

EXECUTIVE SUMMARY
FOR
PROPOSED INTEGRATED PAINTS MANUFACTURING INDUSTRY

AT
SIPCOT INDUSTRIAL PARK
PLOT NO. A3/1, A4/2, VILLAGE: MAGAJANAPAKKAM,
TEHSIL: CHEYYAR, DISTRICT: THIRUVANNAMALAI,
STATE: TAMIL NADU



FOR
M/s. GRASIM INDUSTRIES LIMITED

[As Per EIA Notification, 2006 and its amendments,
Project Activities are termed under 5(h)-Integrated Paint Industry, Category - "B"]

BASELINE STUDY PERIOD:
15th April 2021 to 14th July 2021

BASELINE STUDY CARRIED BY CO-CONSULTANT:
M/s. Hubert Enviro Care Systems (P) Ltd., Chennai.
(NABL Certificate No.: TC-5786 valid until 29/04/2022 and
MoEF&CC Recognized Env. Laboratory F. No.: Q-15018/13/2016-CPW, Dtd. 13/09/2017)

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1. Project background

Grasim Industries Limited, a flagship company of the global conglomerate Aditya Birla Group, proposes new Integrated Paints Manufacturing industry with a total production capacity of 8,75,000 KL/Annum of products and intermediates at plot No. A3/1 and A4/2, SIPCOT Industrial Park, Magajanapakkam Village, CheyyarTaluk, Tiruvannamalai District, Tamil Nadu state.

Application for Environmental Clearance was submitted online vide Proposal no. SIA/TN/IND3/63411/2021 on 19/05/2021 and the project was considered in 215th TN, SEAC meeting for proposing Terms of Reference.

Standard Terms of Reference was issued for the project vide F.No. 8560/2021.

2. Project location

The site is located in 110.67 Acres in plot nos. A3/1 and A4/2 of Magajanapakkam village, CheyyarTaluk, Tiruvannamalai District, Tamil Nadu.

The site is located in SIPCOT Industrial Park. SIPCOT has obtained Environmental Clearance from MoEF&CC for the Industrial Park at Cheyyar under 7 (c) category A vide F.No.21-181 /2014 IA-III dated 30th September 2016.

Land has been allotted by SIPCOT for development of industry to Grasim Industries Limited.

The site is well connected by SH116 (Kancheepuram- Vandavasi Road) at ≈0.74 km towards East of site. Kanchipuram East Railway station is ≈15.4 km (NNE) from project site and Chennai International Airport is ≈ 61.11 km (ENE) of project site.

2.1 Site Salient features

Table 1 Salient features of the project site and surrounding features

S. No.	Particulars	Details
1	Plant site Latitude	12° 42'28.74"N(Centre Co-ordinate)
2	Plant site Longitude	79° 39'13.35"E(Centre Co-ordinate)
3	Elevation of Project site	~83 - 92 m AMSL
4	Present land use	Industrial Use, since EC has been obtained for the Industrial Park, vide F.No. 21-181/2014-IA.III dated 30 th September 2016.
5	Nearest Highway	SH-116(Kanchipuram -Vandavasi) ≈0.74 km (E) NH-48(Delhi-Kanchipuram-Chennai) ≈ 17.21 km (N)
6	Nearest railway Station	Kanchipuram East Railway station ≈15.4 km (NNE).
7	Nearest Airport	Chennai International Airport ≈ 61.11 km (E NE)

8	Nearest Village	Villages	~ Distance	Direction	Population as per 2011 Census
		Mahajanambakkam	0.49km	S	1,707
9	Nearest Town	Cheyyar(Tiruvettipuram)≈11.78 Km (WSW)			
10	Nearest City	Kanchipuram ≈10.79 km (NNE)			
11	Water bodies	Water bodies	~ Distance	Direction	
		Pond	Adjacent to Site	S	
		Lake near Project Site	0.13km	W	
		Lake near Kunnavakkam	0.33km	NNW	
		Ukkamperumbakkam	0.85km	E	
		Mangal Lake	0.93km	E	
		Mamandur Tank	2.55km	NNW	
		Lake near Ukkal	2.61km	ESE	
		Eruppati Lake	2.98km	E	
		Cheyyar R	3.39km	S	
		Lake near Sanarpandai	5.07km	WNW	
		Canal near Anumantandalam	5.15km	SE	
		Odai near Nattapettai	5.75km	NNE	
		Tandarai Canal	5.88km	WNW	
		Perunagar Lake	5.90km	SSW	
		Palar R	9.30km	N	
		Uttiramerur Tank	10.25km	SE	
Sevilimedu Lake	10.81km	N			
Odai near Adavapakkam	11.67km	E			
Vegavati R	13.02km	NNE			
AnakkavurEri	14.63km	WSW			
12	Reserve Forests and Protected Forests	Forests	~ Distance	Direction	
		Marudam RF	13.50km	E	
		Tandappantangal RF	14.71km	NW	
13	Notified Wildlife Sanctuary/ Ecologically sensitive areas	Nil within 15 km radius			

