EXECUTIVE SUMMARY

FOR

EXPANSION OF BULK DRUGS MANUFACTURING FACILITY FOR CHANGE IN PRODUCTION CAPACITY FROM 4800 TPA TO 9156 TPA

AT

R. S Nos. 30, 32, 33, 34, 35, 36 etc.

VILLAGE: PERIYAKALAPET, MATHUR ROAD
TEHSIL: PUDUCHERRY
STATE: PUDUCHERRY

BY:

M/s. Strides Shasun Limited

Project termed under schedule 5(f): Category 'A' Synthetic Organic Chemicals, ToR *vide* file no. J-11011/211/20l7-1A. II (I), dated: 16th August, 2017.

Report Prepared by:

(NABET Accredited vide Certificate No. NABET/EIA/1619/RA0083 &
MoEF Recognized Lab vide F. No. Q-15018/29/2007-CPW)
HUBERT ENVIRO CARE SYSTEMS (P) LTD, CHENNAI

FEBRUARY, 2018

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I. Background

Strides Shasun Limited, an integrated, leading global supplier for development and manufacturing services of Bulk drugs, intermediates, API (Active Pharmaceutical Ingredients) and Formulations to the Pharmaceutical Industry, holding a Consent to Operate (CTO) for the existing facility with the manufacturing capacity of 4800 TPA for 5 products, proposes an "expansion of bulk drugs manufacturing facility with change in capacity from the existing 4800 TPA (5 products) to 9156 TPA (8 products)" at Plot No. R.S Nos. 30/4 PT, 32/1A, 32/2, 32/3, 33/1, 33/10, 33/11, 33/13, 33/2, 33/3, 33/4, 33/5, 33/6, 33/9, 34/1, 34/2, 34/3, 34/4, 34/5, 34/6, 34/7, 34/8, 35/4, 35/5, 35/6, 35/7, 36/5, Periakalapet, Mathur Road, Puducherry. Strides Shasun proposes to expand the above bulk drugs facility due to market demand.

II. Management Commitment

The company assigns prime importance for environmental protection. Zero Liquid Discharge concepts have already been implemented by the company and it complies with all the stipulated environmental regulations. The company has recently purchased additional 1 acre of land for maintaining the adequate greenery within the facility. Water conservation measures will be implemented which include the existing freshwater consumption of 45 KLD currently utilized by boilers will be replaced with recycled water in the proposed expansion and is also committed to follow all the environmental statutory regulations and requirements in future.

III. Products Details

The products categories are bulk drugs and the project, located at Periakalapet, Mathur Road, Puducherry is categorized under Schedule 5 (f), Category A, Synthetic Organic Chemicals. Strides Shasun proposes to expand the bulk drug unit with change in capacity from the existing 4800 TPA (5 products) to 9156 TPA (8 products). Existing and Proposed products details are provided in **Table-1.**

Table-1 Existing and Proposed Products with Capacity

S. No	Existing		New Addition		S. No	Proposed	
	Product Name	Quantity TPA	Product Name	Quantity TPA		Product Name	Quantity TPA
1	Ibuprofen	4308	Ibuprofen	2892	1	Ibuprofen	7200
2	Ibuprofen DC	240	Ibuprofen DC	960	2	Ibuprofen DC	1200

3	Ibuprofen Lysinate	240	Ibuprofen Lysinate ,	300	3	Ibuprofen Lysine,	540
	Ibuprofen Sodium&		Ibuprofen Sodium&			Ibuprofen Sodium&	
	S+ Ibuprofen		S+ Ibuprofen			S+ Ibuprofen	
4	Carisoprodol	12	Carisoprodol	0	4	Carisoprodol	12
5	Pilot Scale Operations for R&D	-	Pilot Scale Operations for R&D	-	5	Pilot Scale Operations for R&D	-
			Pilot Plant Small Scale Volume Products	12	6	Pilot Plant Small Scale Volume Products	12
			Pregabalin	180	7	Pregabalin	180
			Sapropetrein	12	8	Sapropetrein	12
Total		**4800**		**4356**			**9156**

V. Categorization

The proposed project is termed under Schedule 5 (f), Category A, Bulk Drugs and Intermediates as per the EIA Notification 2006 and its Amendments requiring EIA studies of the project. As the project site is located at Periakalapet, Mathur Road, Puducherry within 5 km of the Tamilnadu – Puducherry interstate boundary, the facility attracts general conditions and hence it requires prior Environmental Clearance from Expert Appraisal Committee (EAC) at the Ministry of Environment, Forest and Climate Change (MoEF&CC) before commencing onsite activities, i.e., Category A. As per EIA Notification, 2006 in para 7 (i), sub section III it attracts public hearing for expansion or modernization or change of product mix in existing projects as it attracts specific condition. There are no interlinked projects. The company holds a CTO for the existing facility with the manufacturing capacity of 4800 TPA for 5 products.

The proposal was appraised in the 24th EAC meeting held on 14th June 2017 and was issued the Terms of Reference (ToR) for preparing Environmental Impact Assessment (EIA) Report vide Letter No. IA-J-11011/211/2017-IA-II (I) dated 16/08/2017. The total project cost is Rs.125 Crores.

VI. Land Requirement

The plant facilities are spread over 105155.54 sq.m (25.99 Acres). The proposed expansion is within the existing facility only. In addition to the existing greenbelt area of 7.39 acres, 1 acre of land has been purchased for maintaining a greenbelt area which comprises 35.37% of the total land area of 25.99 acres. The land use pattern is provided in **Table-2** overleaf.

