

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

for

**Proposed Standalone Cement Grinding Unit of 500 TPD in a Phased
manner**

at

SF. No. : 30/2, 30/3, 30/4

**Village: Dheevanur,
Taluk: Thindivanam,
District: Villupuram,
State: Tamil Nadu.**

By



M/s. Sakthipriyan Cements

**Project termed under Schedule 3(b), Category B1 as per EIA Notification 2006
and its subsequent amendments**

ToR Issued on F.No.9460/3(b)/ToR – 1300/2022 dated:01.11.2022

Baseline Monitoring Period – April to June 2023

EIA Consultant



M/s. HUBERT ENVIRO CARE SYSTEMS (P) LTD

**(NABET Certificate No. NABET/EIA/24-27/RA0335 dated 27.06.2024 valid upto
31.03.2027)**

Baseline Monitoring Laboratory



M/s. Vimta Labs Ltd

(NABL Certificate No. TC 5418 dated 31.03.2022 valid upto 30.03.2024)






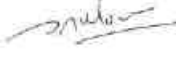


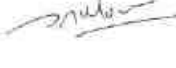
August 2024

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Rev No.	Date	Details	Name	Sign	Name	Sign	Name	Sign
			Prepared by		Checked by		Approved by	

ACKNOWLEDGEMENT

The following personnel are gratefully acknowledged for their fullest support in collection, compilation of needful data regarding the project and kind cooperation in fulfilling the report on Environmental Impact Assessment (EIA) report of “**Proposed Standalone Cement Grinding Unit of 500 TPD in a Phased manner**” at Survey No.30/2, 30/3, 30/4, Dheevanur village, Tindivanam Taluk, Villupuram District, Tamil Nadu State

M/s. Sakthipriyan Cements


K. Rajasekar

M/s. Hubert Enviro Care Systems (P) Limited,

1. Dr. J R Moses (CEO)
2. Dr. Raj Kumar Samuel (Director – Technical)
3. Mr. Vamsee Krishna Navooru (Head Consultant)


Declaration by the Project Proponent

I, Mr. K. Rajasekar declaration/undertaking that owing the contents (information and data) of the EIA report preparation has been undertaken in the compliance with Terms of Reference (ToR) for the **“Proposed Standalone Cement Grinding Unit of 500 TPD in a Phased manner”** at Survey No.30/2, 30/3, 30/4, Dheevanur village, Tindivanam Taluk, Villupuram District, Tamil Nadu State and the information and content provided in the report are factually correct.

Authorized Signatory
For SAKTHIPRIYAN CEMENTS

SAKTHIPRIYAN CEMENTS Partner

Declaration by the Head of the Accredited Consultant Organization

I, Dr.J.R. Moses, hereby, confirm that the below mentioned experts prepared the EIA/EMP report for “**Proposed Standalone Cement Grinding Unit of 500 TPD in a Phased manner**”at Survey No.30/2, 30/3, 30/4, Dheevanur village, Tindivanam Taluk, Villupuram District, Tamil Nadu State.I also confirm that I shall be fully accountable for any misleading information mentioned in this statement.

Signature: 

Date: 30.08.2024

Name: Dr.J.R.Moses

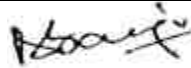
Designation: Chief Executive Officer

Name of the EIA Consultant Organization: M/s. Hubert Enviro Care Systems (P) Ltd, Chennai

NABET Certificate No & Validity: NABET/EIA/24-27/RA 0335, valid up to 31.03.2027

Declaration of Experts contributing to the EIA

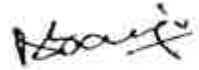
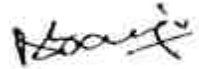




I hereby certify that I was involved in the preparation of EIA/EMP for the “**Proposed Standalone Cement Grinding Unit of 500 TPD in a Phased manner**”at Survey No.30/2, 30/3, 30/4, Dheevanur village, Tindivanam Taluk, Villupuram District, Tamil Nadu State by **M/s. Sakthipriyan Cements** as EIA Coordinator with the support of the following Functional Area Experts.


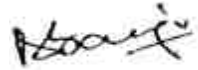

EIA Co-ordinator:	
Name	Dr. Dibyendu Banerjee
Signature	
Date	30.08.2024
Period of Involvement	April 2023 to till date

Contact Information:

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Functional Area Experts

S. No.	Functional Areas		Name of the Expert	Involvement (Period & task)	Signature
1.	AP	FAE	Dr. Dibyendu Banerjee	Period: April 2023 to till date Task: Selection of air quality monitoring location, sampling and interpretation of ambient air quality results. Estimation of fugitive emissions, identification and assessing of impacts due to air pollution and suggested suitable mitigation measures.	
2.	AQ	FAE	Dr. Dibyendu Banerjee	Period: April 2023 to till date Task: Collection and developing of micro-meteorological data from secondary sources, preparing site specific wind rose pattern, prediction of dispersion of pollutants and incremental pollution levels with air quality modelling. Identification of impacts and proposed the suitable control measures, development of EMP.	
3.	LU	FAE	Mr. Venkateshwaralu Rachala	Period: April 2023 to June 2023 Task: Development of land use maps and land use pattern of study area using GIS/related tools, and finalization of land use maps. Performed site visit for ground reality survey, and marking of eco- sensitive areas within the study area as per Topo map and Gazette notifications.	
4.	WP	FAE	Dr. Rajkumar Samuel	Period: April 2023 to June 2023 Task: Identification of surface and ground water quality monitoring locations, interpretation of water quality analysis results. Identification and quantification of impacts and proposed suitable control measures and Environmental Management Plan.	
5.	EB	FAE	Dr. Rajkumar Samuel	Period: April 2023 to June 2023 Task: Site visit, collection of baseline data from primary and secondary sources on flora and fauna species, and comparing of field data. Compilation of Ecology and bio diversity data and their impact assessment on the study area, preparation of conservation plan, greenbelt development plan and environmental management plan for biological environment.	
6.	SE	FAE	Mr. V. Dhivakar	Period: April 2023 to June 2023 Task: Site visit, and conducted	

S. No.	Functional Areas		Name of the Expert	Involvement (Period & task)	Signature
				baseline socio-economic surveys. Collection of secondary data, discussion with stake holders and preparation of socio-economic status of the study area. Review of demographic characteristics, and supervision of baseline data collection.	
7.	Noise	FAE	Mr. Vamsee Krishna Navooru	Period: April 2023 to June 2023 Task: Identification of noise monitoring locations and measured the ambient noise levels generated due to various activities. Verification of Noise and traffic baseline data, and identifying the probable impacts and suggested noise pollution control measures along with environmental management plan.	
8.	SHW	FAE	Dr. Dibyendu Banerjee	Period: April 2023 to till date Task: Quantification of Municipal solid waste generation and management measures, quantification of hazardous waste generation with management measures.	
9.	RH	FAE	Dr. J. R. Moses	Period: April 2023 to June 2023 Task: Identification of hazards materials, fire accidents within the facility and validation of existing risk assessment & Disaster management plan along with the preparation of risk for the proposed unit with consequence analysis and mitigation measures	

- AP - Air pollution monitoring, prevention and control*
AQ - Meteorology, air quality Modelling and prediction
LU - Land use
WP - Water pollution monitoring, prevention and control
EB - Ecology and bio-diversity
SE - Socio-economics
Noise - Noise
SHW - Solid and Hazardous waste management
RH - Risk assessment and Hazard management

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CHAPTER - 1 INTRODUCTION

1 INTRODUCTION

1.1 PURPOSE OF THE REPORT

M/s Sakthipriyan Cements has proposed to establish a new cement grinding unit with a capacity of 500 TPD in a phased manner at S.F. No:30/2,30/3&30/4, Dheevanur Village, Thindivanam (Tk), Villuppuram District, Tamil Nadu.

CTE has been obtained vide Consent order No. 2101241030221 dated 23.09.2021 for a production of Portland Pozzolana Cement (PPC) for a capacity of 100 TPD. Since the proposed production is increased to 500 TPD due to market demand, the proposed project attracts the EIA Notification 2006, terms under Schedule 3(b), Category B1.

The proposed project activity is termed under Schedule 3(b), Category B1 as per EIA Notification, 2006 and its subsequent amendments and requires prior Environmental Clearance. Terms of reference for carrying out EIA studies was prescribed by SEIAA, Tamil Nadu vide **SEIAA-TN/F.No 9460/3(b)/ToR-1300/2022 dated: 01.11.2022** (Copy of ToR letter enclosed as **(Annexure-XVI)**).

This objective of the Environmental Impact Assessment (EIA) report is

- To identify, predict and evaluate the economic, environmental and social impact of project activities
- To provide information on the environmental consequences for decision making and
- To promote environmentally sound and sustainable development through the identification of appropriate alternatives and mitigation measures.

Baseline studies for one season (non-monsoon) i.e from **April to June 2023** were conducted by **M/s Vimta Labs Ltd** and potential environmental impacts of the project activities were identified, assessed and documented in this report.

As per the issued ToR, Draft EIA report has been prepared and submitted for Public Hearing (PH). After completion of Public Hearing, the Final EIA report along with action plan for commitment by the proponent will be submitted to TNSEIAA for further appraisal of the project and obtaining Environmental Clearance.

1.2 IDENTIFICATION OF PROJECT & PROJECT PROPONENT

1.2.1 IDENTIFICATION OF THE PROJECT

M/s. Sakthipriyan Cements (herein after called as SPC) proposed to set up a standalone cement grinding unit to manufacture Pozzolanic Portland Cement (PPC), Ordinary Portland Cement (OPC), Portland Slag Cement (PSC) with production capacity of 500 TPD at S.F.No:30/2,30/3&30/4, Dheevanur Village, Tindivanam (Tk), Villuppuram District, Tamil Nadu. Pozzolanic Portland Cement (PPC), Ordinary Portland Cement (OPC), and Portland Slag Cement (PSC) are distinct types of cement used in construction, each with unique properties and applications. PPC, a blend of OPC and pozzolanic materials, enhances long-term strength and durability, making it suitable for large structures like dams. OPC, made from clinker and

gypsum, is known for its high early strength and is used in general construction. PSC, a mix of Portland cement clinker, blast furnace slag, and gypsum, offers improved chemical resistance and workability, ideal for structures in aggressive environments. The proposed project will be implemented in three phases viz. First phase-100 TPD; Second Phase - 300 TPD (upon completion) and Third Phase-500 TPD (upon completion) to attain a total production capacity of 500 TPD. The estimated cost for the proposed project is Rs. 5.0 crores.

1.2.2 IDENTIFICATION OF THE PROJECT PROPONENT

SPC is a partnership firm set up on 2021 at Tindivanam, Villupuram district. The company has a clear vision to make the quality cement for construction activities. The company has proposed to develop a standalone cement grinding plant to manufacture Pozzalanic Portland cement (PPC), Ordinary Portland Cement (OPC), Portland Slag Cement (PSC) of 500 TPD capacity. The company will be equipped with high technology machinery to reduce pollution, power consumption, running and increases the quality of cement.

Table 1-1 General Information

Registered address	S.F. No:30/2,30/3&30/4, Dheevanur Village, Tindivanam (Tk), Villuppuram District, Tamil Nadu - 640 206
Proponent Name	K. Rajasekar
Designation	Partner
Email Address	sakthipriyancementsc@gmail.com
Contact Number	73730 53003

1.3 BRIEF DESCRIPTION OF NATURE, SIZE, LOCATION OF THE PROJECT AND ITS IMPORTANCE TO THE COUNTRY, REGION

1.3.1 NATURE OF THE PROJECT

The proponent has proposed to develop a cement grinding plant to manufacture Pozzolan Portland Cement (PPC), Ordinary Portland Cement (OPC), Portland Slag Cement (PSC) of 500 TPD capacity at S.F. No:30/2,30/3,30/4, Dheevanur Village, Tindivanam (Tk), Villuppuram District, Tamil Nadu. This is a proposed cement grinding project, categorized under Schedule 3(b), Sector 4 - Cement plant: All stand-alone grinding units of Category B1 as per EIA Gazette Notification dated Sep 14th, 2006 and its subsequent amendments on Dec. 1st 2009 and Apr 4th 2011.

1.3.1.1 SCREENING CATEGORY

The project activity is termed Schedule 3(b) of EIA Notification, 2006 and its subsequent amendments and therefore requires prior Environmental Clearance.

Sr. No	Item no. in Schedule	Activity	Sub-activity	Product & quantity	Category
1	3(b)	Cement plants	<1.0 million tonnes/annum Production capacity All Stand alone grinding units	Pozzolanic Portland Cement (PPC), Ordinary Portland Cement (OPC), Portland Slag Cement (PSC) of 500 TPD	Cat. B

**Source: EIA Notification 2006 and its subsequent amendments*

1.3.2 SIZE OF THE PROJECT

Brief description about of the project is detailed in the table below:

Table 1-2 Brief Description

Sr.No	Parameter	Description																					
1	Location– SF Nos.	30/2, 30/3 & 30/4, Dheevanur Village, Tindivanam (Tk), Villuppuram District, Tamil Nadu-604 206.																					
2	Total area of the plant	1.877 hectares (4.64 acres)																					
3	Plant Capacity	Phase-I : 100 TPD Phase-II: 300 TPD (upon completion) Phase-III: 500 TPD (upon completion) Total production capacity: 500 TPD																					
4	Water requirement	8.0 KLD																					
5	Waste water	1.14 KLD																					
6	Waste water treatment	Septic Tank & Soak Pit																					
7	Manpower requirement	30 Nos																					
8	Power requirement	500 kVA																					
9	DG sets	2 x 125 kVA																					
10	Project Cost	5 Crores																					
11	Location	<table border="1"> <thead> <tr> <th>S.No</th> <th>Latitude</th> <th>Longitude</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>12°15'42.88"N</td> <td>79°33'58.04"E</td> </tr> <tr> <td>2</td> <td>12°15'42.12"N</td> <td>79°34'0.15"E</td> </tr> <tr> <td>3</td> <td>12°15'43.01"N</td> <td>79°34'0.56"E</td> </tr> <tr> <td>4</td> <td>12°15'42.50"N</td> <td>79°34'2.28"E</td> </tr> <tr> <td>5</td> <td>12°15'38.00"N</td> <td>79°34'0.44"E</td> </tr> <tr> <td>6</td> <td>12°15'37.80"N</td> <td>79°34'0.64"E</td> </tr> </tbody> </table>	S.No	Latitude	Longitude	1	12°15'42.88"N	79°33'58.04"E	2	12°15'42.12"N	79°34'0.15"E	3	12°15'43.01"N	79°34'0.56"E	4	12°15'42.50"N	79°34'2.28"E	5	12°15'38.00"N	79°34'0.44"E	6	12°15'37.80"N	79°34'0.64"E
		S.No	Latitude	Longitude																			
		1	12°15'42.88"N	79°33'58.04"E																			
		2	12°15'42.12"N	79°34'0.15"E																			
		3	12°15'43.01"N	79°34'0.56"E																			
		4	12°15'42.50"N	79°34'2.28"E																			
5	12°15'38.00"N	79°34'0.44"E																					
6	12°15'37.80"N	79°34'0.64"E																					

Sr.No	Parameter	Description		
		7	12°15'36.86"N	79°34'0.34"E
		8	12°15'37.63"N	79°33'58.34"E
		9	12°15'39.10"N	79°33'58.53"E
		10	12°15'39.73"N	79°33'56.08"E

1.3.3 LOCATION OF THE PROJECT

Table 1-3 Project Site Location

Sr. No	Particulars	Details		
1	Project Address	Dheevanur Village, Tindivanam (Tk), Villuppuram District, Tamil Nadu-604 206		
2	Geographical Coordinates	S.No	Latitude	Longitude
		1	12°15'42.88"N	79°33'58.04"E
		2	12°15'42.12"N	79°34'0.15"E
		3	12°15'43.01"N	79°34'0.56"E
		4	12°15'42.50"N	79°34'2.28"E
		5	12°15'38.00"N	79°34'0.44"E
		6	12°15'37.80"N	79°34'0.64"E
		7	12°15'36.86"N	79°34'0.34"E
		8	12°15'37.63"N	79°33'58.34"E
		9	12°15'39.10"N	79°33'58.53"E
10	12°15'39.73"N	79°33'56.08"E		
3	SOI Toposheet	57P/7, 57P/8, 57P/11 & 57P/12		
4	Site elevation	78 m		

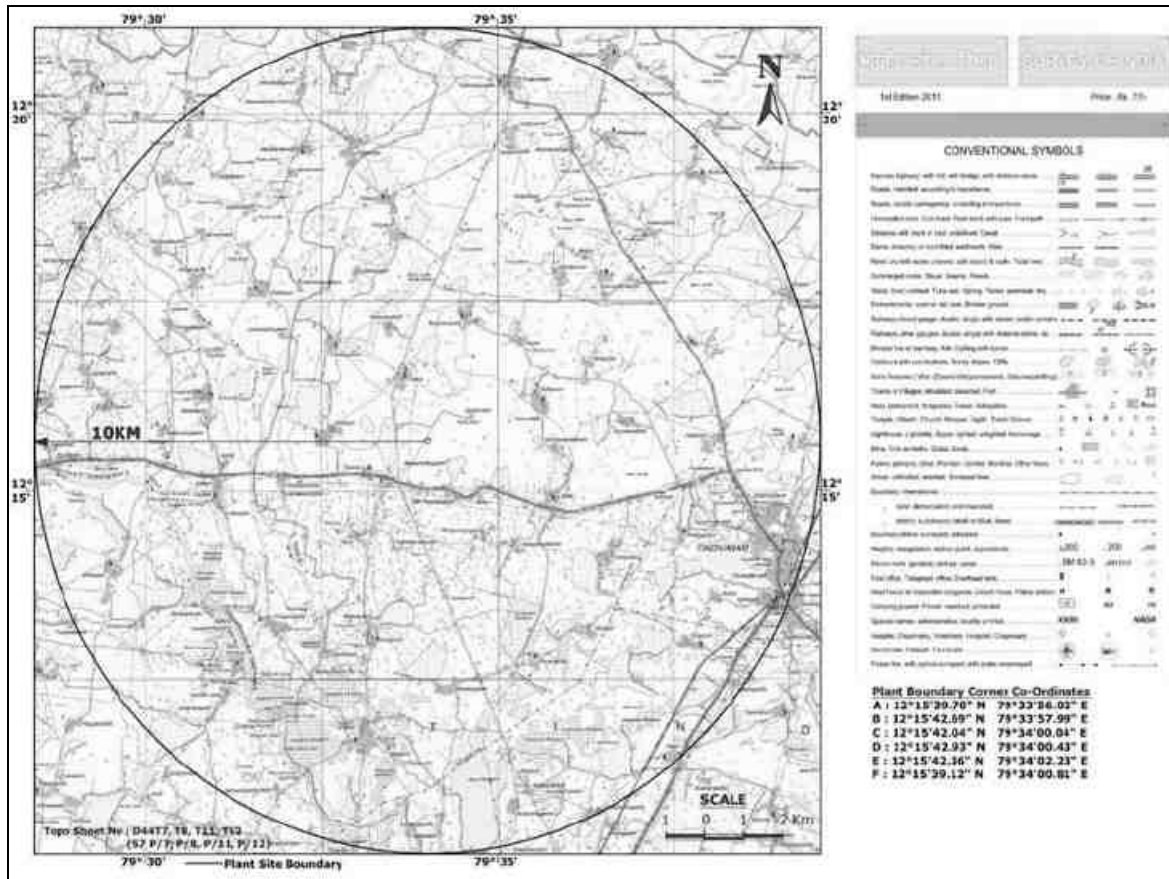


Figure 1-1 10 km radius toposheet showing project site and study area

1.3.3.1 PHOTOGRAPHS SHOWING PROPOSED SITE



Figure 1-2 Photographs showing proposed project site

1.3.4 SITE CONNECTIVITY AND ENVIRONMENTAL SETTINGS

Table 1-4 Environment Settings

Sr. No.	Particulars	Details		
		S.No	Latitude	Longitude
1.	Latitude & Longitude	1	12°15'42.88"N	79°33'58.04"E
		2	12°15'42.12"N	79°34'0.15"E
		3	12°15'43.01"N	79°34'0.56"E
		4	12°15'42.50"N	79°34'2.28"E
		5	12°15'38.00"N	79°34'0.44"E
		6	12°15'37.80"N	79°34'0.64"E
		7	12°15'36.86"N	79°34'0.34"E
		8	12°15'37.63"N	79°33'58.34"E
		9	12°15'39.10"N	79°33'58.53"E
		10	12°15'39.73"N	79°33'56.08"E
2.	Elevation above MSL	78 m		
3.	Land use at the project site	Unclassified land use		
4.	Nearest Habitation	Agoor (1.22 km, NNE) Dhevanur (1.47 km, SSW)		
5.	Nearest Highway	NH 77-Gingee to Thindivanam Road (1.2 km,S) SH 5- Vanthavasi to Mayillam Road (6.8 km, E)		
6.	Nearest Railway station	Thindivanam Station (9.9 km, SE)		
7.	Nearest Air Port	Puducherry Airport (42.21 km, SE) Chennai International Airport (102 km,NE)		
8.	Nearest Sea Port	Cuddalore (64.88 km, SSE)		
9.	Nearest Major Town	Tindivanam (9.9 Km, SE)		
10.	Reserve Forest within 10-km radius	Nil		
11.	Nearest water bodies	Dheevanur Lake (0.96 km, W) Mannampoondi Lake (1.89 km, N) Salai Lake (2.10 km, E) Vilukkam Lake (2.56 km, E) Kollar Lake (3.3 km, E) Venganthur Pond (4.01 km SW) Tributary River (4.31 km,SW) Puliyannur Lake (5.03 km, N) Taniyal Lake (6.44 km, N) Gingee River (6.71 km, SW) Meur Lake (8.17 km, S) Modaiyur Lake(8.7 km, SW) Chitheri (9.03 km, NNW) Thenpasar Lake (9.31 km, SSE) Kodium Lake (9.58 km, NE) Botheri Lake (9.78 km, SE) Vairapuram Big Lake (10 km, NE) Melsevur Lake (10 km, SSW)		
12.	Hills/ Valleys	Nil		

Sr. No.	Particulars	Details
13.	Ecologically sensitive zones like Wild Life Sanctuaries, National Parks and biospheres	None within 10-km radius
14.	Defense Installation / Archaeological	Nil
15.	Historical places	None within 10-km radius
16.	Socio-economic factors	No resettlement and rehabilitation involved
17.	Nearest Hospitals	1. Mannampoondi Hospital- (2.78 km, NNW) 2. Rettanai Government Hospital- (6.89 km,SSW) 3. Government Hospital- Thindivanam, (9.49 km, SE)
18.	Religious places	1. Sri Nerkuthi Vinayagar Temple (1.17 km,SW) 2. Sri Lakshminarasimha Temple (9.29 Km,SE) 3. Masjide Thakva Pallivasal (1.73Km, NNW) 4. St.Joseph's Church (3.16Km,NW)
19.	Nearby Major Industries	1. NCC Agro Industries, (5.47 Km, SW) 2. Stellar Pipes (5.87 km, E) 3. Mint Industries (9.8 Km,SE) 4. Venmaniyathur SIPCOT, (4.5 Km,E)
20.	Fire and rescue service	Tamil Nadu Fire and Rescue service, Tindivanam– (10.83 km, SE)
21.	Seismic Zone	Seismically, this area is categorized under Zone II as per IS: 1893 (Part 1) 2002.