14	Heritage Sites	Heritage Site	~ Distance	Direction
		ShriVanasundareswarar Temple Manampathy	8.03km	S
		ThiruppanamoorDigambar Jain Temple	8.82km	NW
		Thalapureeswarar Temple/Padal Petra Temple Thiruppanangadu	10.47km	NNW
		Sri 1008 BhagwanMahaveerDigambar Jain Temple	10.49km	NW
		Sri ThiruMakaraleswarar Temple Magaral	10.66km	E
		SunnatJama'athJuma Masjid	13.74km	NNE
		VaradarajaPerumalKovil	13.91km	NNE
		Sri SundaraVaradararajaPerumal Temple Uthiramerur	14.40km	SE
		Sri Kachabeswarar Temple	14.69km	NNE
15	Monuments	Monuments	~ Distance	Direction
		Rock cut caves Narasamangalam	3.28km	NNE
		Rock cut caves sculptures and inscriptions Mamandur	3.64km	N
		Megalithic cists and cairns circles Settupattu	5.17km	S
		Rock cut shrine Kuranganilmuttam	7.34km	NE
		Megalithic cists and cairns Perunagar	7.72km	SSW
		Megalithic cists and cairns Nedungal	8.38km	SSW
		Megalithic cists and cairns Nedungal	8.65km	SSW
		Megalithic cists and cairns Nedungal	8.41km	SSW
		Megalithic cists Tetturai	8.71km	S
		Dolmen intact Uttiramerur	13.52km	SE
		Vaikuntaperumal temple	14.67km	SE
		Kailasanathar Temple	14.75km	NNE
		Sri Matangeswara Temple Kanchipuram	14.76km	NNE
VaikuntaPerumal Temple Kanchipuram	14.97km	NNE		

2.2 Magnitude of operation

The proposed project is manufacturing of integrated paints manufacturing with a total capacity of 875000 KL/Annum. The list of proposed products and their respective quantities are given in **Table 2**.

Table 2 List of Proposed products with quantity

S.No	Products / Intermediates	Unit	Qty / Annum
1	Water Based Paints (Including Distemper) & colorants	KL	5,00,000
2	Solvent Based Paints (Including Wood Finish)	KL	1,00,000
3	Intermediate - Emulsion	KL	1,80,000
4	Intermediate - Resins	KL	70,000
5	Thinners	KL	25,000
	Total	KL	8,75,000

Land Allotted for the project is 110.67 Acres. Land area breakup for the project is given in Table 3. Built up area break up is given in Table 4.

Table 3 Land area breakup details

S.No	Land use	Area (Sq.m)	Area (acre)	%
1	Factory area	215980.71	53.43	48.28
2	Roads & pavements	46539	11.5	10.39
3	Parking area	28328	7	6.33
4	Greenbelt	157018.29	38.74	35.00
	Total land area	447866	110.67	100

Table 4 Detail Breakup of Building Area

S.No	Break Up of Building Area	Area (sq.m)
1	Factory Buildings PEB/RCC Type /structure- 21 Nos.	80,000
2	Above Ground Tanks - 120 Nos.	10,000
3	Effluent collection Tanks (near production blocks) - 5 Nos.	50
4	Rainwater Harvesting System - 01 Nos.	100
5	Strom water and Roof water Reservoir additional	7700
6	Effluent Treatment plant -01 Nos.	5600
7	Sewage Treatment plant -01 Nos.	1400
8	Fire Hydrant system	900
	Total	105,750

2.3 Raw materials

All the raw materials required in manufacturing are procured either from local markets or imported. The raw materials and finished products are being transported by road. All chemicals used in the process will be stored in a designated area with proper labels in the warehouse. Solvents used for the production process are stored in tanks under controlled conditions and closed loop operations will be attained through high degree of automation. Fire hydrant, sprinklers, foam pouring systems will be installed.

Raw material requirement under various sections for manufacturing of Paints are given in **Table 5**.