Table-2 Land Use Pattern

Sl. No.	Description	Existing			Proposed		Total Area (After Expansion)		
		Area in (Sq.m)	Area in (Acres)	Area in (%)	Area in (Sq.m)	Area in (Acres)	Area in (Sq.m)	Area in (Acres)	Area in (%)
1	Green Belt	29919	7.39	28.45	7,274.44	1.80	37,193.29	9.19	35.37
2	Roads & Other Area	51688	12.78	49.15	- 9,135.71	-2.26	42,551.98	10.52	40.47
3	Build up Area	23549	5.82	22.39	1,861.27	0.46	25,410.27	6.28	24.16
Total Land Area		**105156**	**25.99**	**100**	**0**	**0**	**105155.54**	**25.99**	**100**

VII. Water Requirement

The total water requirement after expansion will be 2315 KLD. The freshwater consumption will be 498 KLD sourced from inhouse bore wells. 1817 KLD of recycled water will be obtained from expanded ZLD plant. The external sources water consumption is detailed in **Table-3.**

Table-3 Water consumption from external sources

S. No	Description	Existing in KLD	Proposed in KLD	Total After Expansion in KLD
1	Freshwater requirement	110	388	498
2	Treated sewage water from PWD, MGMC& PIMS etc.,	440	150	590
3.	Treated sewage water and process effluent from Strides Shasun – Formulation division (non EC category)	199	0	199
Total		749	451	1287

The water requirement break-up details are given in **Table-4.**

Table-4 Water Requirement Break-Up Details

Requirement	Freshwater consumption in KLD			Recycled water consumption in KLD			Total (KLD)		
	Existing	Additional	Total Proposed	Existing	Additional	Total Proposed	Existing	Additional	Total Proposed
Process water	60	393	453	0	0	0	60	393	453
Boilers	45*	0	0	251	67	318	251	67	318
Cooling tower	0	0	0	522	654	1176	522	654	1176
Green Belt	0	0	0	30	20	50	30	20	50
Washings & cleaning	0	0	0	50	25	75	50	25	75
Domestic	5	40	45	0	0	0	5	40	45
TW to formulation unit**	0	0	0	198	0	198	198	0	198
Total	**110**	**433**	**498***	**1051**	**766**	**1817**	**1116**	**1199**	**2315**

Note:

* Existing Freshwater of 45 KLD utilized for Boilers will be replaced with recycled water in the proposed expansion.

**Recycled water is supplied to Formulation unit (non EC Category) for their utility application and again taken as sewage water of 156 KLD and effluent of 43 KLD (over and above PWD, PIMS, MGMC etc).

VIII. Wastewater Generation

The expansion facility will generate 45 KLD of wastewater from domestic activities. The effluent generated from manufacturing process (550 KLD) will be sent to the MEE followed by Biological Treatment and RO along with sewage water sourced from PWD (Public Works Department), Mahatma Gandhi Medical College, PIMS which will be used in the process/non process application. Zero Liquid Discharge (ZLD) system already exists and ZLD is also proposed for expansion. The existing and total water balance quantity charts are shown in **Figures-1 & 2.**

High pollutant stream is treated in Stripper and MEE. The condensate is sent to Biological treatment followed by RO plant for usage in Process/Non process area.

Less pollutant stream along with externally procured treated sewage is sent to Biological treatment followed by RO for using in Process/Non process area. Marine outfall has been discontinued in October 2017.

Concentrate from Multiple Effect Evaporator (MEE) is treated in Agitated Thin Film Drier (ATFD) and the sludge generated from biological treatment system and ATFD salts are currently stored inhouse and procedures to dispose them to nearby TSDF sites/Co processor will be established.