1.4 PROJECT IMPORTANCE TO COUNTRY/ REGION

- Cement demand is closely linked to the overall economic growth, particularly the housing and infrastructure sector. If the rate of growth of consumption remains low at 5-6%, the existing capacity would be sufficient to meet the cement demand for the next few years. However, from a long-term point of view, overall pick-up observed in the infrastructure spending by the Government and downward trend in the interest rates is expected to revive the demand across sectors. The 7th Pay Commission is expected to aid in housing demand. Government thrust on affordable housing for realizing its vision of “Housing for All” by 2022 and Smart City program is expected to help in demand growth for cement. The rate of new capacity additions has also slowed down considerably. Therefore, the outlook for the cement sector looks better.
- Therefore, keeping in view the above-mentioned points and to meet the rising demand of cement in near future, M/s. Sakthipriyan Cements will prove beneficial to the country and to the state Tamil Nadu in particular.

1.4.1 IMPORTS VS INDIGENOUS PRODUCTION

India is self sufficient to meet the demands of the market with the GDP projected at 10% in the coming decades and in view of the infrastructure development. Since the facilities are growing across the region, the growth rate of cement demand will increase. Hence, the proposed project shall cater to meet requirement of nation's developmental project. Proposed standalone cement grinding plant is expected to cater the demands of domestic and international markets. The proposed cement production will cater to the cement demands in Tamil Nadu. India is the world's second largest cement producer. India's domestic cement production was nearly 294.4 MT in FY21 and accounted for over 7% of the global installed capacity in FY21.

1.5 SCOPE OF THE STUDY – DETAILS OF REGULATORY SCOPING CARRIED OUT (AS PER TERMS OF REFERENCE)

In line with EIA notification dated 14.09.2006 and subsequent amendments, a ToR meeting (Minutes of 321th meeting of SEAC) was held for determining the Terms of Reference (TOR) on 14th October 2022 for the preparation of EIA report for the proposed project. This EIA has been prepared based on the ToR condition given by SEIAA **Letter No. SEIAA-TN/F.No.9460/3(b)/ToR-1300/2022 dated: 01.11.2022**. The copy of Terms of Reference (ToR) is attached as **Annexure-XVI**.

Baseline data generation for one season (non-monsoon) was carried out during **April to June 2023**. Radial distance of 10 km from the project site was considered as the study area. Draft EIA report was prepared for conduction of public hearing as per the generic structure of EIA report prescribed as Appendix III of EIA Notification, 2006 and subsequent amendments. The final EIA/EMP report incorporating the outcomes of public hearing is prepared for appraisal before the SEAC, Tamil Nadu.

1.5.1 STRUCTURE OF EIA REPORT

This EIA Report has been structured as follows:

- **Chapter 1 - Introduction:** Provides a background to the project, identification of the project and project proponent, brief description of the project, details of the project proponent, scope of the study and structure of this report.
- **Chapter 2 - Project description:** Provides details of project, infrastructure required, technology and process description with process flow diagram, information on the needs and desirability of the project and sources of pollution with pollution control measures.

- **Chapter 3 - Description of the Environment:** Provides description of the receiving Environment details, baseline conditions identified for the project within 10 km radius from the project site.
- **Chapter4 - Anticipated Environmental Impact and Mitigation Measures:** describe the anticipated impacts identified during the EIA process during the various project phases.
- **Chapter 5 - Analysis of alternatives:** provides the different technology alternatives which were considered for the project.
- **Chapter 6 - Environment Monitoring program:** provides the monitoring schedule and implementation plan during the operation phase of the project.
- **Chapter 7 - Additional Studies:** has the information about risk and hazard assessment and details of disaster management plan and public hearing.
- **Chapter8 - Project benefits:** associated with the proposed project are discussed in this Section.
- **Chapter9 - Environmental Cost Benefit Analysis:** This Chapter summarizes the cost benefit analysis if it is available in scoping stage.
- **Chapter 10 –Environmental Management Plan:** Details of the administrative aspects of ensuring that mitigative measures are implemented and their effectiveness monitored, after approval of the EIA
- **Chapter 11 - Summary & Conclusion**
- **Chapter 12 - Disclosure of Consultants engaged.**

1.6 REGULATORY COMPLIANCE

Table 1-5 Regulatory Compliance Status

S. No	Regulatory compliance	Compliance Status				Remarks
		Sr. No	SF No	Land Area	Ownership	
1.	Land Document	1	30/2,30/3&30/4	1.877 hectares	Sakthipriyan Cements	Land documents are enclosed in Annexure – IX.
2.	Consent to Establish	CTE is obtained for the production capacity of 100 TPD.				Copy of CTE for (100TPD production capacity) is enclosed as Annexure-XVII.
3.	Water	Source: Private suppliers				Private water supply letter is attached as Annexure-X.
4.	Power	TANGEDCO				-
5.	Terms of Reference	Terms of reference for carrying out EIA studies was prescribed by SEIAA, Tamil Nadu vide SEIAA-TN/F. No 9460/3(b)/ToR-1300/2022 dated: 01.11.2022.				Enclosed as Annexure-XVI.

1.7 APPLICABLE RULES/REGULATION/ACTS

The applicable Environmental Rules/Act/Regulation are applicable upon the project: -

- ❖ The Factories Act, 1948 The Wildlife Protection Act, 1972 & subsequent amendments till date
- ❖ The Water (Prevention and Control of Pollution) Act, 1974 & subsequent amendments till date
- ❖ The Air (Prevention and Control of Pollution) Act, 1981 & subsequent amendments till date
- ❖ Environment (Protection) Act, 1986 & subsequent amendments till date
- ❖ Motor Vehicles Act, 1988 and the amendments thereunder
- ❖ Public Liability Insurance Act, 1991 and amendments till date
- ❖ Fly ash notification 1999 & subsequent amendments till date
- ❖ The Noise Pollution (Regulation and Control) Rules, 2000 & subsequent amendments till date
- ❖ The Biological Diversity Act, 2002&its subsequent amendments Act, 2023.
- ❖ EIA Notification, 2006 & subsequent amendments till date
- ❖ Construction and Demolition Waste Management Rules 2016 & subsequent amendments till date
- ❖ Solid Waste Management Rules, 2016 & subsequent amendments till date
- ❖ Hazardous and Other Waste (Management and Transboundary Movement) Rules 2016 & subsequent amendments till date
- ❖ E-Waste (Management) Rules 2016 & subsequent amendments till date
- ❖ Plastic Waste Management Rules 2016 & subsequent amendments till date
- ❖ GSR 94(E): Mandatory Implementation of Dust Mitigation Measures for all Construction and Demolition Activities
- ❖ The Petroleum Act, 1934 and amendments there under
- ❖ Bio-Medical Waste Management Rules, 2016 & subsequent amendments till date

1.8 COMPLIANCE TO TERMS OF REFERENCE

(TOR Vide Letter No. SEIAA-TN/F.No 9460/3(b)/ToR-1300/2022 Dated: 01.11.2022)

1.8.1 STANDARD TERMS OF REFERENCE (TOR)

Sl. No	Queries	Reply
1	Executive Summary	Executive summary of the project is enclosed with EIA/ EMP Report.
2	Introduction	<p>M/s. Sakthipriyan Cements (herein after called as SPC) proposed to set up a standalone cement grinding unit to manufacture Pozzolanic Portland Cement (PPC), Ordinary Portland Cement (OPC), Portland Slag Cement (PSC) with production capacity of 500 TPD at S.F.No:30/2,30/3,30/4, Dheevanur Village, Tindivanam (Tk), Villuppuram District, Tamil Nadu. The proposed project will be implemented in three phases viz. First phase-100 TPD, Second Phase-300 TPD (upon completion), Third Phase-500 TPD (upon completion). The total production capacity is 500 TPD. The estimated cost for the proposed project is Rs. 5.0 crore.</p> <p><i>Note: The CTE has been obtained for a production capacity of 100TPD. Since proposed production is increased to 500 TPD due to market demand, the proposed project attracts the EIA Notification 2006, terms under Schedule 3(b), Category B1.</i></p>
I	Details of the EIA Consultant including NABET accreditation	<p>M/s. Hubert Enviro Care Systems (P) Ltd., Chennai. (NABET Accredited vide Certificate No. NABET/ EIA/ 24-27/ RA0335 Valid up to 31/03/2027) Baseline studies carried out by M/s Vimta Labs Ltd NABL Certificate No. TC 5418 dated 31/03/2022 valid upto 30/3/2024</p>
II	Information about the project proponent	<p>M/s. Sakthipriyan Cements has proposed to manufacture a standalone cement grinding unit with a capacity of 500 TPD at S.F.No:30/2,30/3&30/4, Dheevanur Village, Tindivanam (Tk), Villuppuram District, Tamil Nadu.</p> <p>Details of the project proponent are given in Chapter 1, Section 1.2.2 of the EIA/EMP report.</p>
III	Importance and benefits of the	The proposed standalone cement grinding plant will result in

Sl. No	Queries	Reply															
	project	<p>improvement of instructure as well as overall socio-economic development in the area. The people residing in the nearby areas will be benefited directly and or indirectly due to the proposed project.</p> <p>The manpower requirement for the operational phase of the proposed plant will be about 50 people (Direct-30 & Indirect-20). All attempts will be made to employ locally available skilled personnel from the study area.</p> <p>Benefits of the project:</p> <ul style="list-style-type: none"> • Employment to the local population • Infrastructure development of surrounding area. • Economic and Social upliftment of suppressed class. • Revenue to State and Central exchangers 															
3	Project Description																
I	Cost of project and time of completion	The total cost for the proposed project is Rs.500 Lakhs. The project will commence after obtaining the Environmental clearance and CTE/CTO from SEIAA and State Pollution Control Board respectively.															
II	Products with capacities for the proposed project	<table border="1"> <thead> <tr> <th>Sr. No</th> <th>Products</th> <th>Quantity (TPD)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>PPC (Pozzolanic Portland Cement)/OPC (Ordinary Portland Cement)/PSC (Portland Slag Cement)</td> <td>500</td> </tr> <tr> <td></td> <td>Phase – I</td> <td>100</td> </tr> <tr> <td></td> <td>Phase – II (Upon Completion)</td> <td>300</td> </tr> <tr> <td></td> <td>Phase – III (Upon Completion)</td> <td>500</td> </tr> </tbody> </table> <p><i>Note: A-Clinker: 65-75%, Pozzolanic Material: 15-35% and Gypsum: 3-5%, B-Clinker (90-95%), Gypsum (3-5%), Minor additional constituents (0-5%) and C-Clinker (45-65%), Granulated Blast Furnace Slag (30-50%), Gypsum (3-5%)</i></p>	Sr. No	Products	Quantity (TPD)	1	PPC (Pozzolanic Portland Cement)/OPC (Ordinary Portland Cement)/PSC (Portland Slag Cement)	500		Phase – I	100		Phase – II (Upon Completion)	300		Phase – III (Upon Completion)	500
Sr. No	Products	Quantity (TPD)															
1	PPC (Pozzolanic Portland Cement)/OPC (Ordinary Portland Cement)/PSC (Portland Slag Cement)	500															
	Phase – I	100															
	Phase – II (Upon Completion)	300															
	Phase – III (Upon Completion)	500															
III	If expansion project, details of existing products with capacities	Not applicable, since it is a greenfield project.															

Sl. No	Queries	Reply
	and whether adequate land is available for expansion, reference of earlier EC if any	
IV	List of raw materials required and their source along with mode of transportation	The raw material requirement details along with the source and mode of transportation are presented in Chapter 2, Table-2.4 of EIA/EMP Report.
V	Other chemicals and materials required with quantities and storage capacities	Not applicable
VI	Details of Emission, effluents, hazardous waste generation and their management	Stack Emission details are presented in Chapter 2, Section 2.8.1 of EIA/EMP Report. Solid waste generation and management details are provided in Section 2.8.2 of Chapter 2 in EIA/EMP Report. Sewage generated of 1.14 KLD will be disposed to septic tank followed by soak pits.
VII	Requirement of water, power, with source of supply, status of approval, water balance diagram, manpower requirement (regular and contract)	Water requirement details are presented in Chapter 2, Section 2.7.3 and Power requirement and the source of supply are provided in Chapter 2, Section 2.7.4 in EIA/EMP Report. Water Balance is given in Figure-2.10 . The man power requirements are provided in Section 2.7.5 of Chapter 2 .
VIII	Process description along with major equipments and machineries, process flow sheet (quantative) from raw material to products to be provided.	The process description details are provided in Chapter 2, Section 2.6 of EIA/EMP Report. The process flow sheet is presented in Figure 2-8 .
IX	Hazard identification and details of proposed safety systems	Hazard identification and the safety measures details are provided in Chapter-7 in EIA/EMP Report.
X	Expansion / modernization proposals:	
	a. Copy of all the Environmental Clearance(s) including Amendments thereto obtained for the project from MoEF/SEIAA shall be attached as an Annexure. A certified copy of the latest	Not applicable, since it is a greenfield project. CTE has been obtained for a production capacity of 100 TPD. Since proposed production is increased to 500 TPD due to market demand, the proposed project attracts the EIA Notification 2006, terms under Schedule 3(b), Category B1.

Sl. No	Queries	Reply
	<p>Monitoring Report of the Regional Office of the Ministry of Environment and Forests as per circular dated 30th May, 2012 on the status of compliance of conditions stipulated in all the existing environmental clearances including Amendments shall be provided. In addition, status of compliance of Consent to Operate for the ongoing/existing operation of the project from SPCB shall be attached with the EIA-EMP report</p>	
	<p>b. In case the existing project has not obtained environmental clearance, reasons for not taking EC under the provisions of the EIA Notification 1994 and/or EIA Notification 2006 shall be provided. Copies of Consent to Establish/No Objection Certificate and Consent to Operate (in case of units operating prior to EIA Notification 2006, CTE and CTO of FY 2005-2006) obtained from the SPCB shall be submitted. Further, compliance report to the conditions of consents from the SPCB shall be submitted</p>	<p>Not applicable</p>
<p>4</p>	<p>Site Details</p>	
<p>I</p>	<p>Location of the project site covering village, Taluka/Tehsil, District and State, Jurisdiction for selecting the site, whether other sites were considered</p>	<p>M/s. Sakthipriyan Cements (herein after called as SPC) proposed to set up a standalone cement grinding unit to manufacture Pozzolanic Portland Cement (PPC), Ordinary Portland Cement (OPC), Portland Slag Cement (PSC) with production capacity of 500 TPD at S.F. No: 30/2, 30/3 & 30/4, Dheevanur Village, Tindivanam (Tk), Villuppuram District, Tamil</p>

Sl. No	Queries	Reply												
		Nadu. No other alternative sites were considered.												
II	A toposheet of the study area of radius of 10 km and site location on 1:50,000/1:25,000 scale on an A3/A2 sheet. (Including all eco-sensitive areas and environmentally sensitive places.	The study area map prepared from the survey of india toposheet (1:50000) is provided in Figure 1-1 .												
III	Details w.r.t. Option analysis for selection of site	Option analysis for site selection is provided in Chapter 5 .												
IV	Co-ordinates (lat-long) of all four corners of the site	Site Co-ordinates: <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Point 1</th> <th>Point 2</th> </tr> </thead> <tbody> <tr> <td>12°15'39.7" N 79°33'56.02"E</td> <td>12°15'42.69" N 79°33'57.99" E</td> </tr> <tr> <th>Point 3</th> <th>Point 4</th> </tr> <tr> <td>12°15'42.04" N 79°34'00.04" E</td> <td>12°15'42.93" N 79°34'00.43" E</td> </tr> <tr> <th>Point 5</th> <th>Point 6</th> </tr> <tr> <td>12°15'42.36" N 79°34'02.23" E</td> <td>12°15'39.12" N 79°34'00.81" E</td> </tr> </tbody> </table>	Point 1	Point 2	12°15'39.7" N 79°33'56.02"E	12°15'42.69" N 79°33'57.99" E	Point 3	Point 4	12°15'42.04" N 79°34'00.04" E	12°15'42.93" N 79°34'00.43" E	Point 5	Point 6	12°15'42.36" N 79°34'02.23" E	12°15'39.12" N 79°34'00.81" E
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Point 5	Point 6													
12°15'42.36" N 79°34'02.23" E	12°15'39.12" N 79°34'00.81" E													
V	Google map-Earth downloaded of the project site	Google Earth map of the proposed project site is shown in Figure2-5, Chapter-2 in EIA/EMP Report.												
VI	Layout maps indicating existing unit as well as proposed unit indicating storage area, plant area, greenbelt area, utilities ect. If located within an Industrial area/Estate/Complex, layout of Industrial Area indicating location of unit within the Industrial area/Estate	The master layout plan of the proposed unit with various legends along with scale is presented in Figure 2.9 of Chapter 2 .												
VII	Photographs of the proposed and existing (if applicable) plant site. If existing, show photographs of plantation/greenbelt, in particular	Site photographs are mentioned as Figure 2.7, Chapter 2 of EIA/EMP Report.												
viii	Landuse break-up of total land of the project site (identified and	The land use break up details of the proposed project site are presented in Chapter 2, Table 2.8 .												