Table 5 Raw Material Storage Details

Sr. No	Raw materials	Proposed Quantity (TPA /KLPA)	Storage mode	Specific hazard	Sourcing	Mode of Transport
1.	Pigments such as Rutile (TiO ₂) various grades, Redoxide, etc.	115000	Silos /Hoppers	Non- flammable	Indian Domestic Market/ Import	Truck (By Road) / Ship
2.	Extenders such as China clay, Calcium carbonate, Silica, Marble powder, Dolomite, etc.	230000	Silos /Hoppers	Non- flammable	Indian Domestic Market/ Import	Truck / Bulk Containers (By Road) /Ship
3.	Polyols such as Phthalic anhydride, Pentaerythritol, Maleic anhydride, benzoic acid, sodium bicarbonate, etc.	12000	Silos /Hoppers/Bags	Low Flammability Moderate Health Hazard	Indian Domestic Market	Tanker /Truck (By Road)
4.	Colored pigments such as Blue, Green, yellow oxide, carbon black, etc.	7200	Bags	Non- flammable	Indian Domestic Market / Import	Truck (By Road) /Ship
5.	Additives such as Natrosol, Di-ammonium phosphate, sodium benzoate, Hydroxy ethyl cellulose, etc.	35000	Bags	Flammable Moderate Health Hazard	Indian Domestic Market / Import	Trucks (By Road) /Ship
6.	Solvents such as Mineral turpentine, Xylene, Dipentine, MCEE 10, Solvent MPA etc.	58120	Tanks	Flammable	Indian Domestic Market / Import	Tanker / Truck (By Road) /Ship
7.	Driers and additives such as Calcium octoate,	70200	Tanks	Flammable	Indian	Tanker /

Sr. No	Raw materials	Proposed Quantity (TPA /KLPA)	Storage mode	Specific hazard	Sourcing	Mode of Transport
	Cobalt octoate, Ropaque, Soya fatty acid, Indofil etc.			Moderate Health Hazard	Domestic Market / Import	Truck (By Road) /Ship
8.	Monomers such as Methyl Methacrylate, 2-Ethyl hexyl acrylate, Butyl acrylate, Styrene, etc.	75000	Tanks	Flammable Severe Health Hazard	Import	Ship /Tanker Truck (By Road)
9.	Oils such as Raw linseed oil, Castor oil, Soyabean oil, etc.	20000	Tanks	No Specific Hazard	Indian Domestic Market	Tanker/ Truck (By Road)
10.	Polyols such as Propylene glycol, Liquor ammonia, Texanol, etc.	11000	Tanks	Flammable Moderate Health Hazard	Indian Domestic Market / Import	Tanker/ Truck (By Road)
11.	Additives/Biocides such as Nipacide, Dapro, Neopon, Thorew paste, etc.	14000	Barrel	Non- Flammable Toxic	Indian Domestic Market / Import	Truck (By Road)
12	Pigments such as Yellow fine paste, Blue fine paste, Red fine paste, etc.	4000	Barrel	Non- Flammable	Indian Domestic Market / Import	Truck (By Road) /Ship
13	Additives such as Morpholene, Benzyl alcohol, Glycerine, etc.	4000	Barrel	Flammable Moderate Health Hazard	Indian Domestic Market	Truck (By Road)

2.4 Water requirement

Construction Phase: During Construction phase of the proposed project, the freshwater requirement will be 105 KLD. Water will be sourced from SIPCOT. Mobile sanitation facility is proposed and 80 KLD of treated sewage will be used for green belt development during construction phase and dust suppression. Total water requirement during construction phase will be 185 KLD.

Operation Phase:The total water requirement is 1253 KLD out of which, fresh water requirement will be 1110 KLD.

Total wastewater generated from the various processes involved is 298KLD out of which 128 KLD will reused in the process and 170 KLD will be treated and recycled in process, cooling tower, gardening etc., inside the premises.

The total recycled water is 143 KLD. Zero Liquid Discharge requirements will be met.

For the operation phase, the freshwater requirements will be obtained from SIPCOT. The breakup of water for operation phase is given in **Table 6**.

Table 6 Water Requirement for the project

S.No	Description	Water Consumption KLD	Losses KLD	Wastewater Generation KLD	Reused In Process KLD	Recycled Water KLD	Effluent Treatment and Disposal	Re-use / Recycle	Remarks
1	Domestic requirement	27	1	26	0	26	STP	Gardening	30 KLD - STP Design
2	Process	702	0	10	4	6	ZLDS (ETP-RO-MEE)	Process / Utilities	Design Capacities ETP -150 KLD RO-240 KLD MEE - 25 KLD
3	Wash Water (Process)	110	0	110	90	20			
4	Wash Water (Others)	3	2	1	0	1			
5	Cooling tower	220	197	23	0	23			
6	Boiler	40	5	35	34	1			
7	Scrubber	5	2	3	0	3			

S.No	Description	Water Consumption KLD	Losses KLD	Wastewater Generation KLD	Reused In Process KLD	Recycled Water KLD	Effluent Treatment and Disposal	Re-use / Recycle	Remarks
8	WTP	-	-	90	0	90			
9	Green belt	146	-	-	-	-		26 KL from STP	-
Total Water Consumption		1253	207	298	12	170	-	-	-
Recycled Water from RO and MEE		143					-	-	-
Fresh Water Consumption (Cheyyar SIPCOT 1200 KLD)		1110							

2.5 Power and fuel requirement

The power required for the project will be sourced from TANGEDCO. Power requirement is estimated to be 8200 kVA. DG sets of 3 x 2000 kVA & 1x750 kVA will act as standby power facilities, of which 3 DGS will be working and 1 DG will be standby.