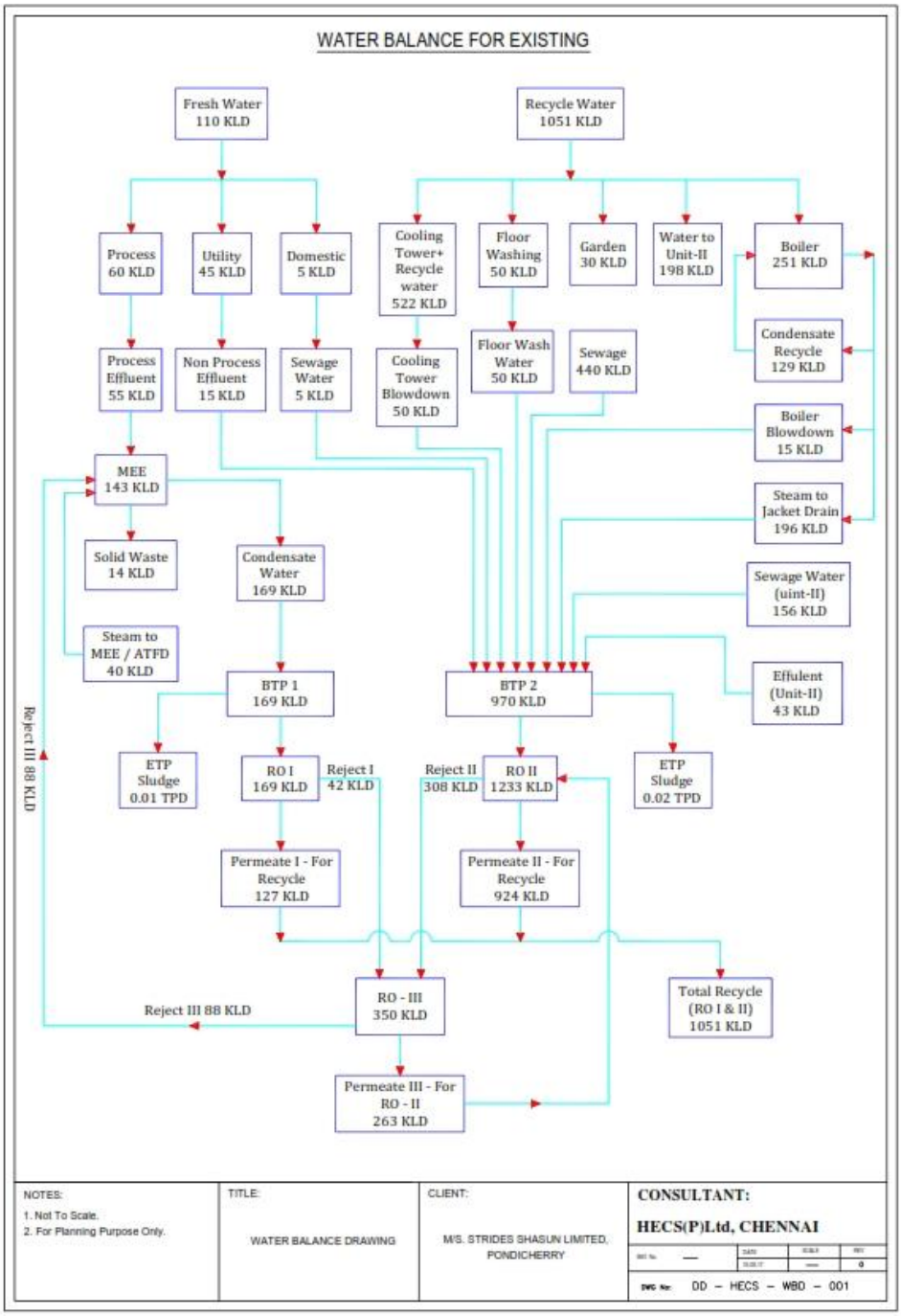


Figure-1 Existing Water Balance Chart

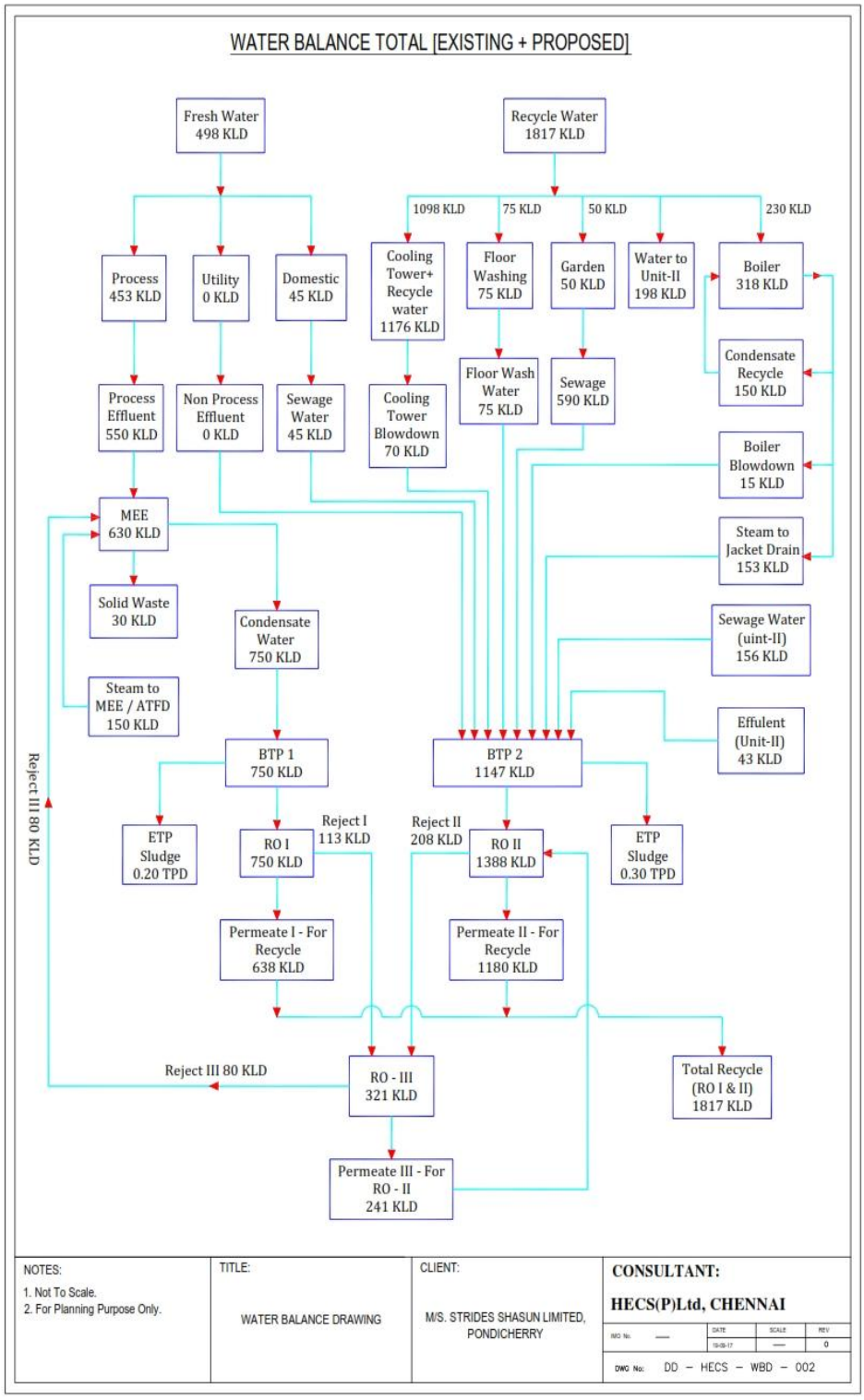


Figure-2 Total Water Balance Chart

IX. Power Requirement

The power required for the project will be sourced from Puducherry Electricity Board. 6 DG sets (3 nos. of 1000 kVA and 3 nos. of 1500 kVA) will be used as backup facilities in case of power failure.1 no. of 16 TPH boiler will be used for production and another of the same capacity will be used as standby. The power requirement details and backup power facilities are provided in **Table-5.**

Table-5 Power Requirement and and backup power facilities

Details	Existing	Proposed	After expansion
Power Requirement Soure: Puducherry Electricity Board	3860 KVA	2000 KVA	5860 KVA
Power Back Up through DGs	2 x 1500 KVA	1 x 1500 KVA	3 x 1500 KVA
	2 x 1000 KVA	1 x 1000 KVA	3 x 1000 KVA
Boiler-bio-Briquettes	1 x 16TPH	1 x 16 TPH	1 x 16 TPH
	1 x 3.5 TPH (S.B)	1 X 15 Lac Kcal/hr Thermic Fluid Heater	1 X 15 Lac Kcal/hr Thermic Fluid Heater
	2 x 4.5 TPH (S.B)		1 x 3.5 TPH
			2 x 4.5 TPH (S. B) 1 x 16 TPH (S. B)

S.B = standby boiler

Note: 1 no. of 3.5 TPH Boiler acting as standby in the present unit will be running after expansion. 2 Nos of 4.5 TPH boilers from existing unit will be retained as standby after proposed expansion.