Sl. No	Queries	Reply
	acquired), government/private-agricultural, forest, wasteland, water bodies, settlements, etc shall be included. (not required for industrial area)	
Ix	A list of major industries with name and type within study area (10 km radius) shall be incorporated. Land use details of the study area	Major industries located near the industries are, 1. NCC Agro Industries, (5.47 Km, SW) 2. Stellar Pipes (5.87 km, E) 3.Mint Industries (9.8 Km,SE) 4. Venmaniyathur SIPCOT, (4.5 Km,E)
X	Geological features and Geo-hydrological status of the study area shall be included	Geological features and Geo-Hydrogeology status of the study area are given in Chapter-3, Section 3.2.4 of EIA/EMP Report.
XI	Details of Drainage of the project upto 5 km radius of study area. If the site is within 1 km radius of any major river, peak and lean season river discharge as well as flood occurrence frequency based on peak rainfall data of the past 30 years. Details of Flood Level of the project site and maximum Flood Level of the river shall also be provided. (mega green field projects)	Drainage map of the study area is presented in Figure-3.5 of Chapter-3 in EIA/EMP Report.
XII	Status of aquisition of land. If acquisition is not complete, stage of the acquisition process and expected time of complete possession of the land	The proposed project does not involve any land aquisition, as the entire land required for the proposed project is available under the possession of Sakthipriyan Cement.
XIII	R & R details in respect of land in line with state Government policy	Does not involve any Rehabilitation and Resettlement issues in this proposed activity. As the entire land required for the proposed project is under Sakthipriyan cement
5	Forest and wildlife related issues (if applicable):	
I	Permission and approval for the use of forest land (forestry	No forest land is involved in the proposed project. Hence it's not applicable.

Sl. No	Queries	Reply
	clearance), if any, and recommendations of the State Forest Department (if applicable)	
II	Landuse map based on High resolution satellite imagery (GPS) of the proposed site delineating the forestland (in case of projects involving forest land more than 40 ha)	Land use map based on High resolution satellite imagery is shown in Figure-3.21 of Chapter-3 in EIA/EMP report.
III	Status of application submitted for obtaining the stage I forestry clearance along with latest status shall be submitted	Not applicable
IV	The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, the project proponent shall submit the map dully authenticated by Chief Wildlife Warden showing these features vis-a-vis the project location and the recommendations or comments of the Chief Wildlife Warden-thereon	Not applicable
V	Wildlife Conservation Plan duly authenticated by the Chief Wildlife Warden of the State Government for conservation of Schedule I fauna, if any exists in the study area	Not applicable
VI	Copy of application submitted for clearance under the Wildlife(Protection) Act, 1972, to the Standing Committee of the	Not applicable

Sl. No	Queries	Reply
	National Board for Wildlife	
6	Environmental Status	
I	Determination of atmosphere inversion level at the project site and site-specific micro-meteorological data using temperature, relative humidity, hourly wind speed and direction and rainfall	Details of the meteorological data generated at site are given in Section-3.3 of Chapter-3 in EIA/EMP Report.
II	AAQ data (except monsoon) at 8 locations for PM ₁₀ , PM _{2.5} , SO ₂ , NO _x , CO and other parameters relevant to the project shall be collected. The monitoring stations shall be based CPCB guidelines and take into account the predominant wind direction, population zone and sensitive receptors including reserved forests	The AAQ monitoring locations are shown in Chapter 3, Figure-3.12 and AAQ results are mentioned in Table 3-10 of the EIA/EMP Report. Summaries of AAQ results are incorporated in Annexure-III .
III	Raw data of all AAQ measurement for 12 weeks of all stations as per frequency given in the NAAQM Notification of Nov. 2009 along with - min., max., average and 98% values for each of the AAQ parameters from data of all AAQ stations should be provided as an annexure to the EIA Report	The AAQ monitoring locations are shown in Chapter 3, Figure-3.12 and AAQ results are mentioned in Table 3-10 of the EIA/EMP Report. Summaries of AAQ results are incorporated in Annexure-III .
IV	Surface water quality of nearby River (100m upstream and downstream of discharge point) and other surface drains at eight locations as per CPCB/MoEF &	The surface water has been collected in the 4 locations. The results have been given in Table 3.14, Chapter-3 of EIA/EMP Report.

Sl. No	Queries	Reply
	CC guidelines	
V	Whether the site falls near to polluted stretch of river identified by the CPCB/MoEF & CC if yes give details	Not applicable
VI	Ground water monitoring at minimum at 8 locations shall be included	The ground water sampling for eight locations with their results is presented in Table 3.12 and Table 3.13 of Chapter 3 .
VII	Noise levels monitoring at 8 locations within the study area	The results of Noise level monitoring at 8 locations in the study area are tabulated in Table-3.18 of Chapter-3 in EIA/EMP report.
VIII	Soil Characteristic as per CPCB guidelines	The Soil analysis results at six locations in the study area are provided in Table-3.16 of Chapter-3 in EIA/Emp report.
IX	Traffic study of the area, types of vehicles, frequency of vehicles for transportation of materials, additional traffic due to proposed project parking arrangement etc	The Traffic study for the proposed project is provided in Section-3.11 of Chapter-3 in EIA/EMP Report.
		The vehicles entering the plant will only be present in the premises for a very short duration. Hence separate parking arrangements are not required.
X	Detailed description of flora and fauna (terrestrial and aquatic) existing in the study area shall be given with special reference to rare, endemic and endangered species. If Schedule - I fauna are found within the study area, a Wildlife Conservation Plan shall be prepared and furnished.	Detailed description of flora and fauna are presented in subsection 3.8 of Chapter-3 in EIA/EMP Report.
		The schedule - I fauna found within the study area.
XI	Socio-economic status of the study area	Demography and Socio-economic status of the study area is presented in sub-Section-3.10 of Chapter-3 in EIA/EMP report.
7	Impact Assessment and Environment Management Plan	
I	Assessment of ground level concentration of pollutants from the stack emission based on site-specific meteorological features. In case the project is located on a	The ground level concentration of pollutants for the proposed activities is presented in Table- 4.10 of Chapter 4 .
		The air quality contours are presented in Figure 4-1 to 4-3 of Chapter-4 in EIA/EMP Report.

Sl. No	Queries	Reply
	<p>hilly terrain, the AQIP Modelling shall be done using inputs of the specific terrain characteristics for determining the potential impacts of the project on the AAQ. Cumulative impact of all sources of emissions (including transportation) on the AAQ of the area shall be well assessed. Details of the model used and the input data used for modeling shall also be provided. The air quality contours shall be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any</p>	<p>Details of the model used and inputs are provided in Section4.3.5 of Chapter-4 in EIA/EMP Report.</p>
II	<p>Water Quality modelling – in case, of discharge in water body.</p>	<p>There is no proposal for the discharge of effluent into the local drain. Hence water quality modelling is not required.</p>
III	<p>Impact of the transport of the raw materials and end products on the surrounding environment shall be assessed and provided. In this regard, options for transport of raw materials and finished products and wastes (large quantities) by rail or rail-cum road transport or conveyor-cum-rail transport shall be examined</p>	<p>The Traffic study for the proposed project is provided in Chapter-3, Section3.11 of EIA/EMP Report.</p> <p>The raw materials are carried through closed trucks so there will not be an impact to the surroundings.</p>
IV	<p>A note on treatment of wastewater from different plant operations, extent recycled and reused for different purposes shall be included. Complete scheme of effluent treatment. Characteristics of untreated and treated effluent to</p>	<p>The domestic waste water from the proposed plant shall be treated with septic tank followed by soak pit and also discussed in Section 4.3.7.</p>

Sl. No	Queries	Reply
	meet the prescribed standards of discharge under E(P) Rules.	
V	Details of stack emission and action plan for control of emissions to meet standards	Details of stack emission are presented in Table 4.7 and Table 4.8 of Chapter 4. Action plan to meet the standards are presented in section 4.9.1 of Chapter 4.
VI	Measures for fugitive emission control	Action plan to meet the standards are presented in section 4.9.1 of Chapter 4.
VII	Details of hazardous waste generation and their storage, utilization and disposal. Copies of MOU regarding utilization of solid and hazardous waste in cement plant shall also be included. EMP shall include the concept of waste-minimization, recycle/reuse/recover techniques, Energy conservation and natural resource conservation	The solid waste generation and their details are presented in Table 2.16 of Chapter 2. The solid waste management details are presented in Section 4.6.4 of Chapter 4.
VIII	Proper utilization of fly ash shall be ensured as per Fly Ash Notification, 2009. A detailed plan of action shall be provided.	No fly ash would be generated from the proposed cement plant.
ix	Action plan for green belt development plan in 33% area i.e. Land with not less than 1,500 trees per ha. Giving details of species, width of the plantation, planning schedule etc. shall be included. The green belt shall be around the project boundary and a scheme of greening of the roads used for the project shall also be incorporated.	The greenbelt development details are presented in section 4.7 of Chapter 4.
X	Action plan for the rain water	The proposed rainwater harvesting scheme are provided in Section

Sl. No	Queries	Reply
	harvesting measures at plant site shall be submitted to harvest rainwater from the roof tops and storm water drains to recharge the ground water and also to use for the various activities at the project site to conserve fresh water and reduce the water requirement from other sources	2.8.3 of Chapter 2.
XI	Total capital cost and recurring cost/annum for environmental pollution control measures shall be included	The construction of proposed standalone cement grinding plant will be carried out after obtaining EC. The total project cost will be Rs.500 lakhs, which is inclusive of pollution control activities of 40 Lakhs.
XII	Action plan for post-project environmental monitoring shall be submitted	The action plan for post-project environmental monitoring is presented in Section 6.3 of Chapter 6.
XIII	Onsite and Offsite Disaster (natural and Man-made) Preparedness and Emergency Management Plan including Risk Assessment and damage control. Disaster management plan should be linked with District Disaster Management Plan.	Damage and risk assessment is presented in Section 7.1 of Chapter 7. Disaster Management plan is presented in Section 7.4 of chapter 7.
8	Occupational health	
I	Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers	After commissioning of the project, the fund is allocated separately especially for safety and also health check up for the labourers conducted periodically.
II	Details of exposure specific health status evaluation of worker. If the worker's health is being evaluated by pre designed format, chest x rays, Audiometry, Spirometry, Vision testing (Far & Near vision, colour vision and any other ocular defect) ECG, during pre	The workers will undergo regular periodical examination of health by district health officers with respect to factories act.

Sl. No	Queries	Reply
	placement and periodical examinations give the details of the same. Details regarding last month analyzed data of above mentioned parameters as per age, sex, duration of exposure and department wise.	
III	Details of existing Occupational & Safety Hazards. What are the exposure levels of above mentioned hazards and whether they are within Permissible Exposure level (PEL). If these are not within PEL, what measures the company has adopted to keep them within PEL so that health of the workers can be preserved.	Not Applicable, since it is a greenfield project
IV	Annual report of health status of workers with special reference to Occupational Health and Safety	The annual report of health status will be carried out regularly in the operation phase of the project.
9	Corporate Environment Policy	
I	Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report	The company does not have a corporate environment policy.
II	Does the Environment Policy prescribe for standard operating process/procedures to bring into focus any infringement/deviation/violation of the environmental of forest norms/conditions? If so, it may be detailed in the EIA.	Environmental policy will be submitted as applicable
III	What is the hierarchical system or	The hierarchial system or administrative order of the company is

Sl. No	Queries	Reply
	Administrative order of the company to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions? Details of this system may be given	presented in Figure 10.1 of Chapter 10 .
IV	Does the company have system of reporting of non compliances/violations of environmental norms to the Board of Directors of the company and/or shareholders or stakeholders at large? This reporting mechanism shall be detailed in the EIA report	Yes, the company will report the non-compliances/ violations of the environmental norms to the board of directors of the company.
10	Details regarding infrastructure facilities such sanitation, fuel, restroom etc. to be provided to the labour force during construction as well as to the casual workers including truck drivers during operation phase	Other facilities such as sanitation and restroom are being/will be provided to workers. Local labour will be employed during construction phase and operational phase.
11	Enterprise Social Commitment (ESC)	
	i. Adequate funds (atleast 2.5% of the project cost) shall be earmarked towards the Enterprise Social Commitment based on Public Hearing issues and item-wise details along with time bound action plan shall be included. Socio-economic development activities need to be elaborated upon	Public Hearing will be conducted and the action plan for the raised issues will be addressed in the Final EIA report.
12	Any litigation pending against the project and/or any direction/order	New Proposal. There is no litigation pending against project, if any, with direction/ order passed by any court of law against the

Sl. No	Queries	Reply
	passed by any Court of Law against the project, if so, details thereof shall also be included. Has the unit received any notice under the Section 5 of Environment (Protection) Act, 1986 or relevant Sections of Air and Water Acts? If so, details thereof and compliance/ATR to the notice(s) and present of the case	Project Proponent.
13	A tabular chart with index for point wise compliance of above TORs	A tabular chart with index for point wise ToR compliance is prepared & incorporated in the EIA report Chapter 1, Section 1.8.

1.8.2 SPECIFIC TERMS OF REFERENCE FOR EIA STUDIES FOR CEMENT PLANTS

Sl. No	Queries	Reply
I	Limestone and coal linkage documents along with the status of environmental clearance of lime stone and coal mines.	Not Applicable. There is no mining activities involved in this proposed project.
II	Quantum of production of coal and limestone from coal & limestone mines and the projects they cater to;	No power plant activity is involved hence not applicable.
III	For large cement units, a 3-D view i.e. DEM (Digital Elevation Model) for the area in 10 km radius from the proposal site.	Since a grinding plant is proposed in a small area, DEM was not done.
IV	Present land use shall be prepared based on satellite imagery. High-resolution satellite image data having 1m-5m spatial resolution like quick bird, Ikonos , IRS P-6	The thematic map of study area and land use pattern within 10 km radius based on IRS Resourcesat-2 L4FMX- 5m resolution is shown in Figure-3.21 and Figure-3.22

Sl. No	Queries	Reply
	pan sharpened etc. for the 10 Km radius area from proposed site. The same shall be use for land used /land cover mapping of the area.	
V	If the raw materials used have trace elements, an environment management plan shall also be included.	No major trace elements is found in the raw materials.
VI	Plan for the implementation of the recommendations made for the cement plants in the CREP guidelines must be prepared.	CREP guideliness are incorporated in the Section 2.9,Table 2-18.
VII	Energy consumption per ton of clinker and cement grinding.	Complied
VIII	Provision of waste heat recovery boiler.	Not applicable. No waste heat recovery boilers are proposed.
IX	Arrangement for use of hazardous waste.	No hazardous waste are generated.
<p>In addition to the above, the following shall be furnished:</p> <p>The executive summary of the EIA/ EMP report in about 8-10 pages should be prepared incorporating the information on following points:</p>		
I	Project name and location (Village, State, Industrial Estate if applicable)	Noted and addressed in Executive Summary
II	Products and capacities. If expansion proposal then existing products with capacities and reference to earlier EC.	Noted and addressed in Executive Summary
III	Requirement of land, raw material, water, power, fuel, with source of supply (Quantitative).	Noted and addressed in Executive Summary

Sl. No	Queries	Reply
IV	Process description in brief, specifically indicating the gaseous emission, liquid effluent and solid and hazardous wastes.	Noted and addressed in Executive Summary
V	Measures for mitigating the impact on the environment and mode of discharge or disposal.	Noted and addressed in Executive Summary
VI	Capital cost of the project, estimated time of completion.	Noted and addressed in Executive Summary
VII	Site selected for the project – air quality, surface and ground water quality near by (in 2-3 km.) water body, population, with in 10km other industries, forest, eco-sensitive zones,accessibility,(note-in case of industrial estate this information may not be necessary)	Noted and addressed in Executive Summary
VIII	Baseline environmental data – air quality, surface and ground water quality, soil charecteristic, flora and fauna, socio-economic condition of the nearby population.	Noted and addressed in Executive Summary
IX	Identification of hazards in handling, processing and storage of hazardous material and safety system provided to mitigate the risk.	Noted and addressed in Executive Summary
X	Likely impact of the project on air, water, land, flora-fauna and nearby population	Noted and addressed in Executive Summary

Sl. No	Queries	Reply
XI	Emergency preparedness plan in case of natural or in plant emergencies.	Noted and addressed in Executive Summary
XII	Issues raised during public hearing (if applicable) and response given.	Noted and will be addressed in Executive Summary after completion of public hearing
XIII	CSR plan with proposed expenditure.	Noted and addressed in Executive Summary
XIV	Occupational health measures.	Noted and addressed in Executive Summary
XV	Post project monitoring plan.	Noted and addressed in Executive Summary
Besides the above, the below mentioned general points should also be followed:		
I	A note confirming compliance of the TOR, with cross referencing of the relevant sections / pages of the EIA report should be provided.	Complied
II	All the documents may be properly referenced with index, page numbers and continuous page numbering.	Complied
III	Copy of permission related to port facility, Desalination plant, wind mill / solar power plant from competent authority,	Not applicable
IV	Where data are presented in the report especially in tables, the period in which the data were collected and the sources should be indicated.	Complied
V	While preparing the EIA report, the instructions for the proponents and instruction for the	Complied

Sl. No	Queries	Reply
	<p>consultants issued by MoEF vide O.M. No. J- 11013/41/2006-IA.II(I) dated 4th August 2009, which are available on the website of this ministry should also be followed.</p>	
VI	<p>The consultants involved in the preparation of EIA/ EMP report after accreditation with Quality council of India (QCI) / National Accrediation Board of Education and Training (NABET) would need to include a certificate in this regard in the EIA/EMP reports prepared by them and data provided by other organisation / laboratories including their status of approvals etc. In this regard circular no F. No.J-11013/77/2004-IA-II(I) dated 2nd December, 2009, 18th March 2010, 28th May 2010, 28th June 2010, 31st December 2010 & 30th September 2011 posted on the Ministry's website http://www.moef.nic.in/ may be referedAfter preparing the EIA (as per the generic structure prescribed in Appendix – III of the EIA Notification , 2006) covering the above mentioned points, the proponent will take further necessary action for obtaining environmental clearance in accordance with the</p>	<p>Disclosure of consultant for the preparation of EIA report is mentioned inChapter-12.</p>

Sl. No	Queries	Reply
	<p>procedure prescribed under the EIA Notification , 2006.</p> <p>The final EIA report shall be submitted to SEIAA, Tamil Nadu for obtaining environmental clearance.</p> <p>The TORs prescribed shall be valid for a period of three years from the date of issue, for submission of the EIA/EMP report as per OM No.J-11013/41/2006-IA-II(I)(part) dated 29th August 2017.</p>	

A. SPECIFIC STANDARD TERMS OF REFERENCE:

Sr.No	Details	Compliance
1	The PP shall incorporate the Oliver Ridley Sea Turtle conservation measures in consultation with Wild life Warden, Chennai in the EIA Report.	Oliver Ridley Sea Turtle conservation measures in consultation with Wild life Warden that, the project site is far away(~65km) from the seashore and there is no impact on sea turtle for their laying of eggs. As if regulatory agency requested to conserve sea turtle the project proponent may undertake a hatchery for sea turtle along the sea coast under the CSR fund allocation.
2	Clear village map, FMB sketch & A Register shall be furnished.	Village map, FMB sketch and A Register are attached in Annexure-VI, Annexure-VII and Annexure-VIII.
3	Ground water for industrial purpose to be phased out in 5 years. The industry to explore possibilities to meet the Water consumption for industrial purpose through treated sewage obtained from nearest local body/rain water harvesting.	The freshwater requirement will be met from private water suppliers and also rainwater harvesting will practiced with in the industry premises.

Sr.No	Details	Compliance
4	The project proponent has to submit the reclassification certificate from unclassified land to Industrial Land for the proposed project from the competent authority.	The Land-use classification certificate and Land Deed is attached in Annexure-XI .
5	The PP shall obtain fresh water supply commitment letter and disposal of excess treated water from the local body/TWAD.	The fresh water supply commitment letter is attached in Annexure-X .
6	The PP shall furnish An Agreement for purchase of raw material.	The Agreement copy for buying raw material is attached in Annexure-XI .
7	Details of fugitive emission and control measures shall be furnished.	The fugitive emission and control measures are detailed in Chapter-4 .
8	Air modelling study shall be conducted for the CPCB parameters considering the impact on the proposed plant to the nearby village.	As per norms modeling is conducted and the details are given in Section 4.3.4, Chapter-4 .
9	CER proposal shall be furnished as per the MOEF & cc OM dated: 01.05.2018.	CER proposal will be prepared after the public hearing according various comments will arrives from public. Details are incorporated in Section 8.4 .
10	A green belt plan at thick canopy shall be furnished all along the boundary at the proposed site along with name of the species, no. of species etc.,	The name of the species incorporated in the greenbelt development plan is discussed in Section 4.7.3 .
11	The GPS co-ordinates for the boundaries at the green belt proposed & proposed project site shall be furnished separately.	The native species are planted along the boundaries of the proposed project site. The greenbelt development plan is attached in Annexure XII .