Boilers of 4x 2000 kg/hr will be used of which 3 will be working and 1 will be standby. 1x500 kg/hr boiler will be used for MEE. Thermo pack of 4 x 20lakh Kilo cal/hr will be used for the project.

The details of power requirement, backup power facilities and fuel requirement are given in **Table 7**.

Table 7 Power and fuel requirement

Details	Capacity	Numbers	Source
Construction phase			
Power backup	500 x2	2	DG Sets
HSD /LPG requirement for DG	100 LPH	-	HPCL/ BPCL/IOCL
Power Requirement	750 kVA	1	TANGEDCO
Operation Phase			

Power Requirement	8200 kVA	-	TANGEDCO
Power backup	3 x 2000 kVA 1X750 KVA	4	DG Sets
HSD/LPG for DGs	1600 LPD	-	HPCL/ BPCL/ IOCL
HSD/LPG for Boilers (4 x2000 Kg/hr + 1x500 kg/hr)	2000 LPD	4	HPCL/ BPCL/IOCL
HSD/LPG for Thermo packs (4x20 Lakh Kcal/Hr)	1800 LPD	4	HPCL/ BPCL/IOCL

2.6 Manpower requirement

Manpower requirement for the project will be 2000 people during construction phase and 600 people during operation phase. Details are given in Table- 8.

Table 8 Manpower requirement for the project

Description	Man power in Nos.
Construction Phase	
Employees	2000
Operation Phase	
Employees	600

2.7 Project Cost

Estimated project cost is INR. 1137.34 Crores.

2.8 Municipal Solid Waste generation and Management

Municipal Solid waste generation and management for proposed project is detailed in Table 9.

Table 9 Municipal Solid Waste generation and Management

S. No	Waste type	Total (kg/day)	Method of disposal
Construction Phase			
1	Organic	540	Will be composted at site in Organic Waste Converter and used as manure for green belt development during construction stage
2	Inorganic	360	Segregated and disposed through TNPCB authorized recyclers

	Total	900	
Operation Phase			
1	Organic	162	Will be composted in organic waste convertor and used as manure for green belt development
2	Inorganic	108	Segregated and disposed through TNPCB authorized recyclers
	Total	270	

2.9 Hazardous waste generation and management

Hazardous waste generation details for the project are given in Table 10.

Table 10 Hazardous waste Generation and Management

S. No	Type of Waste	Hazardous Waste Category	Quantity per Year	Source	Method of Collection	Treatment / Disposal
1	Contaminated oil with wash water & sludge	3.1	15 MT/Annunum	All Tanks (other than water) bottom sludge	Collected in barrel	Collection, Storage, Disposal and Transportation to active TSDF as landfilling
2	Sludge and filters contaminated with oil	3.3	15 MT/Annunum	Soil contaminated with any material	Collected in barrel	Collection, Storage, Disposal and Transportation to active TSDF as landfilling
3	Used / Spent Oil	5.1	50 MT/Annunum	DG set, Compressor, gear box	Collected in barrel	Collection, Storage and sale to authorised recycler
4	Contaminated aromatic, aliphatic or naphthenic solvents, may or may not be fit for reuse	20.1	170 MT/Annunum	manufacturing process	Collected in barrel	Collection, Storage and sale to authorised recycler
5	Distillation Residues	20.3	95 MT/Annunum	Solvent recovery	Collected in barrel	Collection, Storage,

S. No	Type of Waste	Hazardous Waste Category	Quantity per Year	Source	Method of Collection	Treatment / Disposal
			m	plant		Disposal and Transportation to active TSDF as landfilling
6	Wastes or residues such as filter aid	23.1	90 MT/Annunm	paint manufacturing process	Collected in barrel	Collection, Storage, Disposal and Transportation to active TSDF as landfilling or Sale to authorised recycler
7	Discarded Container/ Drum	33.1	120 MT/Annunm	Paint manufacturing Process	De-contamination followed by storage in designated place in scrap yard	Sale to authorised recycler
8	Chemical containing residue arising from decontamination	34.1	25 MT/Annunm	Paint manufacturing Process	Collected in barrel	Collection, Storage, Disposal and Transportation to active TSDF as landfilling
9	Process wastes, residue and sludge (Filler Residue)	21.1	120 MT/Annunm	Paint manufacturing Process	Packed in bag	Collection, Storage, Disposal and Transportation to active TSDF/ co-processing
10	Discarded containers / barrels /liners contaminated with hazardous wastes / chemicals	33.1	80000 Nos./ Annum	Paint manufacturing Process	in designated place	Sale to authorised recycler