Boilers and thermic fluid heaters: One 16 TPH boiler backed up by one 3.5 TPH and two 4.5 TPH boilers are being operated in the existing facility. One 16 TPH boiler in the existing facility will be used in the proposed facility. One 3.5 TPH existing standby boiler becomes operational during expansion. Two 4.5 TPH and one 16 TPH boilers will be standby during expansion. In addition to this, one Thermic Fluid Heater (TFH) of 15 Lac K Cal capacity powered by Bio-briquettes is also proposed.

X. Manpower

The manpower requirement including both technical and non-technical personnel is given in **Table-6.**

Table-6 Manpower Requirement

S.No	Manpower	Existing	Additional	Total after Expansion
1	Employees	640	50	690
2	Contract labourers	210	0	210
	Total	850	50	900

XI. Solid Waste

MSW in operation phase will be treated in Organic Waste Convertor. 60 TPA of organic waste will be generated in operation phase from canteen and STP. The source of municipal solid waste in the industry is domestic use. Inorganic waste will be disposed to PPCC authorized recycling agency. Municipal Waste Management details are given in **Table-7.**

Table-7 Municipal Solid Waste Quantities

Sl. No.	Description	Quantity (TPA)			Method of Collection	Method of Disposal
		Existing	Additional	Total Proposed		
1	Food waste	35	30	60	Manual	Converted to manure in Organic convertor

XII. Hazardous Waste Management

The hazardous wastes will be stored in an isolated area above concrete platform under roof shed. These wastes will be segregated, stored and will be disposed to MoEF&CC/PPCC authorized TSDF operators within a stipulated period of time (90 days).

The hazardous wastes will be disposed as per the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 and subsequent amendments. ATFD salts are currently stored inhouse and procedures to dispose to nearby TSDF sites/Co processor will be established. Hazardous Waste Generation details are given in **Table-8.**

Table-8 Hazardous Waste Management

Sl.No	Schedule No	Name of the Hazardous Waste	Existing Quantity KLA/TPA	Additional Quantity KLA/TPA	Total Quantity KLA/TPA	Method of Stage / Disposal
1	Class A of Schedule II	Waste Sodium Dichromate Solution	22000	13000	35000	Dispose to PPCC Authorized Vendor
2	34.3 Schedule I	ETP Sludge	3	5	8	Sent to Coprocessing in Cement Industries/ GEPIL
3	5.1 Schedule I	Spent Lubricating Oil	4	6	10	Dispose to PPCC Authorized Vendor
4	5.2 Schedule I	Waste / Residue containing Oil	150	150	300	Dispose to PPCC Authorized Vendor
5	20.2 Schedule I	Spent Solvent	900	680	1580	Dispose to PPCC Authorized Vendor
6	20.3 Schedule I	Distillation Residue	48	48	96	Dispose to PPCC Authorized Vendor
7	28.1 Schedule I	Process Residue / Waste	720	620	1340	Dispose to PPCC Authorized Vendor
8	28.2 Schedule II	Spent Catalyst / Spent Carbon	54	20	74	Dispose to PPCC Authorized Vendor
9	28.3 Schedule II	Off Specification Product	1	4	5	Dispose to PPCC Authorized Vendor
10	28.4 Schedule II	Date Expired / Discarded Off Specification drugs / Medicines	1	2	3	Bio Medical waste Treatment Facility
11	28.5 Schedule II	Spent Organic Solvent	36	50	86	Dispose to PPCC Authorized Vendor
12	33.2 Schedule I	Sludge from Treatment of Waste water arising out of cleaning / disposal of Barrels / containers	20	10	30	Dispose to PPCC Authorized Vendor

Sl.No	Schedule No	Name of the Hazardous Waste	Existing Quantity KLA/TPA	Additional Quantity KLA/TPA	Total Quantity KLA/TPA	Method of Stage / Disposal
13	33.3 Schedule I	Discarded Containers / Barrels / Liners , Contaminated with Hazardous waste Chemicals	250	180	430	Dispose to PPCC Authorized Vendor
14	35.1 Schedule I	Chemical Sludge from Waste water treatment	4800	6180	10980	ATFD salts are currently stored inhouse and options to dispose to nearby TSDF sites/Co processor
15	34.4 Schedule I	Oil and Grease Skimming Residues	1	1	2	Dispose to PPCC Authorized Vendor
16	35.2 Schedule I	Spent Catalyst	1	1	2	Dispose to PPCC Authorized Vendor
17	35.3 Schedule I	Spent Carbon	90	50	140	Dispose to PPCC Authorized Vendor

XIII. Analysis of Alternatives Considered

Since the land adjacent to existing facility is only used for the expansion with change in production capacity, no alternate sites are considered as stated in **Chapter 5 & Section 5.2**.