1.8.3 ADDITIONAL STANDARD TERMS OF REFERENCE

Sr. No	Details	Compliance
1	As per the MoEF&CC office memorandum F.No.22-65/2017-1A.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management Plan.	Public hearing to be conducted.
2	The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities.	The carbon sink study report is attached in the Annexure-XIII .
3	The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.	Complied
4	The Environmental Impact Assessment should study impact on standing trees and the trees should be numbered.	The proposed project land area is 1.877 ha only and also the land is barren land no agricultures activities involved previously. The percentage green belt development area is 42% and it clearly shown in Figure 2.9, Chapter 2.
5	The Environmental Impact	Eight groundwater and four surface water samples are analyzed

Sr. No	Details	Compliance
	Assessment should study on wetlands, water bodies, rivers streams, lakes and hydrological cycles	to capture the impact on the water environment, and the results are presented in Section 3.5, Chapter 3.
6	Detailed study shall be carried out through the accredited research institutions in regard to impact of proposed activity on the following	The detailed study carried out through the institutions is incorporated in the Annexure-XIV .
A	Impact on lakes and other water bodies.	
B	Soil health soil erosion, the soil physical, chemical components, microbial components& bio-diversity.	
C	Impact on the natural flow order of the water bodies & closure of the water body (River) mouths nearby the vicinity of the proposed site.	
D	Climate change leading to Droughts, Floods, etc.	
E	Pollution leading to release of Greenhouse gases (GHG), rise in Temperature, pollution, above soil & below soil carbon stock & Livelihood of the local people.	
F	Possibilities of water contamination and impact on aquatic ecosystem health.	
G	Agriculture, Forestry & Traditional practices.	
H	Hydrothermal/Geothermal effect due to destruction in the	

Sr. No	Details	Compliance
	Environment.	
I	Bio-geochemical processes and its foot prints including environmental stress	
J	Sediment geochemistry in the surface streams.	
7	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways.	Not Applicable
8	The project proponent shall furnish the details of trees in the project site with all trees numbered and protected.	The proposed project land area is 1.877 ha only and also the land is barren land, no agricultures activities involved previously. The percentage green belt development area is 42% and it clearly shown in Figure 2.9, Chapter 2.
9	The project proponent shall furnish the detailed study regarding impact on the Reserve Forests within 10-15km. (if applicable)	Not Applicable
10	The project proponent shall furnish the detailed study on health with regard to respiratory distress due to allergens on workers, impacts on wild life, surrounding agriculture/horticulture and nearby villagers.	The health check up for employess periodically will be monitored time to time and recorded after commisioning the project.
11	The project proponent shall furnish the impact around proposed grinding unit regard to raw materials transported from long distance.	Impacts due to transporation are presented in Section 4.4, Chapter 4.
12	The project proponent shall	The suitable APC measures will be provided to control the dust

Sr. No	Details	Compliance
	furnish the impact on dust pollution on the nearby habitation and livelihoods	pollution. The impact due to Air environment and mitigation measures are discussed in Section 4.3.4, Chapter 4.
13	The project proponent shall furnish the Risk assessment plan, EMP and Disaster management plan which should be prepared after thorough study. The EMP should be modified to incorporate plantation and maintenance cost for 5 years. The recurring cost should also be increased.	The risk assessment studies and environmental management plan are detailed in Chapter 7 and Chapter 10, respectively.
14	The GPS co-ordinates for the boundaries at the green belt proposed & proposed project site shall be furnished separately.	The green belt developed 42% over total area. The development is entirely focusing over native species, will be done on the periphery of the project site. The greenbelt development plan is attached in Annexure-XII .
15	Air quality modelling study shall be conducted for the CPCB primary air pollutants specified by considering the impact on the proposed plant to the nearby villages.	Resultant concentration due to increment of ground level concentration is predicted by AERMOD software and it incorporated with suitable mitigation measures in Chapter-4.

CHAPTER - 2
PROJECT DESCRIPTION

2 PROJECT DESCRIPTION

This chapter provides description of those aspects of the project (based on project feasibility study), that are likely to cause environmental effects.

2.1 TYPE OF PROJECT

The proposed cement grinding plant with 500 TPD production capacity will produce the Pozzolanic Portland Cement (PPC), Ordinary Portland Cement (OPC), and Portland Slag Cement (PSC). The proposed project facility consists of 3 ball mills such as 1 x 5 TPH and 2 x 10 TPH for grinding purpose.

Table 2-1 Production capacity

Sr. No	Products	Quantity (TPD)
1	A. PPC (Pozzolanic Portland Cement)/ B. OPC (Ordinary Portland Cement)/ C. PSC (Portland Slag Cement)	500
	Phase – I	100
	Phase – II (Upon Completion)	300
	Phase – III (Upon Completion)	500
<i>Note: A-Clinker: 65-75%, Pozzolanic Material: 15-35% and Gypsum: 3-5%, B-Clinker (90-95%), Gypsum (3-5%), Minor additional constituents (0-5%) and C-Clinker (45-65%), Granulated Blast Furnace Slag (30-50%), Gypsum (3-5%)</i>		

Note: Based on the market demand, the manufacturing of PPC, OPC & PSC will be in a phased manner.

The project activity is scheduled at item **3(b)** Category “B1” (All standalone projects of Cement grinding) and therefore requires prior Environmental Clearance under the provisions of EIA Notification, 2006 and its subsequent amendments.

2.2 NEED FOR THE PROJECT

- Under Union Budget 2017-18, US\$ 3.42 billion has been allocated to achieve government's mission of 'Housing for All by 2022.
- Cement production is reached to 337.32 million tonnes in 2018-19 and stood at 247.43 million tonnes between April-December 2019. The top 20 companies account for around 70 per cent of the total production.
- The demand of cement industry is expected to achieve 550-600 million tonnes per annum constantly by 2025 because of the expanding requests of different division's i.e. housing, commercial construction and industrial construction.
- The Government of India is strongly focused on infrastructure development to boost economic growth and is aiming for 100 smart cities. The government also intends to expand

the capacity of the railways and the facilities for handling and storage to ease the transportation of cement and reduce transportation costs. As per Union Budget 2019-20, Government is expected to upgrade 1,25,000 kms of road length over the next five years.

- M/s. Sakthipriyan Cements intends to proposed establish the cement grinding unit to cater the demand supply gap in its own humble way.

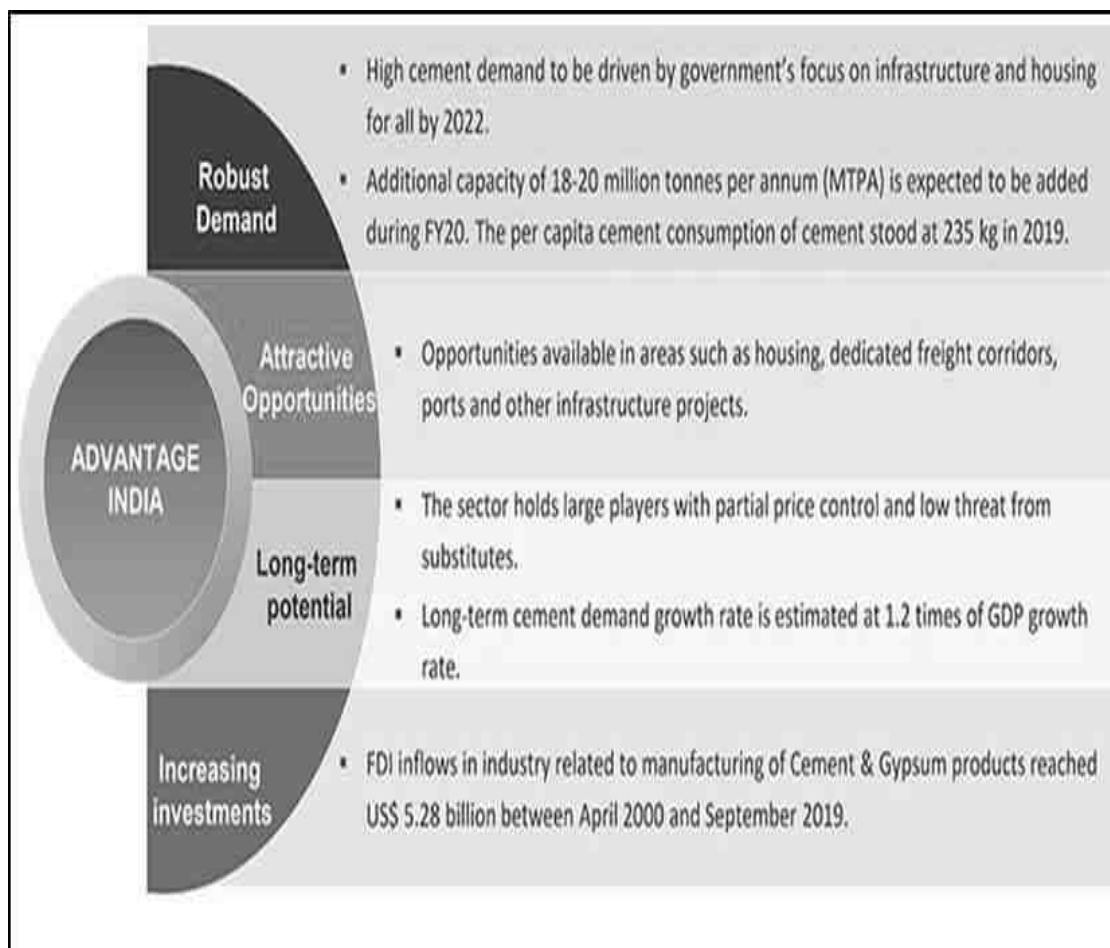


Figure 2-1 Indian Cement Industry Analysis

2.2.1 DEMAND-SUPPLY GAP

As per Indian Brand Equity Foundation (IBEF), the cement demand in India is estimated to touch 419.92 MT by financial year (FY) 2027. As India has a high quantity and quality of limestone deposits through-out the country, the cement industry promises huge potential for growth. India has a total of 210 large cement plants out of which 77 are in the states of Andhra Pradesh, Rajasthan, and Tamil Nadu. Nearly 33% of India's cement production capacity is based in South India, 22% in North India, 13% in Central and West India, and the remaining 19% is based in East India. India's cement production is expected increased at a CAGR of 5.65% between FY16-22, driven by demands in roads, urban infrastructure and commercial real estate. The consumption of cement in India is expected grow to at a CAGR of 5.68% from FY16 to FY22. As per Crisil Ratings, the

Indian cement industry is likely to add ~80 million tonnes (MT) capacity by FY24, the highest since the last 10 years, driven by increasing spending on housing and infrastructure activities. The cement production in region wise and over all cement production in India is given in **Figure 2-1** and **Figure 2-2** respectively.

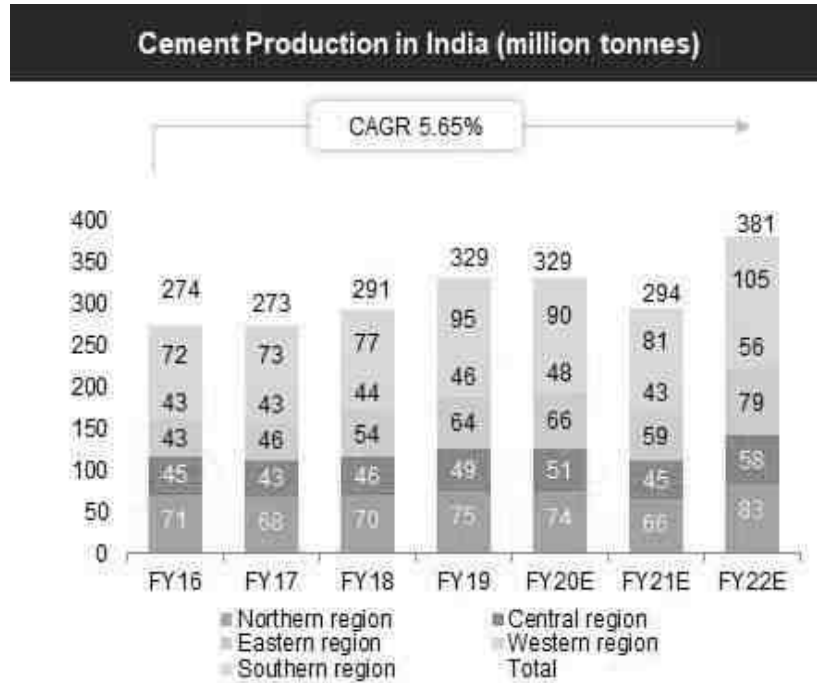


Figure 2-2 Cement Production In Region Wise

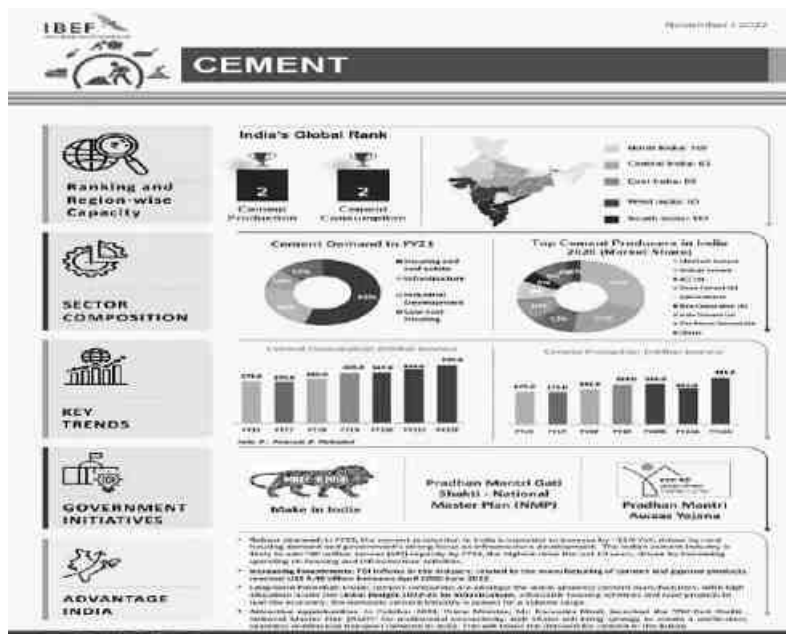


Figure 2-3 Overall Cement Production in India

2.2.2 IMPORT AND EXPORT POSSIBILITY

Proposed establishment of cement plant is expected to cater the demands of domestic market and the cement production will cater to the cement demands in the states of Tamilnadu, Kerala, etc.

apart from cement sell, SPC will use cement for its own requirements as they are big players in real estate. At present, there are no cement export possibilities.

2.3 LOCATION OF THE PROJECT

2.3.1 GENERAL LOCATION

The proposed project site is located in S.F. No:30/2,30/3&30/4, Dheevanur Village, Tindivanam Taluk, Viluppuram District, Tamil Nadu - 640 206.

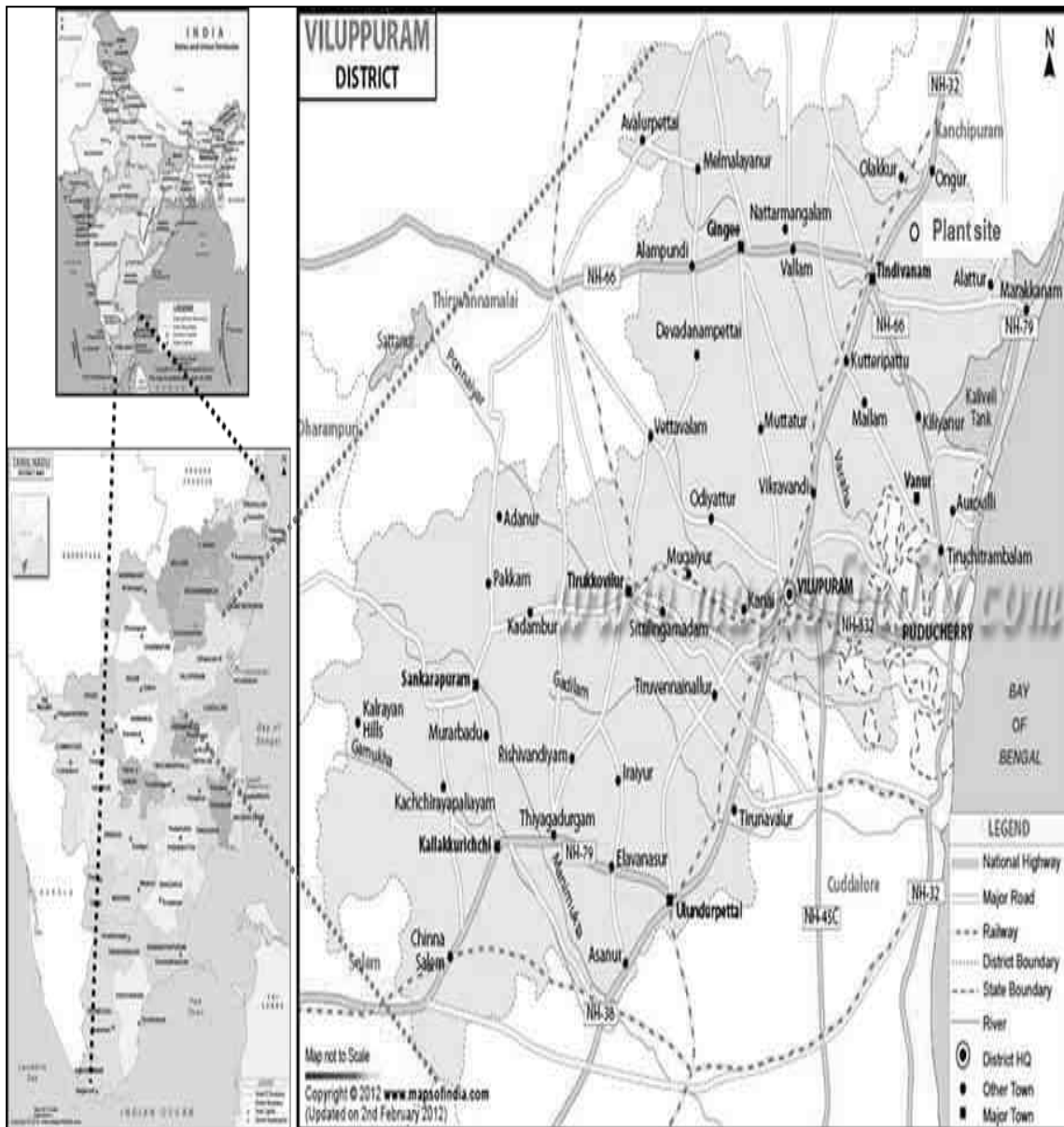


Figure 2-4 General location map

2.3.2 SPECIFIC LOCATION

The Total land area of 1.877 ha (4.64 acres) is under the Ownership of the promoter and it located at S.F.No:30/2,30/3&30/4 in Dheevanur Village, Tindivanam Taluk, Viluppuram District, Tamil

Nadu at Latitude: 12°15'39.7" N & Longitude 79°34'00.81" E. The project site falls on Survey of India Toposheet No. 57P/7, 57P/8, 57P/11 & 57P/12.

Table 2-2 Latitude and longitude of Project Site

S.No	Latitude	Longitude
1	12°15'42.88"N	79°33'58.04"E
2	12°15'42.12"N	79°34'0.15"E
3	12°15'43.01"N	79°34'0.56"E
4	12°15'42.50"N	79°34'2.28"E
5	12°15'38.00"N	79°34'0.44"E
6	12°15'37.80"N	79°34'0.64"E
7	12°15'36.86"N	79°34'0.34"E
8	12°15'37.63"N	79°33'58.34"E
9	12°15'39.10"N	79°33'58.53"E
10	12°15'39.73"N	79°33'56.08"E

Table 2-3 Site Connectivity

S. No.	Particulars	Details
1.	Nearest Railway Station	Thindivanam Station (9.9 km SE)
2.	Nearest Highway	NH 77-Gingee to Tindivanam Road (1.2 km,S) SH 136-Vanthavasi to Mayilam Road (6.8 km, E)
3.	Nearest Airport	Puducherry Airport (42.21 km, SE) Chennai International Airport (102 km,NE)

The project boundary (specific location) & project site layout are depicted below as **Figure 2-5&2-6** respectively. The site photographs were incorporated in **Figure 2-7**.