S. No	Type of Waste	Hazardous Waste Category	Quantity per Year	Source	Method of Collection	Treatment / Disposal
11	Flue gas cleaning residue	35.1	10 MT/Annun	Soot / carbon black	Packed in bag	Collection, Storage, Disposal and Transportation to active TSDF/ co-processing
12	Spent Ion Exchange Resin containing toxic metals	35.2	20 MT/Annun	Resin beads	Packed in bag	Collection, Storage, Disposal and Transportation to active TSDF/ co-processing
13	Chemical sludge from waste-water treatment	35.3	200 MT/Annun	ETP	Packed in bag	Collection, Storage, Disposal and Transportation to active TSDF/ co-processing
14	Oil and Grease skimming residue	35.4	20 MT/Annun	Floating oil from ETP/STP	Collected in barrel	Collection, Storage, Disposal and Transportation to active TSDF/ co-processing
15	Lead Acid Batteries	Schedule III, Part A, Basel No. A1160	500 No/Annun	Used /Waste lead acid batteries	Packed in bag	Sale back to supplier/ SPCB Authorized recyclers
16	Spent Carbon	36.2	10 MT/Annun	Used carbon granules from common scrubbers & STP/ETP	Packed in bag	Return to supplier for regeneration/ Co-processing

Proper authorization for hazardous waste management from TNPCB will be obtained.

3. Environmental Baseline Data

Baseline data was generated for the same project during Mid April 2021-Mid July 2021.

3.1 Micrometeorology

Details are given in Table 11.

Table 11 Micrometeorological data during study period

S. No	Parameter	Observation
1.	Temperature	Max Temperature :40 °C Min Temperature : 23°C AvgTemperature :30.76 °C
2.	Average Relative Humidity	Maximum -100% Minimum -32.27% Average -69.91%
3.	Average Wind Speed	3.42 m/s
4.	Predominant Wind Direction during study period	West

3.2 Ambient Air Quality

The ambient air quality was monitored at 8 locations for 12 parameters as per CPCB guidelines within the study area from mid of April 2021 to mid of July 2021. The baseline levels were

- PM₁₀ ranged from 42-68µg/m³,
- PM_{2.5} ranged from 18 -29µg/m³,
- SO₂ranged from 6-13µg/m³,
- NO₂ranged from 13-28µg/m³,
- CO ranged from 0.069-0.172mg/m³,
- O₃ ranged from 10.21 µg/m³ to 11.56 µg/m³

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.

3.3 Ambient noise Quality

Noise levels were monitored at 8 locations within the study area.

- In industrial area day time noise levels was about 68.7 dB(A) and 69.6 dB(A) during night time noise levels was about 63.5 dB(A) and 64.3 dB(A), which is within prescribed limit by CPCB (75 dB(A) Day time & 70 dB(A) Night time).

- In residential area day time noise levels varied from 50.4 dB(A) to 53.4 dB(A) and night time noise levels varied from 40.3 dB(A) to 43.7dB(A) across the sampling stations. The field observations during the study period indicate that the ambient noise levels in residential area are all well within the limits prescribed by CPCB (55 dB(A) Day time & 45 dB(A) Night time).

3.4 Surface water Quality

Surface water quality was monitored at 8 locations within the study area.

- In the surface water the pH varied between 7.0-7.48
- The Total Dissolved Solids ranged from 1259 mg/l to 2281 mg/l.
- The chloride content in the surface water for study area is ranged from 256.4 mg/l to 791.81 mg/l.
- The sulphate content of the surface water of the study area varied between 161.8 mg/l - 201.4 mg/l.
- The Total hardness ranged between 491.5 mg/l - 800.9 mg/l.
- The concentration of heavy metals in the collected water samples are mostly below limit of quantification.
- BOD levels range from 1.1-1.4 mg/l.