XIV. Project Cost

The total capital investment of the expansion project is INR 125 crores, the details of which are provided in **Table-9.**

Table-9 Project cost Breakup

Sl. No.	Description	Cost In INR Lacs
1	Civil	980.00
2	Equipment Cost	5,750.00
3	Mechanical	1,470.00
4	Electrical	980.00
5	Instrumentation	1,300.00

6	HVAC	670.00
7	EHS	1,250.00
8	Consultancy	100.00
	Grand Total	**12,500.00**

XV. Baseline Study

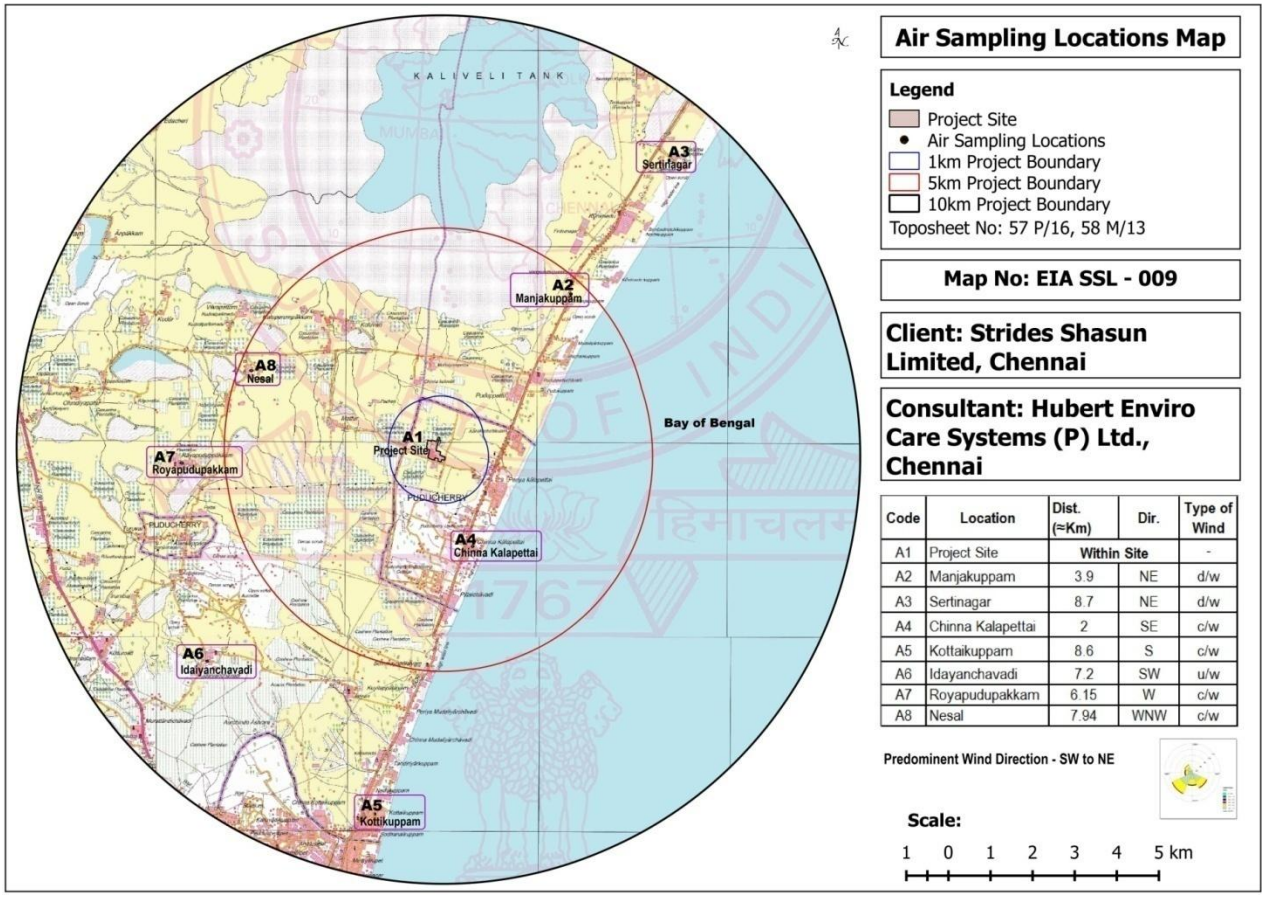
Meteorological Environment

The micro-meteorological conditions during the study period (July – September 2017) for hourly data of wind speed, wind direction and temperature were recorded at the project site. As per the Indian Meteorological Department (IMD) located at Puducherry provided Climatological data, the annually determined wind direction is South East.

Annual total total rainfall was 1354 mm. Maximum and minimum rainfall of 132.8 mm and 89.5 mm was recorded in the months of July and September respectively. In the site specific meteorological data of study period (July – September 2017), an average wind speed of 2.9 m/s. average temperature of 33.1°C and relative humidity of 73% were recorded. Map showing the air monitoring locations is given in **Figure-3.** Air, Noise, SW, GW & Soil Quality Monitoring Locations are provided in **Table-10.**

Table-10 Monitoring Locations

Station Code	Location	Type of Wind	Geographical Coordinates	Distance (Km) from Project boundary	Azimuth Directions
A1	Project Site	-	12° 2'19.87"N 79°51'10.63"E	Within Site	
A2	Manjakuppam	d/w	12° 6'9.14"N 79°54'3.35"E	3.9	NE
A3	Sertinagar	d/w	12° 4'2.21"N 79°52'47.28"E	8.7	NE
A4	Chinna Kalapettai	c/w	12° 1'49.31"N 79°51'46.44"E	2.0	SE
A5	Kottaikuppam	c/w	11°57'55.50"N 79°50'23.44"E	8.6	S
A6	Idayanchavadi	u/w	11°57'50.90"N 79°46'32.54"E	7.2	SW
A7	Royapudupakkam	c/w	12° 1'52.17"N 79°47'35.02"E	6.15	W
A8	Nesal	c/w	12° 3'21.71"N 79°48'44.83"E	7.94	WNW



Code	Location	Dist. (≈Km)	Dir.	Type of Wind
A1	Project Site	Within Site		-
A2	Manjakuppam	3.9	NE	d/w
A3	Sertinagar	8.7	NE	d/w
A4	Chinna Kalapettai	2	SE	c/w
A5	Kottaikuppam	8.6	S	c/w
A6	Idayanchavadi	7.2	SW	u/w
A7	Royapudupakkam	6.15	W	c/w
A8	Nesal	7.94	WNW	c/w

Figure-3 Map showing the Air, Noise, SW, GW &Soil Quality Monitoring Locations

Ambient Air Quality

The ambient air quality has been monitored at 8 locations for 12 parameters as per NAAQS, 2009 within the study area. The baseline levels of PM_{10} (48.5 – 60.8 µg/m³), $PM_{2.5}$ (18.1 – 25.0 µg/m³), SO_2 (10.8 – 13.8 µg/m³), NO_2 (18.2 – 21.5) and CO (0.01 - 0.91 mg/m^3), all the parameters are well within the National Ambient Air Quality Standards for Industrial, Commercial and Residential areas at all monitoring locations during the study period from July to September 2017.