Figure 2-5 Project boundary (specific location) of the project site

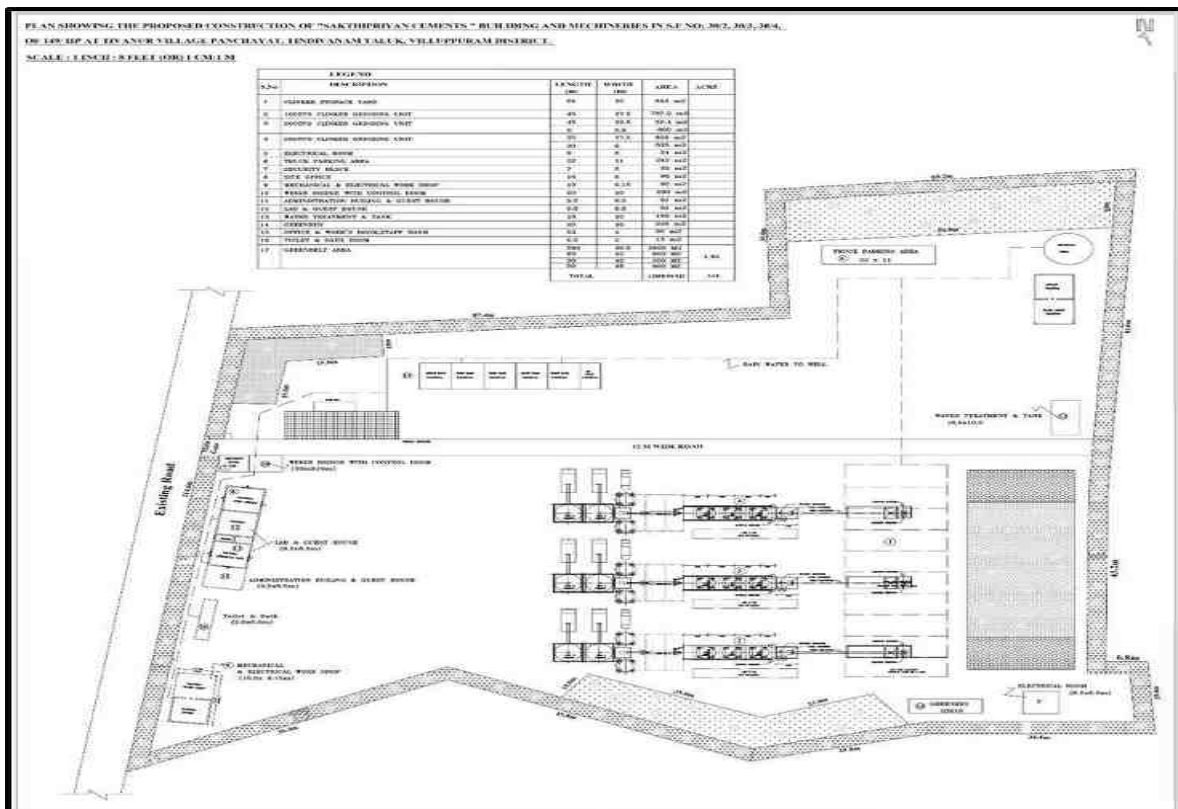


Figure 2-6 Plant site layout



Figure 2-7 Site photographs

2.4 SIZE OR MAGNITUDE OF OPERATION

2.4.1 MAGNITUDE OF PROJECT EXPANSION

Considering the solidity of equipment and the matching capacities between the different sections of the plant, the type of equipment and installation system, as well as the departmental capacities at the plant, has been carefully evaluated. A brief description of the proposed utilities and major equipment is provided in the following sections. The proposed cement grinding plant, with a production capacity of 500 TPD, will produce Pozzolanic Portland Cement (PPC), Ordinary Portland Cement (OPC), and Portland Slag Cement (PSC). The facility will include three ball mills: one with a capacity of 1 x 5 TPH and two with a capacity of 2 x 10 TPH for grinding purposes.

2.4.2 RAW MATERIALS

The daily consumption of raw materials, including clinker, gypsum, fly ash, and GGBFS/slag, for cement production is managed through storage in designated tanks. The quantities of these raw materials required, along with their sources, modes of transportation, and storage methods, are detailed in the table below:

Table 2-4 Raw material requirement

Sr.	Raw	Quantity	Location	Distance	Transportation
-----	-----	----------	----------	----------	----------------

No	Material	in TPD			
1	Clinker	200	Andhra Pradesh	532.3 Km	Closed trucks by road
2	Gypsum	25	Chennai	180 Km	Closed trucks by road
3	Fly ash	175	Chennai	180 Km	Closed trucks by road
4	GGBFS /Slag	100	Thoothukudi	420 Km	Closed trucks by road

Source: SPC

2.4.3 PRODUCTS

The proposed cement project has a total production capacity of 500 TPD. The production will be carried out in three phases: Phase I will produce 100 TPD, Phase II (upon completion) will produce 300 TPD, and Phase III (upon completion) will achieve the full capacity of 500 TPD. Each type of cement will be produced on alternate days. Details of the products for the proposed project are provided below:

Table 2-5 List of products

Sr. No	Products	Quantity (TPD)
1	PPC (Pozzolanic Portland Cement)/ OPC (Ordinary Portland Cement)/ PSC (Portland Slag Cement)	500
	Phase – I	100
	Phase – II (Upon Completion)	300
	Phase – III (Upon Completion)	200

Note: A-Clinker: 65-75%, Pozzolanic Material: 15-35% and Gypsum: 3-5%, B-Clinker (90-95%), Gypsum (3-5%), Minor additional constituents (0-5%) and C-Clinker (45-65%), Granulated Blast Furnace Slag (30-50%), Gypsum (3-5%)
Source: SPC

Note: Based on the market demand, the manufacturing of PPC, OPC & PSC will be in a phased manner.

2.5 PROPOSED SCHEDULE FOR APPROVAL & IMPLEMENTATION

The project establishment will become operational within a year after obtaining all the necessary statutory clearances. The proposed schedule for approval and implementation is outlined below:

Table 2-6 Schedule for Approval & Implementation

S. No.	Statutory Approval	Time period (from application)	Implementation
i.	Environment Clearance	8- 9 months	Current stage
ii.	CTE under Air & Water Acts	90 days	After EC
iii.	CTO under Air & Water Acts	90 days	After EC

2.6 TECHNOLOGY & PROCESS DESCRIPTION

The proposed cement grinding plant consists of 500 TPD production capacity. The cement grinding unit planned to make pozzolanic Portland cement (PPC), ordinary Portland cement (OPC) and Portland slag cement (PSC).

2.6.1 PLANT CAPACITY

Management is planning to set up a cement grinding plant with a production capacity of up to 500 TPD, which will be carried out in three phases: Phase 1 with 100 TPD (upon completion), Phase 2 with 300 TPD (upon completion) and Phase 3 with 500 TPD (upon completion), The total production capacity is 500 TPD. The plant will be equipped with the latest technological appliances to enhance quality and ensure consistent quality parameters for the cement, all while reducing power consumption.

2.6.2 CEMENT GRINDING PROCESS

The process flow diagram of cement grinding unit is given below in **Figure 2-8**.

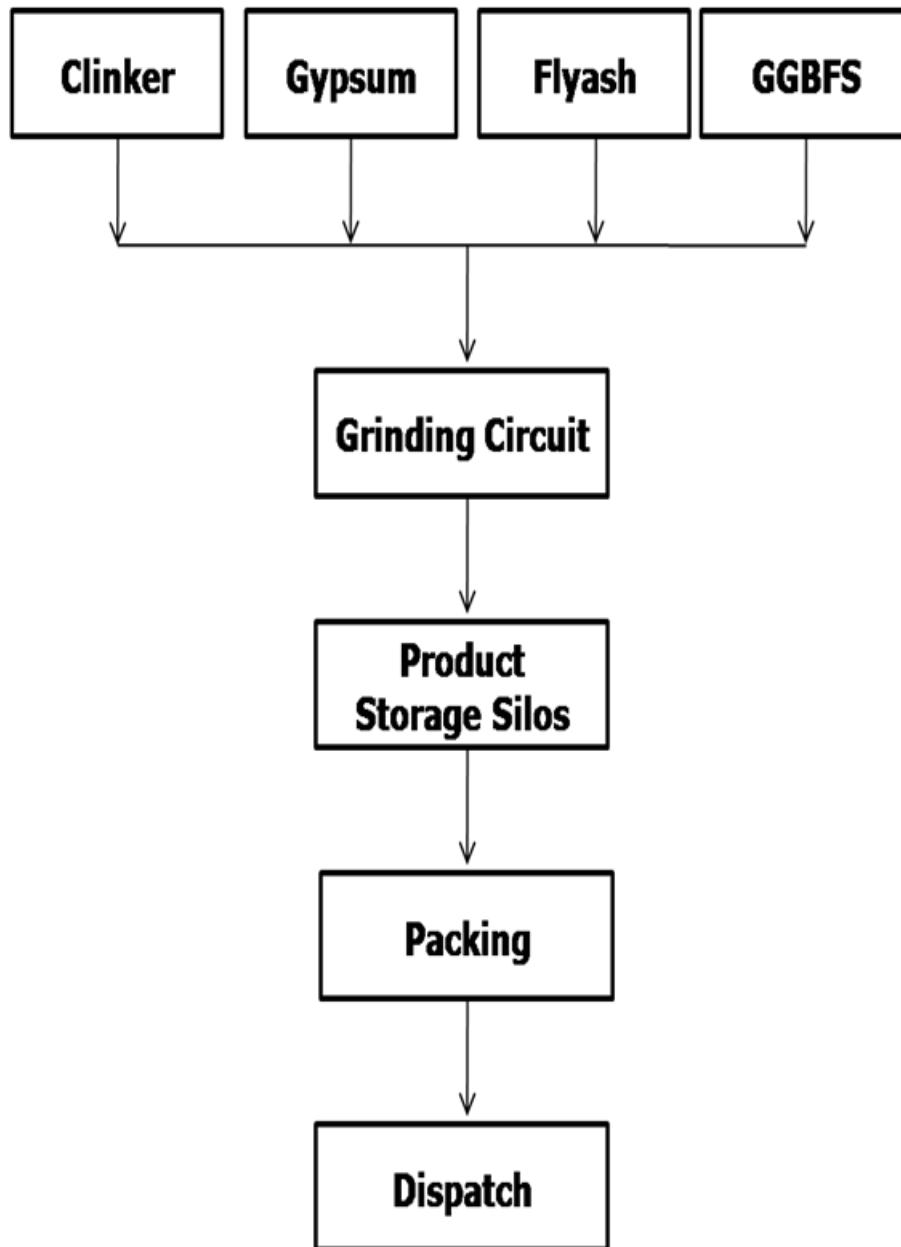


Figure 2-8 Manufacturing Process

2.6.3 MANUFACTURING PROCESS

2.6.3.1 Clinker Grinding

Clinker along with gypsum & Fly ash / GGBFS is grounded in a Ball mill. The output of a ball mill is the product - Cement (PPC / OPC / PSC – Grinding will be carried out depend upon the market requirement). A ball mill is a cylindrical shell lying horizontal which contains metallic balls and as it rotates, the crushing action of the balls helps in grinding the clinker, gypsum and / or fly ash to fine powder. The term bag house is applied to large filters containing a number of tubular bags mounted in a usually rectangular casing. The dust laden air is drawn through them by suction. The bag house is used to remove dusty particles from discharge of different equipment such as cement

mill. In a bag house system discharge gas containing dusty particles is passed through a series of bags made of strong fabrics.

During the final stage of cement production known as finish milling, the clinker is ground with other materials (which impart special characteristics to the finished product) into a fine powder. Up to 5% gypsum is added to regulate the setting time of the cement. Other chemicals, such as those which regulate flow ability or air entrainment, may also be added. The grinding process occurs in a closed system with a Dynamic air separator that separates the cement particles according to product size / fineness. Material that has not been completely ground is sent through the system again for further grinding. Two hoppers are considered; one for handling of Clinker, one for Gypsum.

2.6.3.2 Clinker and Gypsum transport & storage system

Clinker received from the plant (AM Arjun Clinker) through the closed truck shall be stored in the covered yard. Fly ash shall be received in the closed bunker and shall be pumped to the silo with the help of the root blower with high pressure air and the same time the yard and the silo is provided with the de-dusting system (The term bag house is applied to large filters containing a number of tubular bags mounted in a usually rectangular casing) Similarly the Ground Granulated Blast Furnace Slag (GGBFS) shall be handled in the one more raw material silo. The dust laden air is drawn through them by suction. The bag house is used to remove dusty particles from discharge of different equipment such as cement mill & packing section. In a bag house system discharge gas containing dusty particles is passed through a series of bags made of strong fabrics to avoid the dust nuisance and to control the pollution in and around the plant. The clinker and the gypsum are conveyed to the cement grinding section by a belt conveyor. The clinker and gypsum shall be stored in the separate hopper before feeding into the ball mill for grinding.

2.6.3.3 GGBFS storage & handling

Blended Cement manufacturing has become the need of the day, to meet present market trend and also to save ecosystems. Presently, PSC cement is produced by addition of 45-50% fly ash with the 50-55% of OPC. Facilities are proposed for PSC storage & handling which consist of unloading system from the tanker, Storage 1 X 100 T Silo, Silo extraction and conveyors feeding to separator circuit.

2.6.3.4 Fly ash storage & handling

Facilities are proposed for Fly ash storage & handling which consist of unloading system from the tanker, storage 1 x 100 T, Silo extraction and conveyors feeding to separator circuit.

2.6.3.5 Cement processing

GGBFS/Fly ash are extracted from the respective silos with measured quantity is feed to the separator elevator for separation. GGBFS/ Fly ash shall be fed to the ball mill discharge side and

feed directly to the dynamic air separator to make 100% product homogenization and to separate the oversize particle from the product particle and sent back the ball mill inlet for further grinding. Air from the cement mill vent will be de-dusted in the separator and Bag filter before being vented out to the atmosphere. The pollution is avoided as well as the valuable product is received and stored as product.

Cement from the mill will be feed into new generation, high efficiency dynamic air separator through a bucket elevator and screw conveyors. For separator, a circulation fan will be provided for the recirculation of the air required for the working for the dynamic separator for the product homogenization and size separation. The purpose of the recirculation is to avoid/prevent the product temperature and pollution control. The bag filter is provided in the re-circulation duct to vent any excess air.

Product material along with the process air from the dynamic air separator is passed through the cyclone and bag filters to separate the product from the air and transported to the cement storage silo by the set of screw conveyor. Coarse material from separator will return to the ball mill inlet for further grinding.

2.6.3.6 Cement storage

Cement is transported to storage silo by the set of screw conveyor and bucket elevator to 2 x 100 T silo & a 30-35 T silo for bulker loading. The Cement silos shall consist of feeding arrangements and de-dusting arrangement.

2.6.3.7 Cement packing

Once the production of cement is complete, the finished product is transferred using bucket elevators and set of conveyors to large storage silos in the shipping department. Most of the cement is transported in by truck in 50 kg bags. The cement can be extracted from the silos through an extraction system and metering devices. The extracted cement will be conveyed to the Packing machine. Two Electronic Stationary Packers of 15 Tons per hour (each) is considered to pack to different type of cement and the cement bags will be loaded into the truck through belt conveyors and loading stations. The stored cement shall be extracted by the set of components and shall be conveyed the automatic packing machine. The packing machine is the system that will pack the cement in the bags of 50 kg weight. The system is provided with the electronic control weighing system to control the flow of the cement from the silo to the bags, weighing up to the required level of 50 kg and shall cut off the cement flow to the bag and remove the bag from the machine and make fall on the belt conveyor leading to the truck for loading.

2.6.4 STORAGE OF RAW MATERIAL

The storages and the capacities of raw material have been is tabulated below

Table 2-7 Storage Capacities for proposed plant

Sr.No	Department	Storage - time / days
1	Clinker storage (2,000 Tons)	10 Days
2	Gypsum storage (175 tons)	7 Days
3	Fly ash Storage (75-80 Ton Silo – 1 No.)	3 Days
4	GGBFS Storage (100-110 Ton Silo – 1 No.)	2 Days
5	Cement mill Feed – Clinker Hopper	1 hour
6	Cement mill Feed - Gypsum Hopper	5 hours
7	Cement storage Silo # 1 (100-110 Ton Silo – 3 No.)	1 Day
8	Cement storage Silo # 2 (100-110 Ton Silo – 3 No.)	1 Day
9	Cement storage Silo # 3 (30-35 Ton Silo – 3 No.)	For Bulker loading arrangement

2.7 PROJECT DESCRIPTION

2.7.1 LAND

The total land area of 1.877 hectares (4.64 acres) is under the ownership of the promoter, M/s. Sakthipriyan Cements. The proposed plant site falls under unclassified land use as designated by the Directorate of Town and Country Planning (DTCP). The proposed cement grinding plant, owned by M/s. Sakthipriyan Cements, spans 1.877 hectares (4.64 acres) and features a detailed land use plan. The main facilities and admin office occupy 27.15% of the area, while raw material storage takes up 3.23%. A small section (0.15%) is designated for solid waste storage. A significant portion, 42%, is allocated for greenbelt development to enhance environmental sustainability. Internal roads cover 8.08% of the area, and the remaining 19.39% is reserved as open space for future use or expansion. The internal land use breakup of the unit is detailed below:

Table 2-8 Land use break up

Sr. No	Plant Facilities	Area(ha)	Area (acres)	Percentage (%)
1	Plant Facilities Including Admin office etc.,	0.509	1.26	27.15
2	Raw Material Storage Area	0.063	0.15	3.23
3.	Solid waste storage area	0.002	0.007	0.15
4	Greenbelt development	0.789	1.95	42.00
5	Internal Road	0.153	0.373	8.08
6	Open Area	0.361	0.9	19.39
	Total	1.877	4.64	100

The land had been conversion under the process of Industrial use and is bought by M/s Sakthipriyan Cements for the purpose of establishing a mini cement plant.

