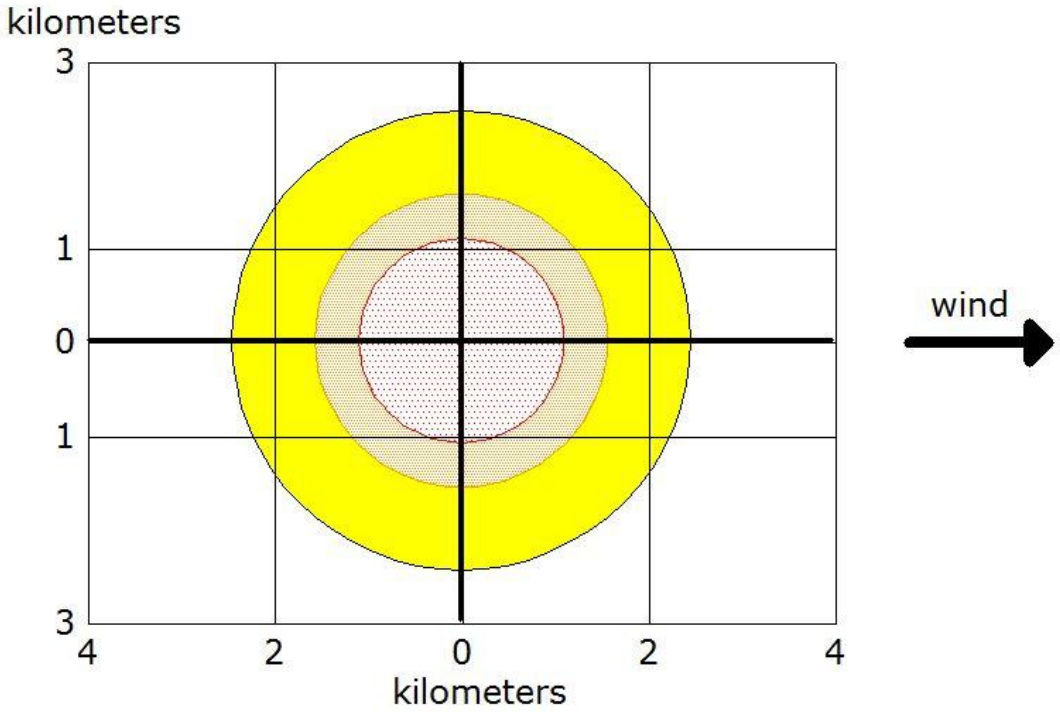
THREAT ZONE:

Threat Modeled: Thermal radiation from fireball

Red : 1.1 kilometers --- (10.0 kW/(sq m) = potentially lethal within 60 sec)

Orange: 1.6 kilometers --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)

Yellow: 2.5 kilometers --- (2.0 kW/(sq m) = pain within 60 sec)


kilometers
3
1
0
1
3
4
2
0
2
4
kilometers
wind
greater than 10.0 kW/(sq m) (potentially lethal within 60 sec)
greater than 5.0 kW/(sq m) (2nd degree burns within 60 sec)
greater than 2.0 kW/(sq m) (pain within 60 sec)


Shri Guru Bhagwan Datt Mandir
Bhagyanagar
Sajai Mandir
Bhagyanagar Sarv Seva Society
Mahalaxmi Mandir Tupewadi
Hingangade
Nagewadi
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Conclusions

When tank explodes and ethanol in a fireball due to BLEVE;

The thermal radiation for the Ethanol tank confined to the maximum at 1 km that means the thermal radiation intensity of 10kW/m^2 is potentially lethal within 60 seconds. Similarly, the other threat zone of 5.0 kW/m^2 causes 2nd degree burns within 60 seconds at 1.6 km and the rest is 2.0 kW/m^2 subjected to within the unit at 2.5 km, which causes pain within 60 seconds