Noise Environment

The existing ambient noise levels were monitored using precision noise level meter in and around the project site at 10 km radius at 8 locations during July - Sept 2017. During the study period in industrial area day time noise levels were about 59.4 dB(A) and 60.8 dB(A), which are within prescribed limit by MoEF&CC (75 dB(A) Day time & 70 dB(A) Night time). During night

time noise levels of 50.1 dB (A) and 55.2 dB (A) were recorded, which are within prescribed limit by MoEF&CC (75 dB(A) Day time and 70 dB(A) Night time). In residential sector, daytime Leq values were in the ranges of (51.1 – 60.2) dB(A), and the nighttime Leq values varied in the range of (44.3 – 50.8) dB(A).

Water Environment

There are two kajor water bodies within the study area: Kaliveli Lake, 8.1 Km towards North and Bay of Bengal 1.72 Km in East direction from the project site. The prevailing status of water quality at 8 sampling locations for surface water and 8 sampling locations for groundwater have been assessed from July to Sept 2017. The standard methods prescribed in IS were followed for sample collection, preservation and analysis in the laboratory for various physiochemical parameters.

Surface water quality

The values range pH: 7.14 – 8.01, TDS: 238 mg/l – 35329 mg/l, Total Hardness: 70 mg/l – 8200 mg/l, Chloride content: 42.552 mg/l – 19750 mg/l. Sulphate content: 34 mg/l – 2530 mg/l. Fluoride 0.21 mg/l - 1.0 mg/l and Dissolved Oxygen 5.5 mg/l – 6.5 mg/l

Groundwater Quality

The values ranges pH: 6.98 - 7.74, TDS: 442 mg/l – 1180 mg/l, Total Hardness: 123 mg/l – 501 mg/l, Chloride content 136 mg/l – 289 mg/l and Sulphate content: 58 mg/l – 157 mg/l. Fluorides were observed between 0.44 mg/l and 1.0 mg/l.

Soil sampling was carried out at eight (8) locations in the study area. It is observed that,

- The pH of the soil samples ranged between 6.90 – 8.15; indicating that the soils are almost neutral in nature.
- Conductivity of the soil samples ranged from 100.5 – 714 µS/cm. As the EC values are less than 2000 µS/cm, the soil is found to be non-saline in nature.
- The water holding capacity of the soil samples varied from 19.6 - 28.6 (%).
- Nitrogen content ranged from 67 kg/ha to 188 kg/ha.
- Phosphorous ranged from 47 kg/ha to 106 kg/ha.
- Potassium content ranged from 60 to 154 kg/ha.

Biological Environment

The sensitive places in the study area are provided in **Table 3-1**. The species observed in the study area are mostly commercial crops and plantation crops and breaks are also observed throughout the semi-evergreen and moist deciduous forest types. The main trees which are grown in this region such as Eucalyptus supply firewood. There are two wildlife refuges in

Puducherry with a great variety of birds. There is no extinct flora and fauna species found in the study area. The biodiversity richness map of study area is provided in **Figure-4.**