3.5 Ground water Quality

Ground water quality was monitored at 8 locations during study period

- In the study area, the average pH ranged from 6.94-7.81
- Na and K concentration in the ground water ranged from 48.9 to 176.5 mg/l and 2.8 to 7.2 mg/l respectively.
- The concentration of Mg ion found in groundwater samples of the study area ranged from 15.6 to 50.2 mg/l.
- Fluoride is one of the main trace elements in groundwater, which generally occurs as a natural constituent. The concentrations of fluoride in groundwater samples of the study area ranged from 0.19 to 0.62 mg/l and it is within the permissible limit.
- Total dissolved solids comprised mainly of carbonates, bicarbonates, chlorides, phosphates and nitrates of Calcium, Magnesium, Sodium, Potassium, Manganese, organic matter salt and other particles. In the present findings the TDS value varied from 442 mg/l to 1334 mg/l for the

ground water and for few samples it exceeds the permissible limits of IS 10500: 2012. The prescribed permissible limit of TDS for drinking water is 2000 mg/l.

- The chloride concentration ranged from 97.8 mg/l to 329.8 mg/l and is below the IS permissible limit. The desirable limit of the chloride content is 250mg/l and permissible limit is 1000 mg/l.
- The desirable limit of the sulphate content is 200mg/l and permissible limit is 400mg/l. the sulphate content of the ground water of the study area varied between 22.5 mg/l - 138.4 mg/l meeting the desirable limit of the IS 10500: 2012.
- The Total hardness ranged between 171 mg/l - 620 mg/l for ground water and for most of the samples, it exceeds the acceptable limit of the IS 10500: 2012.
- Total alkalinity as calcium carbonate values ranged from 133 mg/l to 319mg/l.

3.6 Soil quality

- The pH value of the soil is an indication of soil reaction i.e. alkaline, neutral and acidic. It affects mineral nutrient soil quality and much of the micro-organism activity. For the growth of plant the optimum pH range is between 6.8 and 8. The availability of nutrients to plants can be calculated by its pH values. The pH of the soil samples ranged from 7.24-8.14. Indicating that the soils are almost neutral in nature.
- Soil electrical conductivity (EC) is a measurement that correlates with soil properties that soil texture, cation exchange capacity (CEC), drainage condition, organic matter level, salinity and sub soil characteristic. Conductivity of the soil samples ranged from 107- 327 $\mu\text{S}/\text{cm}$.
- Nitrogen, phosphorus and potassium are macronutrients essential for plant growth. Nitrogen occurs in soils as organic and inorganic forms. Nitrate nitrogen ($\text{NO}_3\text{-N}$) is most commonly measured in standard soil tests because it is the primary form of nitrogen available to trees and, therefore, an indicator of nitrogen soil fertility. Nitrogen content ranged from 169.6 kg/ha to 254.6 kg/ha, Phosphorous ranged from 16.3 kg/ha to 76.8 kg/ha, Potassium content ranged from 73.5 kg/ha to 216.7 kg/ha.

3.7 Ecology

A survey was conducted to study the flora & fauna in 10 km radius. Some of the information was gathered from the local habitants. All the collected data were classified to interpret the impact of pollution on the flora and fauna of that region. Survey of the wild plants as well as cultivated crop plants was made and all the available information was recorded.

Livestock like cattle, buffalo, goat, poultry, duck and pig are reared for dairy products, meat, egg for agriculture purpose. Majority of cattle and buffalo are of local variety. Backyard poultry farms are mostly common in this area.

3.8 Schedule species *Pavocristatus*(schedule I) and *Najanaja*(schedule III) are present within the study area.

Socioeconomic environment

Socio economic indicators of study area are given in Table 12 below.

Table 12 Socio economic indicators of study area

S.No	Particulars	Study Area	Unit
0-5km			
1.	Number of villages and Town in the Study Area	24	Nos.
2.	Total Households	353	Nos.
3.	Total Population	37619	Persons
4.	Children Population (0-6 Years Old)	4018	Persons
5.	SC Population	10588	Persons
6.	ST Population	658	Persons
7.	Total Working Population	19746	Persons
8.	Main Workers	14869	Persons
9.	Marginal Workers	4877	Persons
10.	Cultivators	4789	Persons
11.	Agricultural Labourers	8131	Persons
12.	Household Industries	353	Persons
13.	Other Workers	6473	Persons
14.	Literates population	24940	Persons
15.	Illiterates population	12679	Persons
5-10 km			
16.	Number of villages and Town in the Study Area	83	Nos.
17.	Total Households	25824	Nos.
18.	Total Population	103919	Persons
19.	Children Population (0-6 Years Old)	10941	Persons
20.	SC Population	30839	Persons
21.	ST Population	2061	Persons

S.No	Particulars	Study Area	Unit
22.	Total Working Population	54055	Persons
23.	Main Workers	39165	Persons
24.	Marginal Workers	14890	Persons
25.	Cultivators	9733	Persons
26.	Agricultural Labourers	23772	Persons
27.	Household Industries	3161	Persons
28.	Other Workers	17389	Persons
29.	Literates population	68493	Persons
30.	Illiterates population	35426	Persons

4. Impact on Air environment

Air quality modelling was done using AERMOD software to identify the ground level concentration due to operation of proposed industries. The details on the type of fuel proposed, emissions are given in Table 4-1 of the EIA report. Based on the modelling done, the total ground level concentrations from point source and line source are given in Table 13. GLCs from process stacks are given in Table 14.