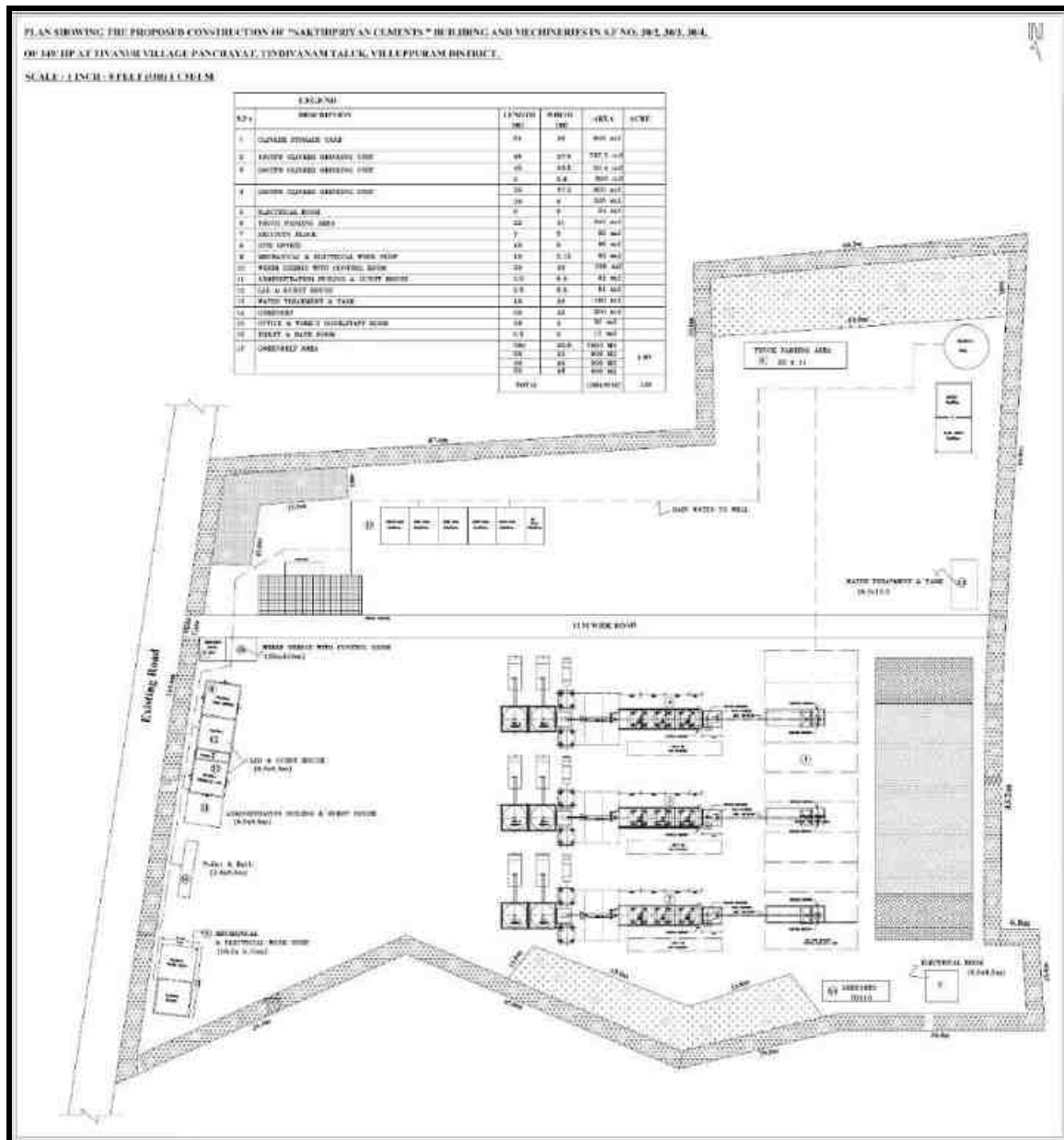


Figure 2-9 Plant layout

2.7.2 DETAILS OF PROCESS & MACHINERY

Table 2-9 Details of machinery

Sr.No.	Particulars	Handling
1.	Gypsum handling	Gypsum will be received by trucks. It is stored in gypsum shed and is fed in pre-determined proportions to roller mills.
2.	Fly-ash Handling	Fly ash will be sourced from Chennai through trucks. Fly ash will be unloaded directly into the silo pneumatically. Adequate capacity bag filter will be provided at vent of fly ash silo.
3.	Cement grinding machinery	A ball mill will be installed. Pre-weighed quantity of clinker, slag and gypsum are extracted in definite quantity and fed to mill feed hoppers which are then be fed to cement mill for grinding.
4.	Cement storage	Cement will be extracted from silo bottom with the help of air slides,

	packing & dispatch	belt conveyors and bucket elevator. In the cement silo the cement is homogenized by fluidization method (for blending) and then extracted through specific equipment's installed and fed to semi-automatic packing plant for packing in bags. After packing in the packer machines the cement bags are loaded into trucks for onward dispatch to the customer.
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Table 2-10 Details of machinery

Sr. No	Existing
1	Mill Drive
2	Conveyor and Elevators
3	Packing Machine
4	Weighing Machine
5	Belt Conveyor
6	Classifier(for fine cement)
7	Air Compressor
8	Blending Blower
9	Loading Belt
10	Mill Motor with Gear Box
11	Ball Mill: 1 x 5 TPH and 2 x 10 TPH
12	Dust Collectors
13	Control Panel

2.7.3 WATER DEMAND

The water requirement for the proposed project will be 8.0 KLD which will be sourced from the Private supplier. Domestic consumption will be 1.35 KLD and for greenbelt activities and dust suppression will be 5.15 KLD and 1.5 KLD respectively. The water requirements for the proposed project are given below:

Table 2-11 Water Requirements

Sr.No	Particulars	Consumption (KLD)	Source
1	Domestic	1.35	Private Suppliers
2	Greenbelt	5.15	
3	Dust Suppression	1.5	
Total		8.0	

Source: SPC

2.7.4 POWER DEMAND

The power requirements for the proposed plant will be 500 KVA. The power requirements will be met from Tamilnadu Generation and Distribution Corporation Limited (TANGEDCO). Two (2)

Nos of Diesel Generator with the capacity of 125 KVA will be used, in cases of the power failure.
The Power and fuel requirement of the proposed plant is given below:

Table 2-12 Power & Fuel Requirements

Sr.No	Particulars	Quantity
1	Total(overall)	500 KVA
	Phase – I	100 KVA
	Phase – II (Usage)	100+200=300 KVA
	Phase – III (Usage)	300+200=500 KVA
2	Backup	
	DG Set – 2 no’s	125 KVA
	Fuel	
	High Speed Diesel	40 Lit/ hr /DG

Source: SPC

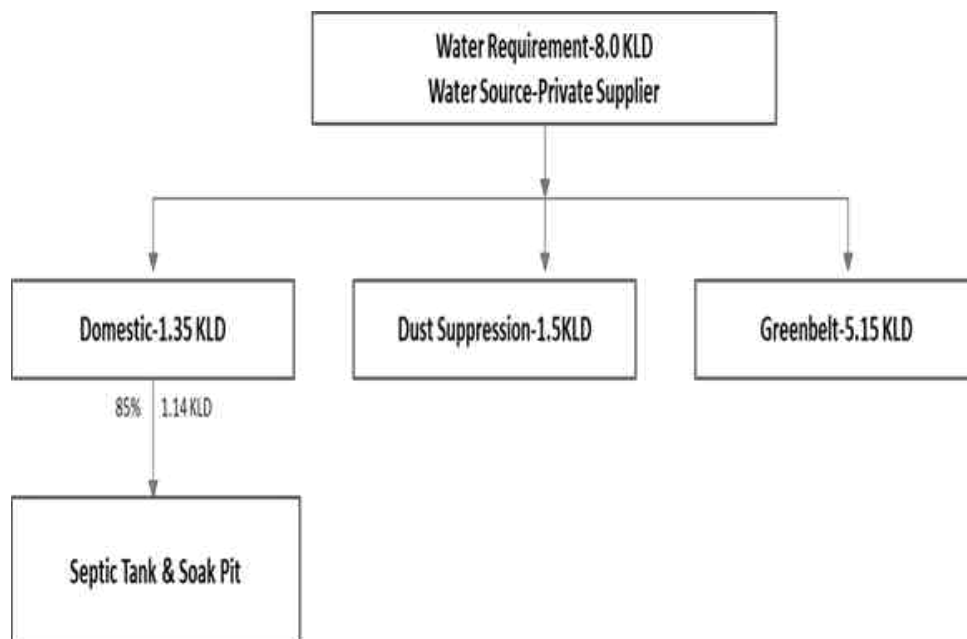


Figure 2-10 Water balance system

2.7.5 MANPOWER DEMAND

The Total manpower employed in the proposed unit will be 30 Persons as direct which includes Managers, Supervisors, Technical assistants and Skilled/semiskilled workers etc., Indirectly 20 Nos will be employed for various jobs.

2.7.6 PROJECT COST

The project cost for the proposed project is Rs. 500.0 Lakh.

2.8 DESCRIPTION OF MITIGATION MEASURES INCORPORATED TO COMPLY WITH THE ENVIRONMENTAL STANDARDS

2.8.1 AIR POLLUTION CONTROL MEASURES

2.8.1.1 Gaseous Emission

In the proposed plant the main sources of emissions will be stacks attached to the cement grinding and packing of cements. The emission of particulate matter for all the stacks will be limited to less than 50 mg/Nm³. The air emission for the proposed standalone cement grinding mill are detailed below:

Table 2-13 Stack Emission Details – Proposed Cement Grinding Plant

Parameters	Units	Stack 1	Stack 2	Stack 3	Stack 4	Stack 5	Stack 6	Stack 7
Stack attached to	-	Hopper	Hopper	Hopper	Ball mill - I	Ball mill - II	Ball Mill - III	Transfer point - I
Made of	-	M.S	M.S	M.S	M.S	M.S	M.S	M.S
Capacity	-	-	-	-	1 x 05 TPH	1 x 10 TPH	1 x 10 TPH	-
Stack Height (AGL)	m	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Stack diameter at exit	m	0.35	0.35	0.35	0.5	0.5	0.5	0.35
Cross sectional area	m ²	0.0961	0.0961	0.0961	0.196	0.196	0.196	0.096
Flue gas Temperature	°C	60	60	60	60	60	60	60
Exit Gas velocity	m/s	25	25	25	20	20	20	25
Volumetric flow rate	Nm ³ /hr	7697.61	7697.61	7697.61	14817.6	14817.6	14817.6	7689.6
Particulate matter	g/s	0.1069	0.1069	0.1069	0.2058	0.2058	0.2058	0.1069
Sulphur dioxides	g/s	-	-	-	-	-	-	-
Nitrogen oxides	g/s	-	-	-	-	-	-	-

Table 2-14 Stack Emission Details – Proposed Cement Grinding Plant

Parameters	Units	Stack 8	Stack 9	Stack 10	Stack 11	Stack 12	Stack 13	Stack 14
Stack attached to	-	Transfer point - II	Transfer point - III	Packaging section - I	Packaging section - II	Packaging section - III	DG Set – I 125 KVA	DG Set – II 125 KVA
Made of	-	M.S	M.S	M.S	M.S	M.S	M.S	M.S
Stack Height	m	8.0	8.0	8.0	8.0	8.0	6.0	6.0

Parameters	Units	Stack 8	Stack 9	Stack 10	Stack 11	Stack 12	Stack 13	Stack 14
(AGL)								
Stack diameter at exit	m	0.35	0.35	0.35	0.35	0.35	0.2	0.2
Cross sectional area	m ²	0.096	0.096	0.096	0.096	0.096	0.031	0.031
Flue gas Temperature	°C	60	60	60	60	60	196	196
Exit Gas velocity	m/s	25	25	25	25	25	18	18
Volumetric flow rate	Nm ³ /hr	7689.6	7689.6	7689.6	7689.6	7689.6	1292.0	1292.0
Particulate matter	g/s	0.1069	0.1069	0.1069	0.1069	0.1069	0.018	0.018
Sulphur dioxides	g/s		-	-	-	-	0.096	0.096
Nitrogen oxides	g/s		-	-	-	-	0.018	0.018

The source of air pollution and control equipment for the proposed plant is given below:

Table 2-15 Proposed Emission Control Equipment

Sr.No	Source of Pollution	Process of pollution	Pollutants	Control measures
1	Hopper (3 Nos.)	Storage	PM	Bag filter (3 Nos) and adequate stack height
2	Ball mill (3 Nos.) 1 x 5 TPH 1 x 10 TPH 1 x 10 TPH	Grinding	PM	Bag filter (3 Nos) and adequate stack height
3	Transfer points (3 Nos.)	Conveyor transfer section	PM	Bag filter (3 Nos) and adequate stack height
4	Packing plant (3 Nos.)	Packing operation take place	PM	Bag filter (3 Nos) and adequate stack height
5	DG Set	Combustion	PM, SO ₂ , NO _x & CO	Acoustic enclosures with adequate stack height

2.1.1.1 Fugitive Emission

The Fugitive emissions occur during the transfer of raw materials and clinker grinding. Additionally, dust is emitted from dust generation during operations such as loading, dumping, transferring, and recirculation by wind or movement of workers and machinery. The amount of dust emitted depends

on the physical characteristics of the materials. High-efficiency bag filters are considered to control these processes. The following measures have been proposed to control fugitive emissions:

- As matter of course, the clinker is dry in nature and quantity of fines is considerable, so avoid this by dry type dust extraction cum bag filter will be installed at the transfer points;
- For controlling the fugitive emissions in gypsum, the enclosure is provided at all storage locations.
- Exhaust fans are provided on the walls of the building and conveyor belt are fitted with rubber flaps and brushes for continuous surface cleaning of cement bags;
- The packing machines are provided with dust extraction arrangements;

2.1.1.2 Action Plan to limit PM Emission from all Stacks below 30 mg/Nm³

The main pollutant expected from the Cement Grinding Unit will be Particulate Matter (PM). The identified sources of Dust/PM are: Wagon Tippler, Truck unloading (Tippler), Hoppers, Storage Silos, Weigh feeders, Cement Mills, and Packers. Emissions from these sources, other than Cement Mills & Packers, would be fugitive in nature. Bag Filters are proposed to control PM emission <30 mg/Nm³. Dust collected from the Bag Filters will be recycled in the Cement manufacturing process. DG stacks will be with acoustic enclosures and stack height as per CPCB Norms. Other gaseous Pollutants like SO₂, NO_x, etc. emission will be insignificant from the Unit.

2.8.2 SOLID WASTE GENERATION AND DISPOSAL

The quantities of the solid waste generation from the proposed plant are represented in **Table 2.16**.

Table 2-16 Solid waste Generation & Disposal

Sr. No	Particulars	Quantity	Treatment and Disposal
Hazardous waste			
1	Used Oil	0.1 TPA	Used Oil will be given to authorized recyclers.
Solid wastes			
2	Total Domestic waste <ul style="list-style-type: none"> • Biodegradable • Non – biodegradable 	13.5 kg/day 8.1 kg/day 5.4 kg/day	Biodegradable: will be used as manure for green belt Non biodegradable: will be disposed to authorized vendors

Source: SPC

2.8.3 RAINWATER HARVESTING

Rainwater harvesting (RWH) system comprises components of various stages- transporting rainwater through pipes or drains, filtration and storage in tanks for reuse or recharge pits. The catchments of a water harvesting system is the surface which directly receives the rainfall and provide water to the rainwater harvesting system. The rainwater run-off from all the un-paved areas shall be routed to rainwater harvesting pits, provided at strategic locations within the project area. The first flush shall be checked from entering collection system, using diversion valves to ensure that runoff from the first spell of rain is flushed out and does not enter the system. This needs to be done since the first spell of rain carries a relatively larger amount of pollutants from the air and catchments surface.

Rainwater from paved and roof areas, landscaped, paved area and rest of the area within project premises will be harvested to ground through rainwater recharge pits. The overflow from the pits will be connected to storm water drainage system of the project area.

Run off from the plant site is calculated using rational formula;

$$Q = C \times I \times A$$

where,

Q = Run-off (cu.m/hr)

A = Catchments Area (Roof area, Landscaped area, Road & parking area)

C = Coefficient of Runoff

I = Intensity of rainfall = 100 mm/hr

The rainwater harvesting measures and quantity with regards to the various structure's in the building are presented in **Table 2-17**

Table 2-17 Rainwater Harvesting

Sr. No	Category	Area (sq.m)	Impermeability Factor	Harvestable water (Intensity x Area x Imp. Factor) cum/hr
1	Building area	5740	0.6	344.4
2	Landscaped area (Green area, Vacant area)	11500	0.3	345.0
3	Road/ Surface parking area	1530	0.9	137.7
	Total	18770	---	827.1

The constant co-efficient factor of 0.80 (for all situations) for evaporation, spillage and first flush wastage (Source: CPWD)

= 827.1 cu.m/hr x 0.80 (for all time)

= 661.6 cu.m/hr

All rainwater will be directed to two 15 KL concrete tanks for storage and reuse. Any excess flow will be diverted to percolation pits and allowed to follow its natural flow path.

The run-off from terraces, roads, paved area & greenbelt & vacant area will be diverted through storm water network to existing open well.

2.8.4 GREEN BELT DEVELOPMENT ACTIVITIES

The greenbelt area of the proposed plant will be of 0.789 ha which is 42.0 % of total area. 1500 trees/Ha i.e 1184 trees such as Neem, Teak, Gulmohar, Ber, Polyalthia, Arjuna, are the species proposed to be planted along the periphery of the industrial premises. Around 30 trees will be cut-down for the proposed project site. With the existing green cover additional greenbelt will be developed based on the suggestions of DFO and Horticulturist.

2.8.5 OCCUPATIONAL HEALTH

All efforts will be taken and followed to avoid the accidents and have a good ‘Occupational Environment’. Entry Level and Periodical Medical Examinations of the Employees will be undertaken by the Unit. The Medical Reports will be reviewed and evaluated for Occupational Health related problems.

2.9 CREP COMPLIANCE

A series of industry specific guidelines are formulated in the Charter on Corporate Responsibility for Environmental Protection (CREP) and action points are also enlisted for the Cement Industry. Plant activities will be compliance with the CREP Guidelines and it provided in **Table 2-18**.

Table 2-18 Compliance to CREP Guidelines

Sr. No	Action Points in CREP	Compliance Status
1	Implementation of standards in non-complying units	Standards and non-complying units are implemented both before and during the operation of the plants.
2	Plants in critically polluted or urban area (5 km distance outside urban boundary) will meet 100 mg/Nm ³ SPM emission and continue working to reduce the emission of particulate matter to 50 mg/ Nm ³	The plant is located in a non-critically polluted indexed area.
3	The new cement kilns to be accorded NOC/EC for complying 50 mg/Nm ³ emission limit.	This is a grinding unit, so there is no need to incorporate a kiln for cement production. Appropriate air pollution control (APC) measures will be proposed to manage emissions effectively.

Sr. No	Action Points in CREP	Compliance Status
4	CPCB will evolve load-based standards by June 2004.	The Ministry of Environment, Forest and Climate Change (MoEF&CC) has established Load Based Emission Norms, which are 0.125 kg/Tonne of Clinker for Rotary Kiln Cement Plants with and without Co-processing, and 0.5 kg/Tonne of Clinker for Vertical Shift Kiln Cement Plants. However the proposed project is Cement Grinding Unit and no clinker manufacturing, these norms do not directly apply.
5	CPCB and NCBM will evolve SO ₂ and NO _x emission standards by June 2004	This Cement Grinding Unit will operate in compliance of emission standards by June 2004.
6	Control fugitive emissions from all the raw material and products storage and transfer points by December 2003. The feasibility for the control of fugitive emissions from limestone and coal storage areas will be decided by the NTF. The NTF shall submit its recommendations within three months	All sources of dust generation in the plant will be well-designed to minimize dust emissions, and high-efficiency bag filters will be installed. Bag filters will specifically be provided for the Truck Tippler and Wagon Tippler areas. Additionally, fully covered sheds will be constructed for Gypsum and other storage areas. Silos will be installed for storage of Clinker, Fly Ash, GGBS, and Cement.
7	CPCB, NCBM, BIS and oil refineries will jointly prepare the policy on use of pet coke as fuel by July 2003.	Not applicable.
8	NTF will decide feasible unit operations/ sections for installation of continuous monitoring equipment. The industry will install the continuous monitoring systems (CMS) by December 2003.	Will be complied.
9	Tripping in Kiln ESP to be minimized by July 2003.	Not applicable.
10	Industries will submit the target date to enhance utilization of waste materials.	Complied.
11	NCBM will carry out a study on hazardous waste utilization in cement kiln by December 2003.	Not applicable.
12	Cement industry will carry out feasibility study and submit target date to CPCB for cogeneration of power by July 2003.	Not applicable.

2.10 ASSESSMENT OF NEW & UNTESTED TECHNOLOGY FOR THE RISK OF TECHNOLOGICAL FAILURE

The technology involved in the cement manufacturing project is well accepted and prevailing in recent times. There is no such need to go for an untested technology for the proposed project.

CHAPTER-3

DESCRIPTION OF ENVIRONMENT

3 DESCRIPTION OF ENVIRONMENT

3.1 INTRODUCTION

This chapter addresses the description of the existing environmental status of the study area with reference to the prominent environmental studies. The study area covers 10 km radius from the project boundary. The existing environmental setting is reviewed to know the baseline environmental conditions, which are set out with respect to climate, hydro geological, atmospheric conditions, water quality, soil quality, vegetation pattern, ecology, socio-economic profile of people, land use and places of archaeological importance. This reports incorporates the baseline data monitored by Vimta Labs Ltd for the period of **April to June 2023** and secondary data collected from various Government, Semi- Government and public Sector organizations.

3.2 TOPOGRAPHY, GEOLOGY, HYDROGEOLOGY & DRAINAGE

3.2.1 TOPOGRAPHY

Villupuram district is located in the southern Indian state of Tamil Nadu. It is situated in the north-eastern part of the state and covers an area of 7,235 square kilometres. The district is bounded by the districts of Cuddalore to the north, Kallakurichi to the west, Tiruvannamalai to the south, and Kanchipuram and Chengalpattu to the east.

The topography of Villupuram district is characterized by a mix of hills, forests, and plains. The eastern part of the district is predominantly flat, with a few low-lying hills and ridges scattered across the landscape. The western part of the district is more hilly and rugged, with several ranges of hills and valleys. In addition to its natural features, Villupuram district is also home to several historic landmarks, including the Gingee Fort, the Thiruvannamalai Temple, and the Srimushnam Temple. These landmarks reflect the rich cultural heritage of the district and attract visitors from across the region.

Topography of the Project Site

The topography of the area lies on a flat country without any major slope in the land area.

3.2.2 GEOLOGY

The geology of Villupuram district is diverse and complex, with a range of rock types and geological formations. The district is located in the eastern part of the Indian peninsula, and its geology is influenced by the tectonic processes that have shaped the region over millions of years. The oldest rock formations in Villupuram district are the Archean rocks. These rocks are found in the western part of the district and are made up of granite, gneiss, and schist. The

Archean rocks are overlain by a series of sedimentary rocks, including sandstone, shale, and limestone, which were deposited during the Proterozoic era.