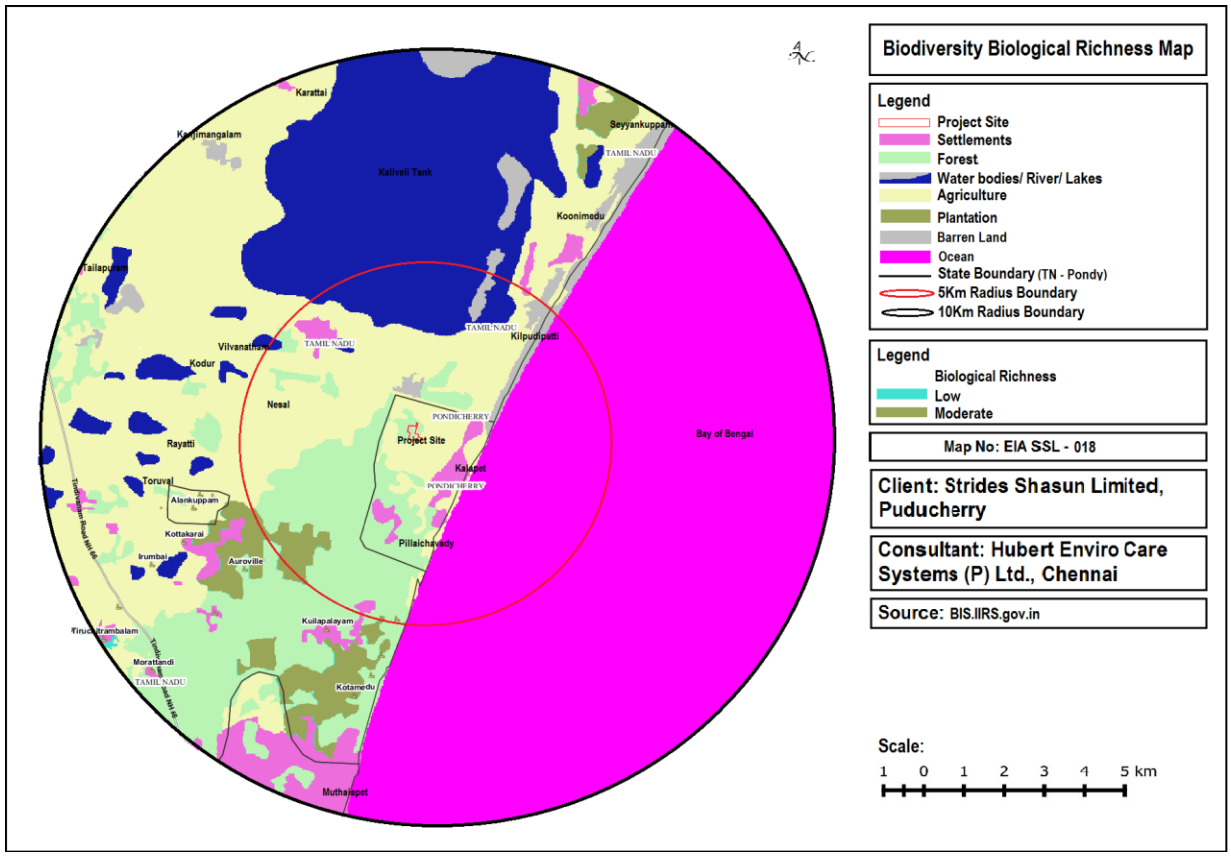


Figure-4 Biodiversity Richness Map

Socio Economic Environment

A socio-economic study was undertaken in assessing aspects which are dealing with social and cultural conditions, and economic status in the study area. The study provides information such as demographic structure, population dynamics, infrastructure resources, and the status of human health and economic attributes like employment, per-capita income, agriculture, trade, and industrial development in the study area. The study of these characteristic helps in identification, prediction and evaluation of impacts on socio-economic and parameters of human interest due to proposed project developments. The parameters are:

- Demographic structure
- Infrastructure Facility
- Economic Status
- Health status

- Cultural attributes

Agriculture is the main occupation of the district, but the district is being close to Chennai and Cuddalore and the fast industrialization in the district, there is shift in the occupation pattern. The main workers of the study area constitute 84.94% i.e a person who has worked for major part of the reference period (i.e. six months or more during the last one year in any economically productive activity is termed as 'Main worker)'. Those who involved in the agriculture are 18.21% and other workers are 79.89%. The socio-economic status of the district and study area are provided in the **Chapter 3, Section 3.11.**

The project area is in Periakalapet Village, Puducherry Tehsil of Union Territory of Puducherry located at Latitude: 12° 2'20.58"N and Longitude: 79°51'9.96"E

XVI. Anticipated Environmental Impacts

Water Environment

The freshwater requirement for proposed expansion phase will be 498 KLD to be sourced from inhouse bore wells/ externally procured treated sewage, PIMS, MGMC, PWD etc. The certificate for registration of existing inhouse borewell is attached as **Annexure 22**. Application has been submitted to Puducherry Groundwater Authority for renewal of Groundwater usage certificate for inhouse borewell and acknowledgement of the same is attached as **Annexure 23**.

The total water requirement for Operation Phase after expansion will be 2315 KLD (freshwater 498 KLD and treated water 1817 KLD). Out of 1817 KLD of recycled water consumed, 590 KLD of treated sewage is sourced from PIMS, MGMC, PWD etc.

Industrial effluent will be treated in a dedicated ETP. Treated wastewater will be used within the plant and Zero Liquid Discharge concept will be maintained. Thus there will be no outfall of effluent to outside and hence there are no adverse impacts due to the proposed project on water environment.

As the proposed expansion will draw groundwater from the site, the following measures are proposed as a part of development to improve the groundwater scenario and also to ensure that groundwater is not contaminated.

- Rainwater is captured from the roof catchments with closed pipe system (without mixing surface water to avoid the spillage contamination) into the recharge pits and excess water is stored in the rain water storage tank/sumps. Strides Shasun has developed rainwater harvesting structures to harvest the runoff water from the rooftops and stormwater drainage system for recharge of groundwater.
- Rooftop harvesting is practiced for non process areas (Admin Building and Canteen) from where the water collected is used for groundwater recharge.

Air Environment

The baseline levels of PM_{10} (48.5 – 60.8 µg/m³), $PM_{2.5}$ (18.1 – 25.0 µg/m³), SO_2 (10.8 – 13.8 µg/m³), NO_2 (18.2 – 21.5) and CO (0.01 - 0.91 mg/m^3), all the parameters are well within the permissible limits as prescribed by National Ambient Air Quality Standards. The main sources of emissions will be from the D.G sets, Reactors, Boilers and Thermic Fluid Heater stacks.

Air pollution control measures following will be adopted:

1. All process vents will be connected to scrubbers and let out through at 3 m stack located above roof level.
2. Utilities stack will be provided with adequate height for DG Sets 20 m & TFH 30 m respectively.
3. After expansion, 16.58 Acres (35.371% of total area of 25.99 Acres) of greenbelt cover will attenuate the air pollutants.

As GLC indicates maximum concentration observed due to proposed expansion for PM, SO_2 and NOx are 0.39 µg/m^3, 0.22 µg/m^3 and 6.13 µg/m^3 (scenario 1) and 3.35µg/m^3, 1.01 µg/m^3 and 18.29 µg/m^3 (scenario 2) respectively. So it can be concluded that even after the expansion of the plant the impact envisaged is minimum.

Noise Environment

During the study period in industrial area day time noise levels were about 59.4 dB(A) and 60.8 dB(A), which are within prescribed limit by MoEF&CC (75 dB(A) Day time & 70 dB(A) Night time). During night time noise levels of 50.1 dB (A) and 55.2 dB (A) were recorded, which are within prescribed limit by MoEF&CC (75 dB(A) Day time and 70 dB(A) Night time). In residential sector, daytime Leq values were in the ranges of (51.1 – 60.2) dB(A), and the nighttime Leq values varied in the range of (44.3 – 50.8) dB(A).

As a preventive measure for the noise reduction the following will be adopted:

1. Acoustic measure for all the rotary equipment.
2. All the equipment will be housed in civil sheds.
3. Greenbelt development and maintenance will attenuate the noise levels.
4. The designed equipment with noise levels not exceeding beyond the requirements of Occupational Health and Safety Administration Standard will be employed.

Land Use

The present land is being used for industrial use from 1986. The proposed project is an expansion within the existing facility. Hence no change in land use is envisaged due to this project.