Project proponent will implement all preventive measures to tackle all type of emergencies arising out of operation or malfunction of individual unit's. The required resources for Onsite and Offsite emergency management plan will be properly planned and provided to implement the plan effectively. The factory shall give highest priority towards Health and safety of the employees and people residing nearby areas. Management shall conduct the training to the nearby villagers to appraise them about their role during emergency. All nearby people shall be given training on do's and don'ts during emergency situation.
Unfortunately, if there is any emergency onsite of offsite, it will be tackled effectively due to availability of required resources at the site. Similarly, all the concern staff and members of the Teams shall be trained appropriately to tackle the emergencies in the plant. By knowing the type of emergency situation that may arise during operation of the plant, appropriate control measures will be implemented to reduce the gravity of the emergencies. Similarly, to avoid the emergency situation, all required mitigation measures will be implemented as recommended.

8 BUDGETARY PROVISIONS TOWARDS ENVIRONMENTAL MANAGEMENT PLAN:

The costs involved in environmental monitoring and management to mitigate the adverse effects will be put on account for the proposed project. The capital cost for the EMP will be Rs. 3400 Lakhs. And recurring cost will be Rs. 275 Lakhs. The detailed EMP budget is given in table below

Table 8-1EMP Budget

Sr. No.	Component	Particulars		Capital Investment (In Lakhs)	Recurring Investment (In Lakhs)
1.	Air	Construction of new common Stack for boilers and ESP		700	60
2.	Water	• Upgradation of ETP • Sugar and distillery CPU • MEE & Drier for Distillery Spentwash treatment		2570	150
3.	Noise	Acoustic enclosures, Silencer pads, ear plugs etc		20	5
4.	Environment monitoring and Management	Quarterly Environment Monitoring (Per Year)		--	20
		Ambient air monitoring	PM_{10}, $PM_{2.5}$, SO_2, NOx		
		Boiler & DG Set Monitoring	TPM, SO_2, NOx		
		Effluent (Treated &Untreated)	pH, COD, BOD, TSS, TDS, Oil & Grease		
5.	Occupational Health	Glares, Breathing Masks, Gloves, Boots, Helmets, Ear Plugs etc. & annual health-medical checkup of workers, Occupational Health (training, OH center)		20	5
6.	Greenbelt	Green belt development activity		10	
		Maintenance of green belt		--	5
7.	Solid Waste Management	Solid Waste Management		60	20
8.	Rain water harvesting	Rain water harvesting		20	5
9.	Carbon and Water Foot Print	Maintain the data of raw materials consumption, steam consumption, vehicle frequency for transport of raw materials, effluent generation, air emissions, hazardous waste generation, and raw material recovery		--	5
		TOTAL COST (INR, LAKHS)		**3400**	**275**

9 CORPORATE ENVIRONMENT RESPONSIBILITY PLAN

The capital cost of the proposed expansion project is Rs. 350 Crores. The industry has reserved Rs. 2.625 Crores (0.75 % of the cost of the project as per Office Memorandum Vide F. No. 22-65/2017-IA.III Dated 01.05.2018) which will be spent on the activities like sanitation and health, education, and educational facilities as a cost towards corporate environment responsibility (CER).

10 RAINWATER AND STORMWATER HARVESTING PLAN

The industry is making efforts to conserve natural resources by adopting green technologies and as such industry proposes to adopt rain water harvesting system. With the annual rainfall of 581 mm there is good potential to harvest rainwater. The rainwater harvesting system is installed at various buildings and about 5246.87 m^3 per year water is harvested. This harvested water shall be utilized for ground water recharge in order to increase the ground water table in the surrounding area

Storm water management system is also adopted by the industry. Separate drains of minimum 0.45 m * 0.6 m are provided for the collection and disposal of storm water from the industry premises.

11 CONCLUSIONS

As the industry has provided all the necessary pollution control measures for water, Air and Solid and hazardous waste disposal, the negative impacts on the environment would be minimal/ negligible. The expansion programme would help the farmers to crush their produce in time which would help to minimize the loss of sugarcane tonnage and yield maximum financial benefits.