In the eastern part of the district, the geology is dominated by the Cuddalore sandstone, which was deposited during the early Cretaceous period. The sandstone is overlain by a series of shale and clay layers, which were deposited during the late Cretaceous period. The Cuddalore sandstone is an important aquifer and provides water for irrigation and drinking purposes. The district is also known for its mineral resources, including limestone, quartz, feldspar, and iron ore. The limestone deposits are found in the eastern part of the district and are used for cement production. The quartz and feldspar deposits are found in the granitic rocks of Gingee and are used in the ceramics and glass industries. The iron ore deposits are found in the western part of the district and are mined for steel production. Overall, the geology of Villupuram district is complex and varied, reflecting the tectonic processes and geological events that have shaped the region over millions of years. The district's diverse geology and mineral resources have played an important role in its economic development and continue to be a key asset for the region.

Study Area

Geologically, the study area and proposed plant site is predominantly occupied by Migmatite, migmatized charnockite and biotite gneiss group. The graphical representation for geology of study area is shown in **Figure-3.1**.

3.2.3 SOILS

Villupuram district is located in the southern part of the Indian state of Tamil Nadu. The district's soils can be broadly classified into four categories: red soils, black soils, alluvial soils, and coastal soils. Red soils are the most dominant soil type in Villupuram district, covering more than 40% of the area. These soils are formed from weathered crystalline rocks and are typically deep, well-drained, and rich in iron and aluminum. They are best suited for crops like groundnut, cotton, and millets. Black soils are the second most prevalent soil type in the district and cover about 25% of the area. These soils are formed from basaltic rocks and are characterized by their high clay content, good water-holding capacity, and excellent fertility. They are ideal for growing crops like cotton, sugarcane, and pulses. Alluvial soils are found in the river valleys and cover about 20% of the area. These soils are formed from the deposition of sediment by rivers and are typically rich in nutrients. They are well-suited for paddy cultivation, as well as for growing crops like maize, vegetables, and sugarcane. Coastal soils are found along the district's coastline and cover about 15% of the area. These soils are formed from marine deposits and are

typically saline and alkaline. They are best suited for salt-tolerant crops like coconut, casuarina, and cashew. However, the dominant red and black soils are rich in nutrients and well-suited for a range of crops, while the alluvial and coastal soils offer their unique advantages for farming.

Study Area

The type of soil located in the proposed project area is red and sandy loam soil. These soils are characterized by deep, well-drained profiles with a loamy texture, but have poorly developed or absent subsurface horizons. The soil map of the study area is shown in **Figure-3.2**. The soil code and their descriptions in the study area are listed in the **Table-3.1**.

Table 3-1 Soil present in study area of 10km radius

Soil Code	Description
181	Moderately deep, moderately well drained, gravelly clay soils on gently sloping lands, slightly eroded; associated with; deep, moderately well drained, clayey soils
182	Deep, somewhat excessively drained, loamy soils on gently sloping lands, moderately eroded; associated with; shallow, well drained, clayey soils
186	Deep, well drained, clayey soils on gently sloping lands, moderately eroded; associated with; rock outcrops
220	Deep, imperfectly drained, calcareous, clayey, soils on nearly level lowlands, slightly erode
259	Very deep, moderately well drained, calcareous, cracking clay soils on nearly level lowlands, slightly eroded; associated with; very deep, moderately well drained, calcareous clayey soils

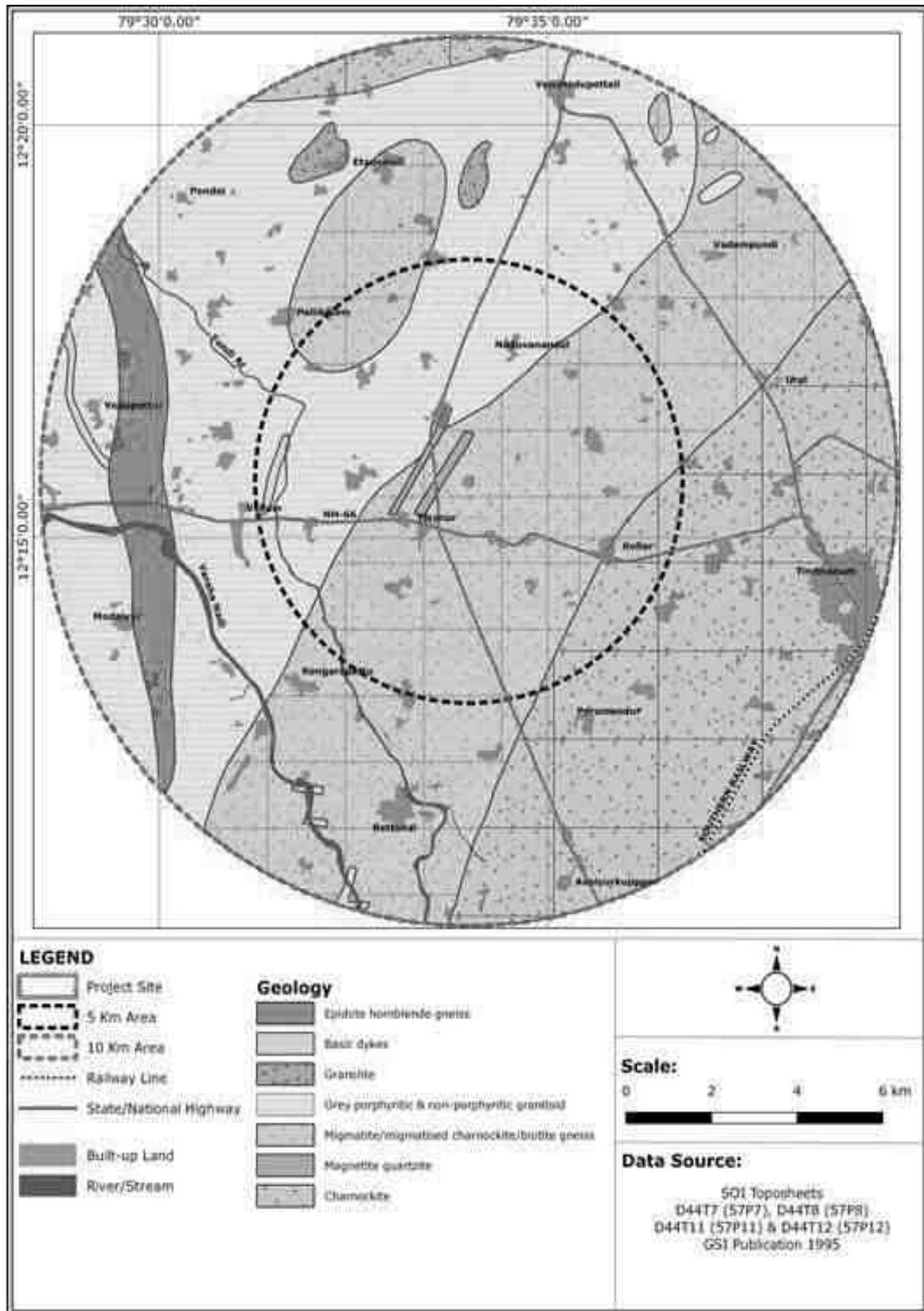
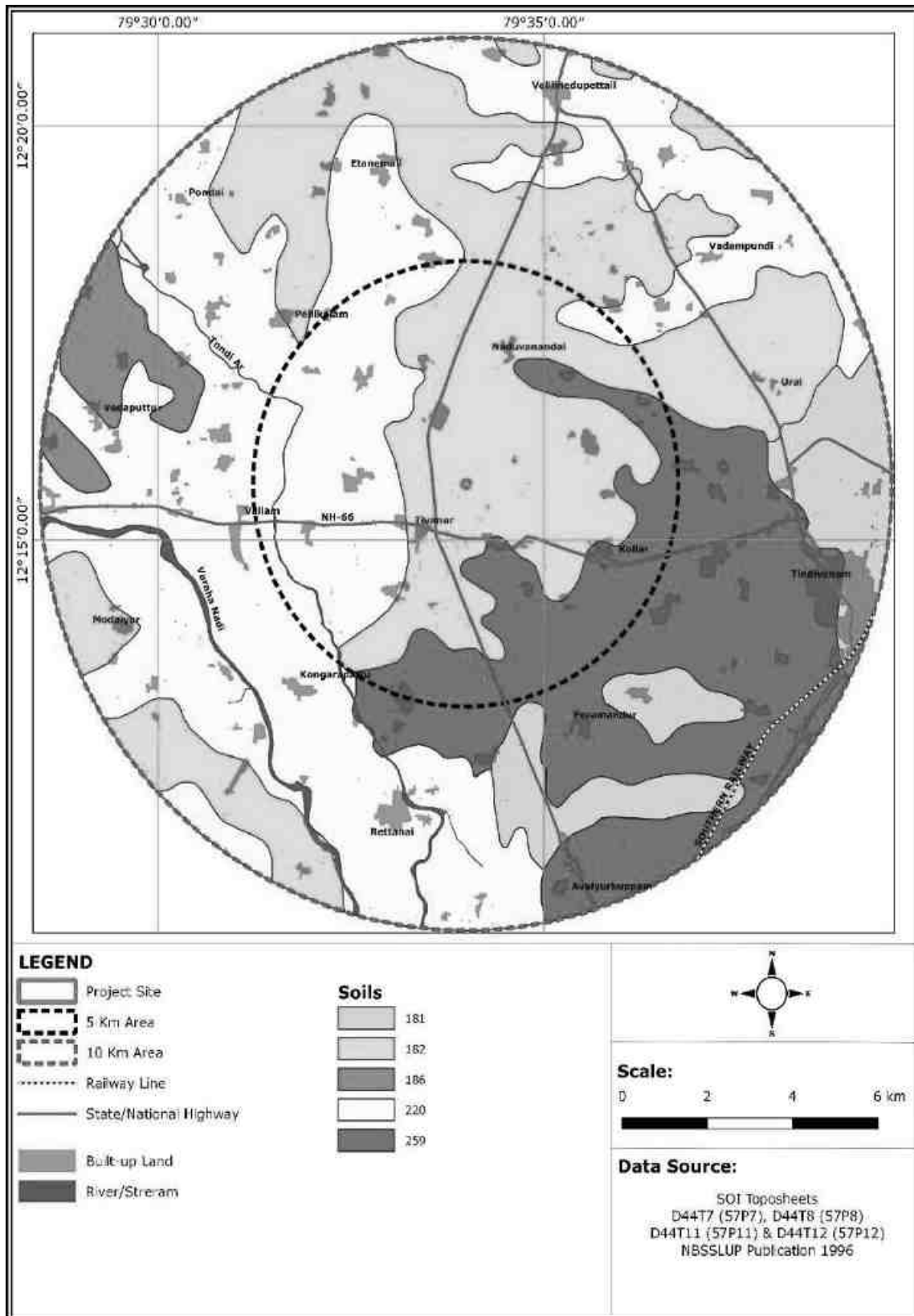


Figure 3-1 Geology in the study area of 10 km radius



Figure

3-2 Soil present in study area of 10km radius

3.2.4 HYDROGEOLOGY

3.2.4.1 GENERAL

Villuppuram district is underlain by crystalline metamorphic complex in the western part of the district and sedimentary tract in eastern side (Plate-II). The thickness of sediments exceeds 600m near southern part of the district. Groundwater occurs under phreatic and semi-confined conditions in consolidated formations, which comprises weathered and fractured granites, gneisses and charnockites whereas in unconsolidated sedimentary rocks the groundwater occurs in phreatic, semi-confined conditions.

The depth of wells varies from 6.64 to 17 m bgl and water levels in observation wells tapping shallow aquifers varied from 0.74 to 9.7 m bgl during pre-monsoon (May 2006) and it varies from 0.7 to 4.45 m bgl during post monsoon (January 2007). During pre-monsoon, the depth to water levels in the range of >2 to 5 m bgl in major part of the district, in the range of >5 -10 m bgl in western and southeastern parts of the district and range of 0-2 m bgl were recorded in two isolated pockets (Plate –III). During post monsoon the depth to water levels range of >2 to 5 m bgl exists in major part of the district, range of 0 - 2 m bgl prevails in central and northeastern parts of the district and range of >5 - 10 m bgl were recorded in two isolated pockets in the southwestern and north western parts of the district (Plate –IV).

The diameter of the well is in the range of 7 to 10 m and depth of dug wells range from 15 to 18 m bgl depending on the weathered thickness and joints. The dug wells yield up to 1 lps in summer months and few wells remains dry. The yield is adequate for irrigation for one or two crops in monsoon period. The yield of bore wells in favorable locations vary from <1 to 6 lps.

Study area

It has been observed from the hydrogeology map of the study area that the plant site is located in the granite, gneisses, charnockite. The hydrogeological conditions in the area are discontinuous unconfined to semi confined aquifers down to 50 m bgl. **Figure - 3.3** shows the hydrogeology of the Villuppuram district and **Figure - 3.4** shows the hydrogeology map of the study area of 10 km radius.