XVII. Environmental Monitoring Program

A monitoring schedule with respect to Ambient Air Quality, Water & Wastewater Quality and Noise as per CPCB/MoEF&CC shall be maintained.

XVIII. Pollution Control Measures

The Air emissions from Thermic Fluid Heaters and D.G sets will be mitigated by providing adequate stack heights. The reactors will be connected to scrubbers, which are attached to individual stacks.

Municipal Solid Waste comprises of food, packing material etc. MSW including food waste will be treated in Organic Waste Convertor. Packing material is sold to PPCC. Boiler ash is distributed to local farmers for agricultural purposes.

The hazardous waste will be stored separately in hazardous waste storage areas and disposed to MoEF & PPCC/CPCB authorized TSDF sites within the stipulated period of time. Hazardous waste materials will be properly disposed as per the Hazardous and other Wastes (Management and trans-boundary Movement) Rules 2016 and subsequent amendments

The expansion facility will generate 45 KLD of sewage from domestic activities and 550 KLD effluents from industrial processes. The effluents will be treated in Combined Effluent Treatment Plant (ZLD system). There will be no discharge to land environment. ZLD system has been installed and commissioned in September 2017. ATFD salts are currently stored inhouse and procedures to dispose to nearby TSDF sites/Co processor will be established. (Refer PPCC NOC and Agreement with TSDF as **Annexure 23**).

XIX. Greenbelt Development

The total existing land area is 105156 Sq. m (25.99 Acres). Total greenbelt area after expansion will be 37,193.29 Sq.m (16.58 Acres) for maintaining 35.37 % greenbelt.

XX. Risk Analysis

Summary of results and observations

- As per the NFPA rating, the fire hazard is observed in chemicals such as Acetone, Toluene, Hexane, Iso-propanol and Methanol. All the chemical are stored underground tank where the impacts are negligible and even risk contours maps are not generated.
- Risk assessment is done for day storages tanks and pipelines with max. capacity and length only.
- The Consequence analysis study has been carried out for Acetone, Toluene, Hexane, Iso-propanol and Methanol storage tank and pipelines.

- All the hazards are observed in North-East direction due to the wind, which is blowing from South-West direction.
- It is observed for IPA, Methanol, Toulene, Acetone, Hexane storage tanks in the catastrophic rupture scenario, the estimated distance for Explosion are 793.71m, 110.21m, 793.71m, 292.62m and 981.246m at wind speed of 1.5 m/s and stability class F, at the pressure of 0.02068 bar.
- It is observed for Hexane, IPA, , Methanol storage tank pipeline in the rupture scenario, the estimated distance for Explosion are 90.56m, 42.64m, 32m at wind speed of 1.5 m/s and stability class F, at the pressure of 0.02068 bar. Acetone Toluene storage tank pipeline in the rupture scenario the estimated distance for explosion are 71.75m, and 72.5m at wind speed of 1.5 m/s and stability class D, at the pressure of 0.02068 bar.
- Mitigative measures for storage tanks are proposed to avoid hazards.

XXI. Disaster Management Plan

The salient features of Disaster Management Plan include:

- Emergency shutdown procedure
- Electrical Power Failure & Key Utility failures
- Fire protection system
- Emergency safety equipment & reporting and response to emergency
- Emergency help from nearby industries and tie up with nearby industries
- Emergency control room - is the focal point in case of an emergency from where the operations to handle the emergency are directed and coordinated. It will be equipped with Internal and P & T telephones, Paging system and Emergency siren.

Major hazards from the hazardous material storage have been identified and evaluated using PHAST software. Impacts due to accidental releases of flammable, explosive and toxic chemicals from the storage tank pipelines are discussed. The consequence analysis is conducted to assess the level of impacts associated with storage and handling of hazardous chemicals. The storage tanks are located within Strides Shasun, Pondicherry boundary and the surroundings are ideal without external interface.

On-Site Emergency Plan

An on-site emergency plan is established to deal with emergencies and prevent disasters:

- To provide effective planning, communication and to ensure discipline while mitigating identified emergencies at the earliest utilising available resources, safety gadgets and systems.
- Synchronized action from all the internal and external agencies at the earliest to initiate corrective and preventive action.
- To minimize the human injury and illness during emergency mitigation, priority will be given to rescue of incident victim/s, rendering them first aid onsite and if required providing further medical services at the earliest, which will be available nearest to our plant.
- To minimize damage to property, general environment or work environment.
- To effectively refer and utilize the revised onsite emergency plan while conducting on site emergency and preparedness response drills and also during real emergencies.
- To identify any deviations during the above drills and real situations to ensure any identified and recorded observations for continual corrective actions and preventive actions.

XXII. Benefits of the Proposed Project

Though there are minor pollution impacts, the project will be beneficial in the following aspects:

1. As seen above there is no marginal impacts on air, noise, water & soil environments.
2. The proposed greenbelt will enhance the green coverage in the area and aesthetics.
3. Rainwater collection and storage systems will enhance the water conservation.
4. An additional employment generation of 50 numbers.
5. Fulfill the market requirement and play a vital role in the manufacture of pharmaceutical bulk drug production sector which thereby reduce imports and address the market demand and social and health benefits. The products manufactured within these facilities will be exported which will aid in adding foreign exchange to the nation.
6. Production of effective drugs to treat life threatening diseases, which will save millions of lives.
7. The existing freshwater consumption of 45 KLD by boilers is planned to be replaced with recycled water during expansion to conserve freshwater use.
8. The image of India will be better positioned as we enter into partnership to deliver products which are being developed by major pharma companies to treat life threatening diseases such as neuro disorders. Strides Shasun will be one among the few companies in the world to produce such complex molecules.

9. Various skill development, education, health care programmes & infrastructure developments are proposed as CSR, through which many villages around will be benefitted.

10. Also by this project the socio economic development of Pondicherry gets projected by means of creating more job opportunities for transport, supplementary supplies, and employees of Shasun living around the facility will create the development.