Table 13 Total concentration from point source & line source (cumulative uncontrolled)

Pollutant	Max. Base line Conc. ($\mu\text{g}/\text{m}^3$)	Estimated Incremental Conc. ($\mu\text{g}/\text{m}^3$)	Total Conc. ($\mu\text{g}/\text{m}^3$)	NAAQ standard ($\mu\text{g}/\text{m}^3$)	% increase
PM10	68	0.57	68.57	100	0.8
SO ₂	13	0.46	13.46	80	3.5
NO _x	28	18.31	46.31	80	65

Table 14 Total concentration from process stacks

Pollutant	Max. Baseline Conc. ($\mu\text{g}/\text{m}^3$)	Estimated Incremental Conc. ($\mu\text{g}/\text{m}^3$)	Total Conc. ($\mu\text{g}/\text{m}^3$)	NAAQ standard ($\mu\text{g}/\text{m}^3$)
PM10	68	2.00	70	100
VOC	BDL	0.00146	0.001	80
HC	BDL	0.036	0.036	4000

From the above table, it is evident that from the proposed project, the Total Concentration for PM₁₀, PM_{2.5}, SO₂ and NO_x are well within the NAAQ Standards.

Following mitigation measures are proposed

- DGs will be provided with stack height of 30 m AGL.
- Boilers will be provided with stack of 30 m AGL.

- 1x500 kg/hr boiler will be provided with stack height of 30 m AGL.
- Thermopack will be provided with stack of 30 m AGL.
- Counter current scrubbers with stack height of 3 m ARL will be provided in water based, solvent based, resin & emulsion blocks respectively.
- 101 vents with bag filters / reverse jet filters will be provided to control PM emissions.

5. Alternate site consideration

M/s. Grasim Industries Limited considered three sites considering good connectivity to the urban areas and other facilities like port, airports etc.

The alternative sites considered as per SOI Topo map were:

- SIPCOT Industrial Park at Manallur
- SIPCOT Industrial Park at Thoothukudi (Milavittan)

SIPCOT Industrial Complex at Cheyyar was selected for development of the Industry.

6. Environmental Monitoring Programme

A monitoring schedule with respect to Ambient Air Quality, Water Quality, Soil and Noise as per CPCB/MoEF&CC will be adopted during construction phase and after establishment of the project.

7. Rehabilitation and Resettlement

The site is located in Notified Industrial Park by SIPCOT. Land has been allotted to Grasim industries Limited by SIPCOT. Hence Rehabilitation and Resettlement is not applicable for the project.

8. Environmental Management Plan

8.1 Air Environment

- Green belt of 38.74 Acres (35% of the land area) out of total land area 110.67 Acres will be converted to a lush green belt across the periphery of the project site. The plantations would consist of a mixture of carefully chosen locally available species of trees, shrubs and herbs, preferably evergreen, tall & resistant to pollution and will act as noise barrier.
- Implementation of completely automated & closed loop system for transfer of powder to control powder waste.
- Highly automated closed loop dust collection system will be implemented.
- DGs will be provided with stack height of 30 m AGL.
- Boilers will be provided with stack of 30 m AGL.

- 1x500 kg/hr boiler will be provided with stack height of 30 m AGL.
- Thermopack will be provided with stack of 30 m AGL.
- Counter current scrubbers with stack height of 3 m ARL will be provided in water based, solvent based, resin & emulsion blocks respectively.
- 101 vents with bag filters / reverse jet filters will be provided to control PM emissions.

8.2 Water Environment

- STP of 30 KLD will be installed for treating the sewage generated and treated sewage will be used for green belt development within the industry.
- Effluent Treatment facilities like ETP of capacity 150 KLD, RO of capacity 240 KLD & MEE of capacity 25 KLD will be installed to treat the effluent and recycled water will be utilized for utilities & process.

Waste Minimization Initiatives (in Plant):

Following systems will be provided to reduce waste generation at source:

- State of the art technology for cleaning of vessels (TSD, mixers, reactors, etc.,)
- Closed loop raw material addition to control waste generation & emissions.
- Implementation of latest technologies for transfer of liquid raw materials through Pipeline Inspection Gauge to reduce effluent generation.
- High level material handling solution with latest IOT enabled automation systems for packing, movement & storage to ensure spill free operations.
- Sensor based water taps / Urinals & water network with pressure reducing valves, orifices etc.
- Self-cleaning filters for elimination of effluents
- Maximum Condensate Recovery from Boiler by having closed loop system.
- Avoid leakages at each raw water consumption point.

Following wastewater reuse schemes will be implemented:

- Emulsion paint wash water reuse
- Emulsion reactor wash water reuse
- Dedicated infrastructure for handling the wash water generated and reusing the same in process through highly automated Distributed Control System.

Following waste water recycle schemes will be implemented:

- Treated effluent will be recycled through high efficient Reverse Osmosis and Multiple Effect Evaporator.
- Waste solvent recycle after SRP
- Use of drip irrigation/sprinkling system for green belt development, which will reduce the freshwater demand.

8.3 Noise Environment

- All the noise generating equipments will be designed / operated to ensure that noise level does not exceed 75-70 dB (A) at plant boundary as per the requirement of Central / State Pollution Control Board.
- Acoustic enclosures will be provided for noise generating equipments (compressors, DG sets, blowers, etc.,) and noise levels will be ensured well within standards.
- Miyawaki method of green belt development will be adopted, which will act as a noise barrier.
- Training will be imparted to personnel to generate awareness about effects of noise and importance of using PPEs.

8.4 Land Environment

- Municipal solid waste will be composted in organic waste convertor & compost will be used as manure for green belt.
- Hazardous wastes generated will be disposed as per Hazardous waste (Management, Handling and Transboundary movement) amendment Rules 2016.
- Good housekeeping and best practices of waste handling will be adopted to eliminate/minimize the risks of soil contamination.
- Zero Liquid Discharge system will be implemented for the project.

8.5 Green belt development

- Green belt of 38.74 Acres (35% of the land area) out of total land area 110.67 Acres will be converted to a lush green belt across the periphery of the project site. The plantations would consist of a mixture of

carefully chosen locally available species of trees, shrubs and herbs, preferably evergreen, tall&resistant to pollution and will act as noise barrier.

- Around 23,520 numbers of trees (1500 trees / Ha)will be planted as per CPCB guidelines for developing greenbelt (PROBES/75/1999-2000, published in Mar 2000).

8.6 Budgetary provisions for EMP

Capital cost of INR 48.1crores has been allocated for Environmental Management measures. Details are given in **Table15**.

Table 15 Budget for Environmental Management Plan

S.No	Components	Capital cost (INR crores)	Recurring cost (INR crores)
1	Air Pollution control (Scrubbers, Vent condensers, Fume exhaust system , Dust collectors, stacks, Ventilation, CEMS)	13.00	0.30
2	Water pollution control (STP, ZLD ETP with CEMS)	13.40	1.20
3	Hazardous waste management inclusive of solvent recovery plant	5.50	0.70
4	Green belt development	3.50	0.30
5	Storm water drainage	5.00	0.10
6	Rainwater harvesting	6.00	0.10
7	Noise Pollution (Acoustic Chambers / Dampeners)	0.30	0.02
8	Water Conservation Measures (/ Wash Water Recycling/ Low Flow Fixtures/Flow Meters)	1.10	0.02
9	Energy Efficient Lighting Fixtures	0.30	0.02
	Total	48.1	2.76

8.7 Proposed CER activities

As per the Office Memorandum dated 1st May, 2018 and 30th Sep, 2020 from MoEF&CC Rs.5.69crores is earmarked towards Corporate Environment Responsibility (CER) activities during the project execution period. The details are given in**Table16**.

Table 16 Budget for CER activities

S.No	Activity	Year wise expenditure Plan (INR crores)		
		2021-2022	2022-2023	2023-2024
1	Mobile ambulance facility to nearby villages	0.3	0.4	-
2	Skill development centre for promoting self help groups in nearby villages.	0.2	0.4	-
3	Providing health equipments to nearby Public Health Centre	0.3	0.5	0.5
4	Digital education facilities to nearby Government schools	0.5	0.5	0.5
5	Providing class room furniture to nearby Government schools	-	0.36	0.5
6	Providing toilet facilities to nearby Government schools		-	0.4
7	Providing solar lighting facility to nearby Government schools	-	-	0.33
	Total	1.3	2.16	2.23
	Grand Total		5.69	

9. Project Benefits

- Potential of providing direct employment (permanent as well as contract) to about 600 persons
- Indirect employment opportunities in ancillary units, transportation and other businesses
- There will be positive impact on social conditions in and around the site due to the proposed project.
- There will be increase in market and business establishment facilities.
- Proposed project will also attract generation of additional revenue to the Government by means of Taxes and duties
- Paint market in India has been growing steadily and this trend is expected to continue into the future. This is largely on account of lower per capita consumption of paint in the country, as compared to some of the other developed nations.