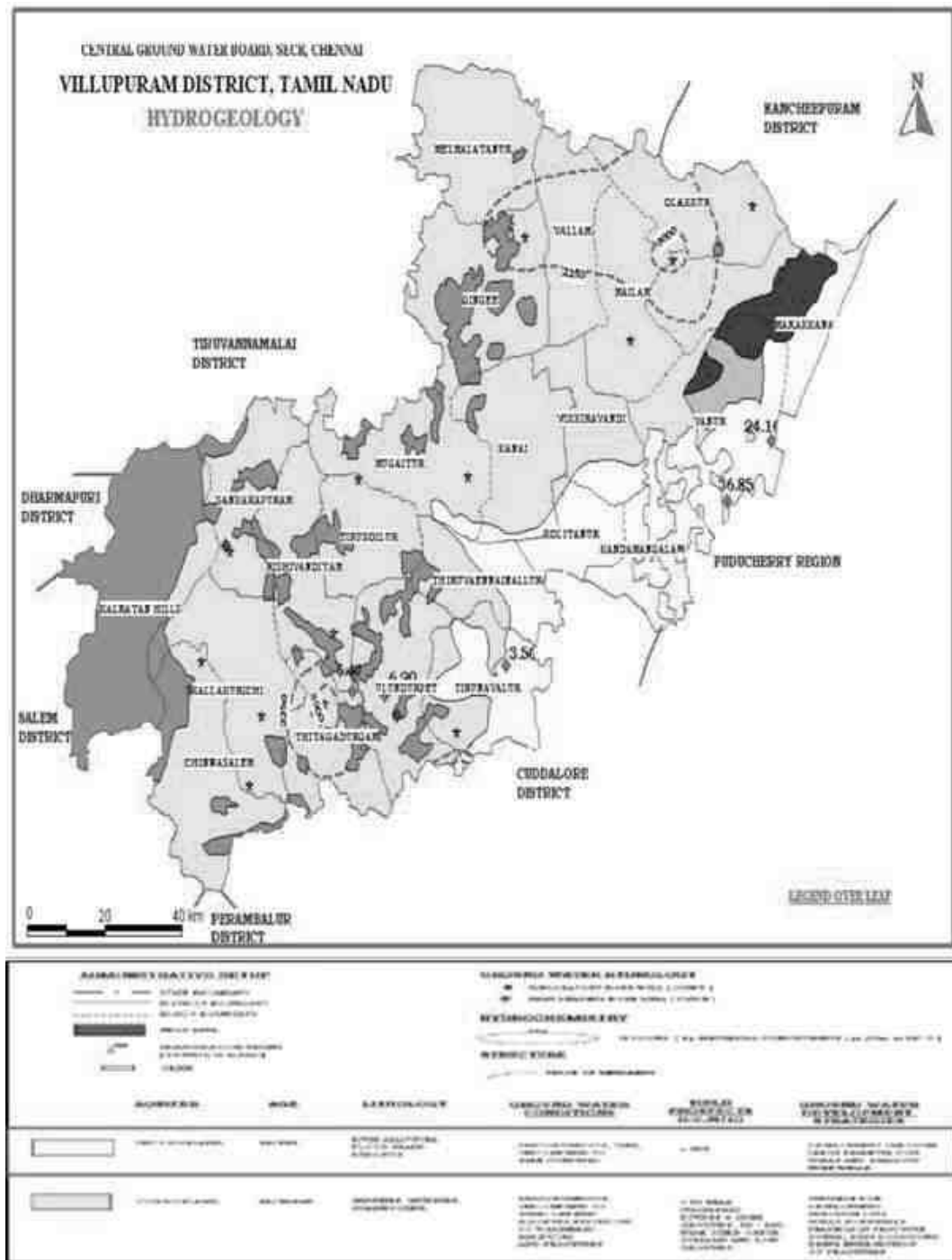


Figure 3-3 Hydrogeology of Villuppuram district

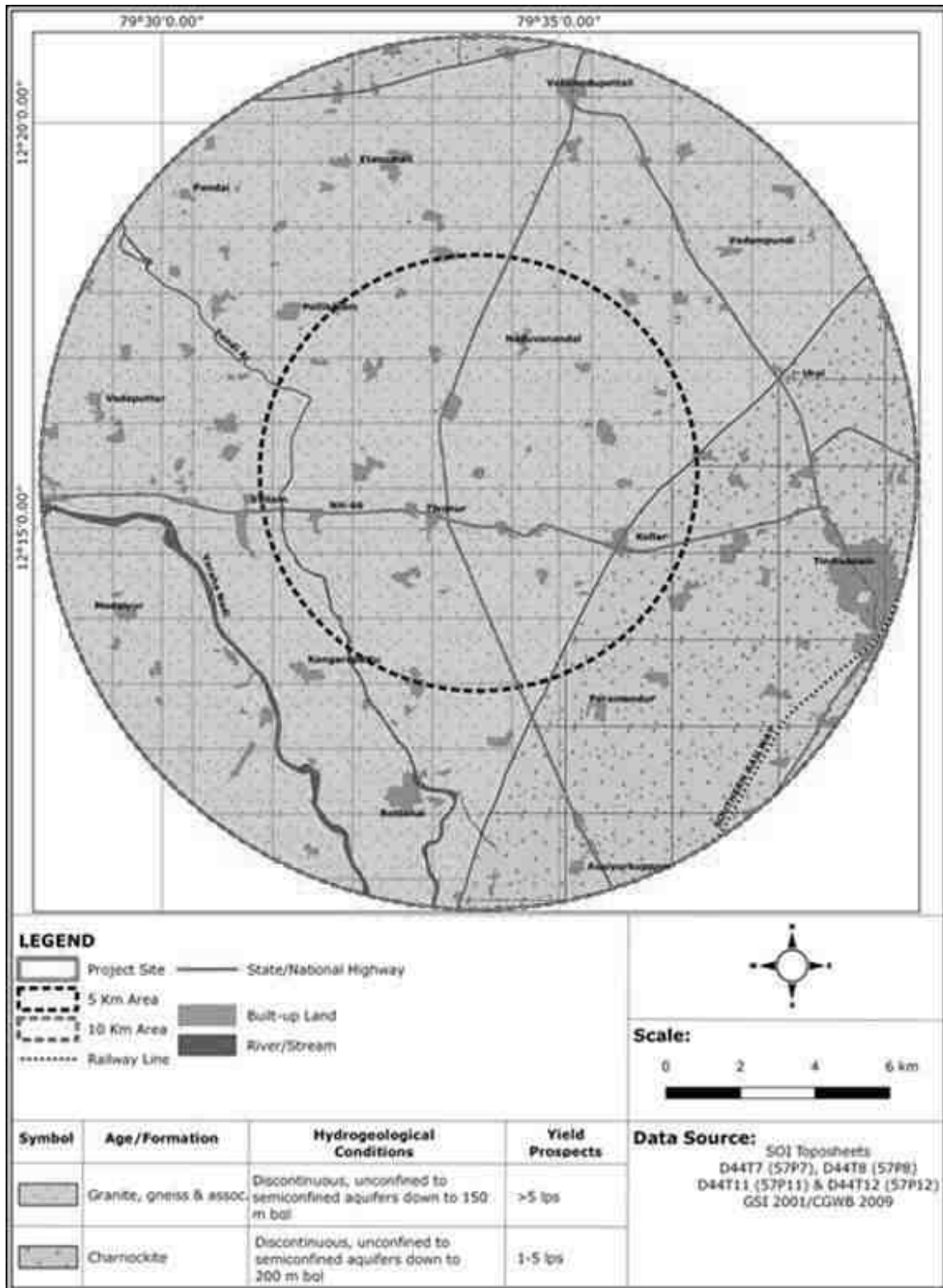


Figure 3-4 Hydrogeology in study area of 10 km radius

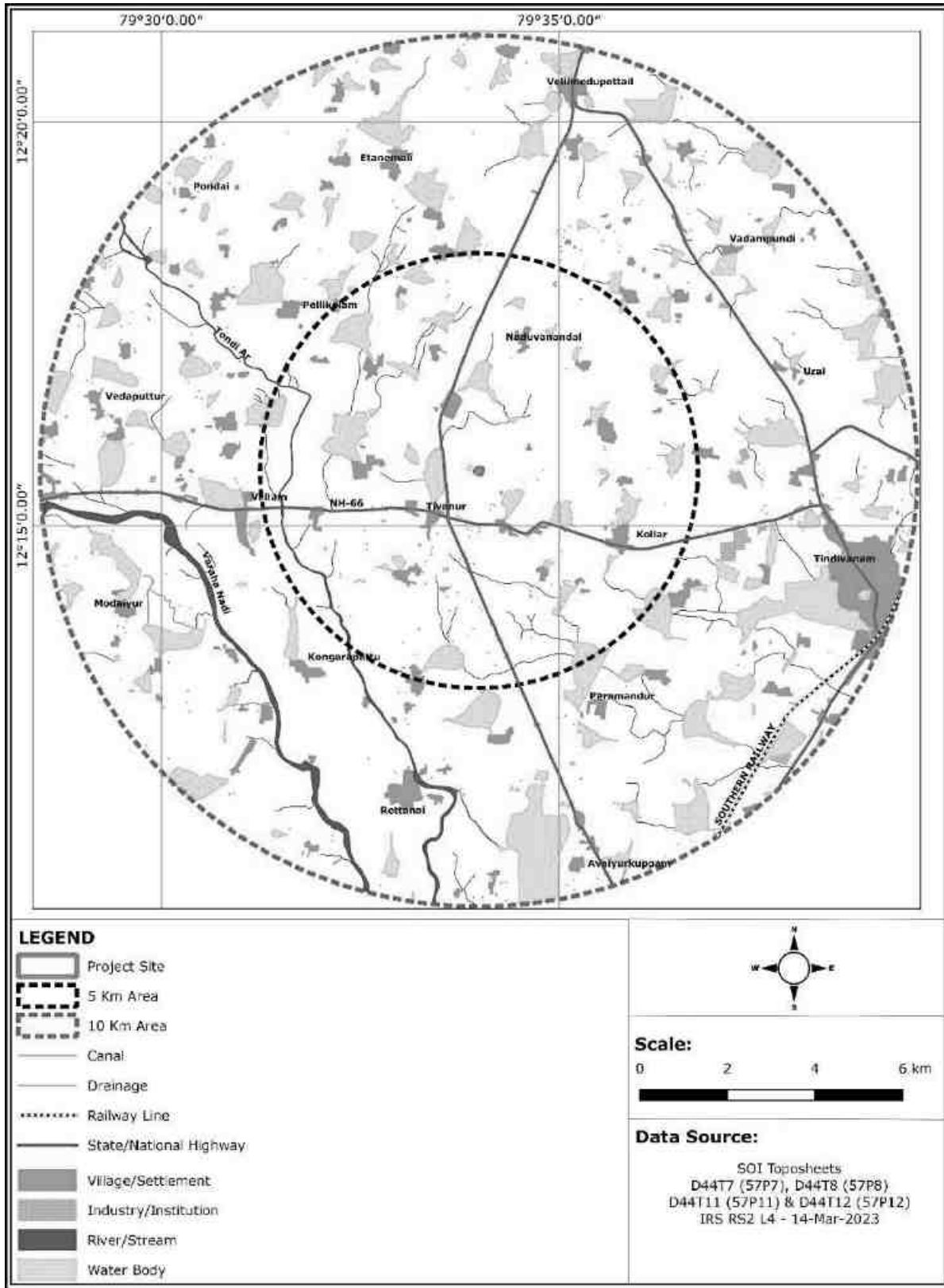


Figure 3-5 Drainage in study area of 10 km radius

3.2.5 DRAINAGE

The Ponnaiyar, the Malattar and the Gadilam are the major rivers draining the district. The Ponnaiyar River flows from northwest to east in the district. The Manimukta nadi originates in Kalrayan hills and drains the southern part of the district. The Pambaiyar and the Varaganadhi originate in the uplands of the district and join Bay of Bengal. The Varaganadhi is also known as the Gingee River and drains the parts of Gingee and Vanur taluks of this district. The Malattar and Gadilam rivers also originate in the uplands within the district and flow eastwards to Cuddalore district. All the rivers are ephemeral in nature and carry only floodwater during monsoon period. The drainage pattern is mostly parallel to sub parallel and drainage density is very low. There are small reservoirs across rivers namely Gomukha, Vedur and Mahanathur. The drainage map of the study area is shown in **Figure 3.5**

Study area

From the drainage map, it was observed that there is two rivers such as tributary river (4.31 Km, SW) and gingee river (6.71 Km, SW) are located in the 10 km project boundaries.

3.3 METEOROLOGY

The meteorological data were recorded during the study period is very useful for proper interpretation of the baseline information as well as for input to prediction models for the air quality dispersion. Historical data on meteorological parameters will also play an important role in identify general meteorological regime of the region.

On-site monitoring was undertaken for various meteorological variables in order to record the site-specific data. Data was recorded every hour continuously from **April to June 2023**. India Meteorological Department has been monitoring surface observations at Puducherry. Temperature, relative humidity, rainfall, wind speed and direction are measured twice a day viz., at 0830 and 1730 hr. The wind speed and wind direction data of IMD, Puducherry station has been obtained for the past available 10 years and processed. Data on cloud cover is compiled from the climatological tables for the IMD station at Puducherry.

3.3.1 SITE SPECIFIC METEOROLOGICAL DATA

The meteorological parameters were recorded at site on hourly basis during the study period of northeast monsoon from **April to June 2023** which comprises the parameters like wind speed, wind direction and temperature. The total rainfall was recorded daily once at 0830 hrs. The maximum

and minimum values for all the parameters except wind speed and wind direction are given in **Table- 3.2.**

Table 3-2 Summary of meteorological data generated at site

Period	Temperature (°C)		Relative Humidity (%)		Rainfall (mm)
	Max	Min	Max	Min	
April 2023	31.4	27.2	72	68	21
May 2023	32.6	27.5	73	66	66.4
June 2023	33.5	25.8	75	63	59.3

Wind Speed / Wind direction

The wind speed and wind direction data generated at site is tabulated in **Table-3.3** taking into the account the predominant wind direction. The site specific wind rose- is shown in **Figure- 3.6.**

Table 3-3 Summary of wind pattern in study area

Period	First Predominant Wind direction	Second Predominant Wind direction	Predominant Wind Speed (m/s)	Calm (%)
April to June 2023	S & SW	SW	3.1	13.6%

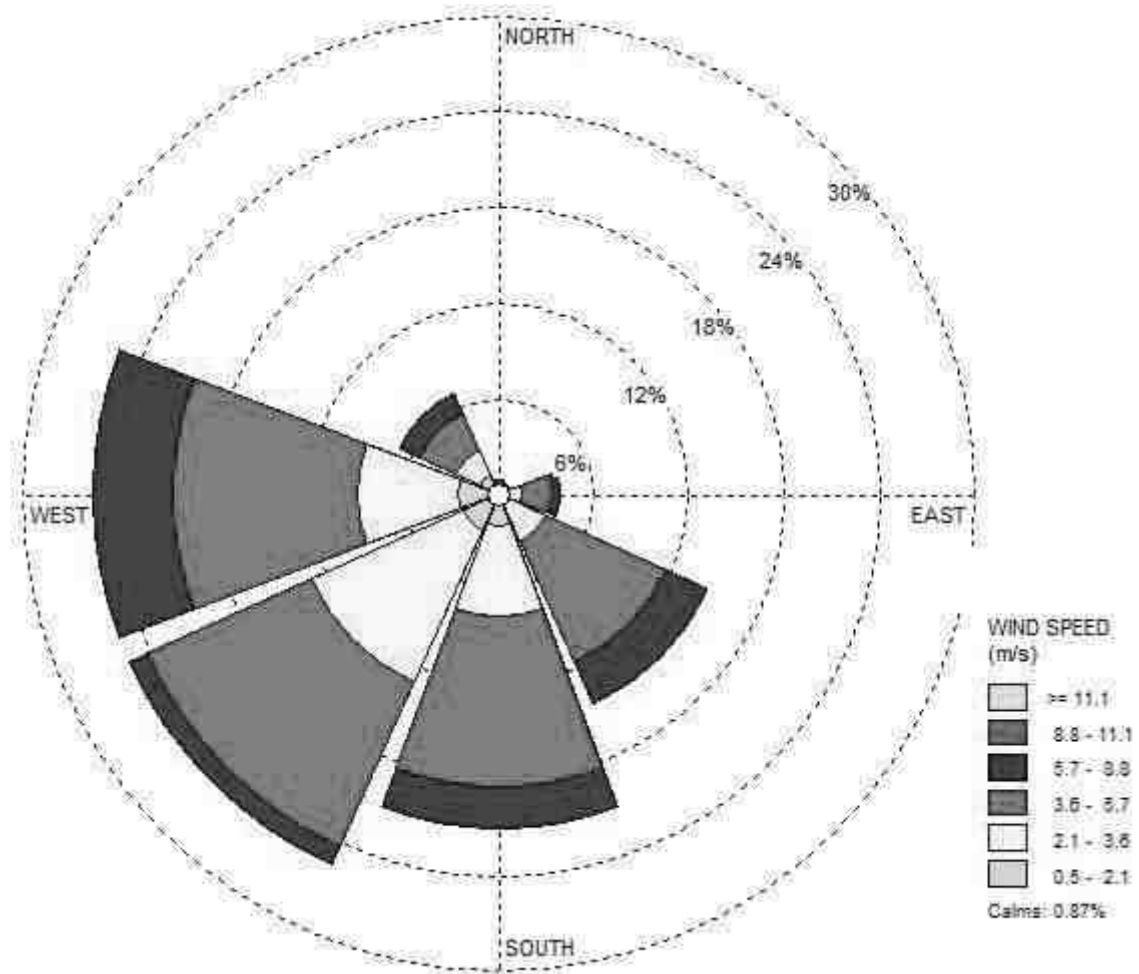


Figure 3-6 Site specific Windrose for April to June 2023

3.3.2 SECONDARY DATA FROM IMD- PUDUCHERRY

Secondary meteorological data from IMD-Puducherry has been collected for temperature, relative humidity, atmospheric pressure, rainfall, wind speed and wind direction. The data at IMD is usually recorded twice a day viz. at 0830 hr and 1730 hr.

3.3.2.1 Meteorological Data

The nearby India Meteorological Department station that is generating meteorological data is in the project site itself i.e. IMD, Puducherry. Hence, secondary information on meteorological conditions has been collected from IMD station at Puducherry.

India Meteorological Department – Puducherry Airport

India Meteorological Department has been monitoring surface observations at Puducherry. Temperature, relative humidity, rainfall, wind speed and direction are measured twice a day viz., at 0830 and 1730 hr. The data of IMD, Puducherry station has been obtained for the past available 10 years (1991-2020). Data on Cloud cover is compiled from the climatological tables for the IMD

station at Puducherry. The monthly data for all the parameters except wind speed and wind direction is presented in **Table - 3.4**.

Table 3-4: Climatological data station :IMD, Puducherry

Month	Atmospheric Pressure (mb)		Temperature (°C)		Relative Humidity (%)		Rainfall (mm)
	0830	1730	Max.	Min.	0830	1730	Monthly Total
January	1013.9	1010.8	27.7	20.6	84	72	40.5
February	1012.8	1009.5	28.8	21.0	85	71	14.9
March	1011.3	1007.4	31.1	23.2	81	71	26.5
April	1009.2	1005.1	33.1	25.8	76	74	36.9
May	1005.6	1001.4	35.9	27.3	69	71	70.1
June	1004.9	1000.9	37.1	27.1	64	63	33.8
July	1005.1	1001.7	35.5	26.2	69	60	68.1
August	1005.7	1001.9	34.8	25.6	74	67	110.2
September	1006.9	1003.3	34.1	25.2	74	70	112.3
October	1009.3	1005.5	31.6	24.2	82	76	240.6
November	1011.1	1007.9	29.2	22.5	84	77	363.4
December	1012.7	1009.8	28.0	21.3	84	74	181.1

Source: Climatological Tables of IMD (1991-2020)

3.3.2.2 Wind Speed and Direction

Generally, light to moderate winds prevails throughout the year. Winds were light and moderate particularly during the morning hours. While during the afternoon hours the winds were stronger. The seasonal and annual wind rose are shown in **Figure-3.7** to **Figure-3.8** respectively and it presented in **Table-3.5**.

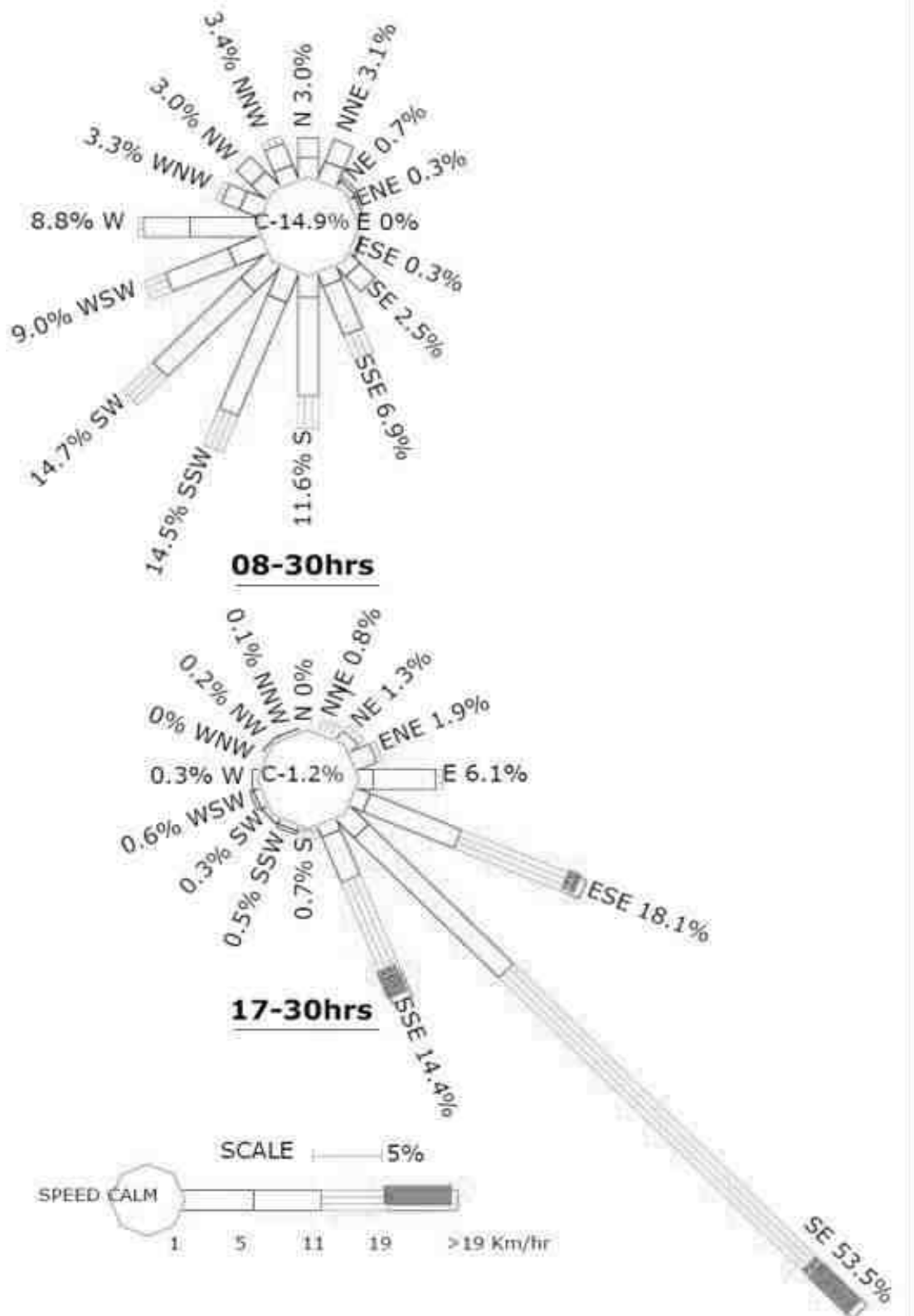


Figure 3-7 Wind rose – pre-monsoon season (IMD - Puducherry)

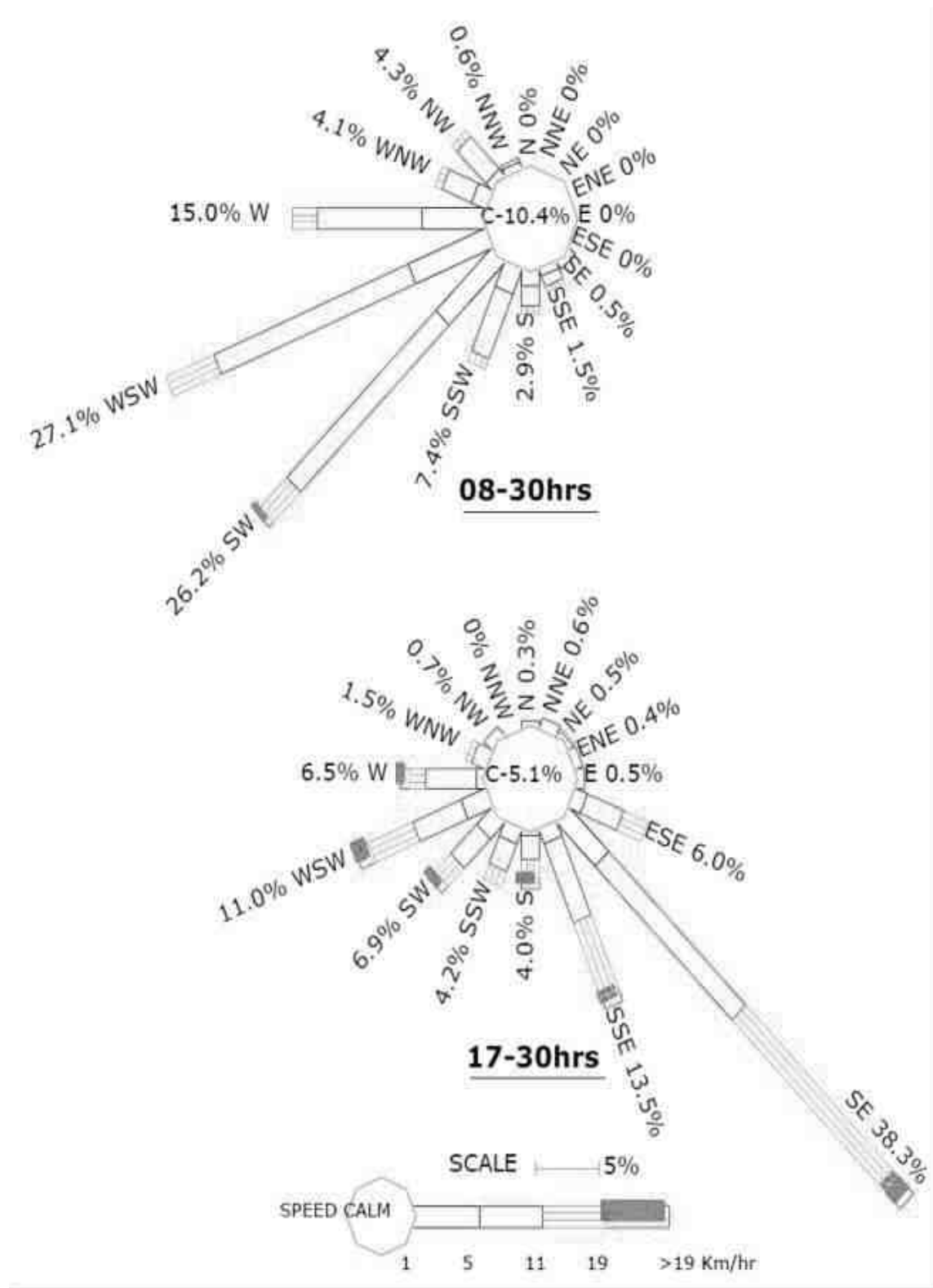


Figure 3-8 Wind rose - monsoon season (IMD- Puducherry)

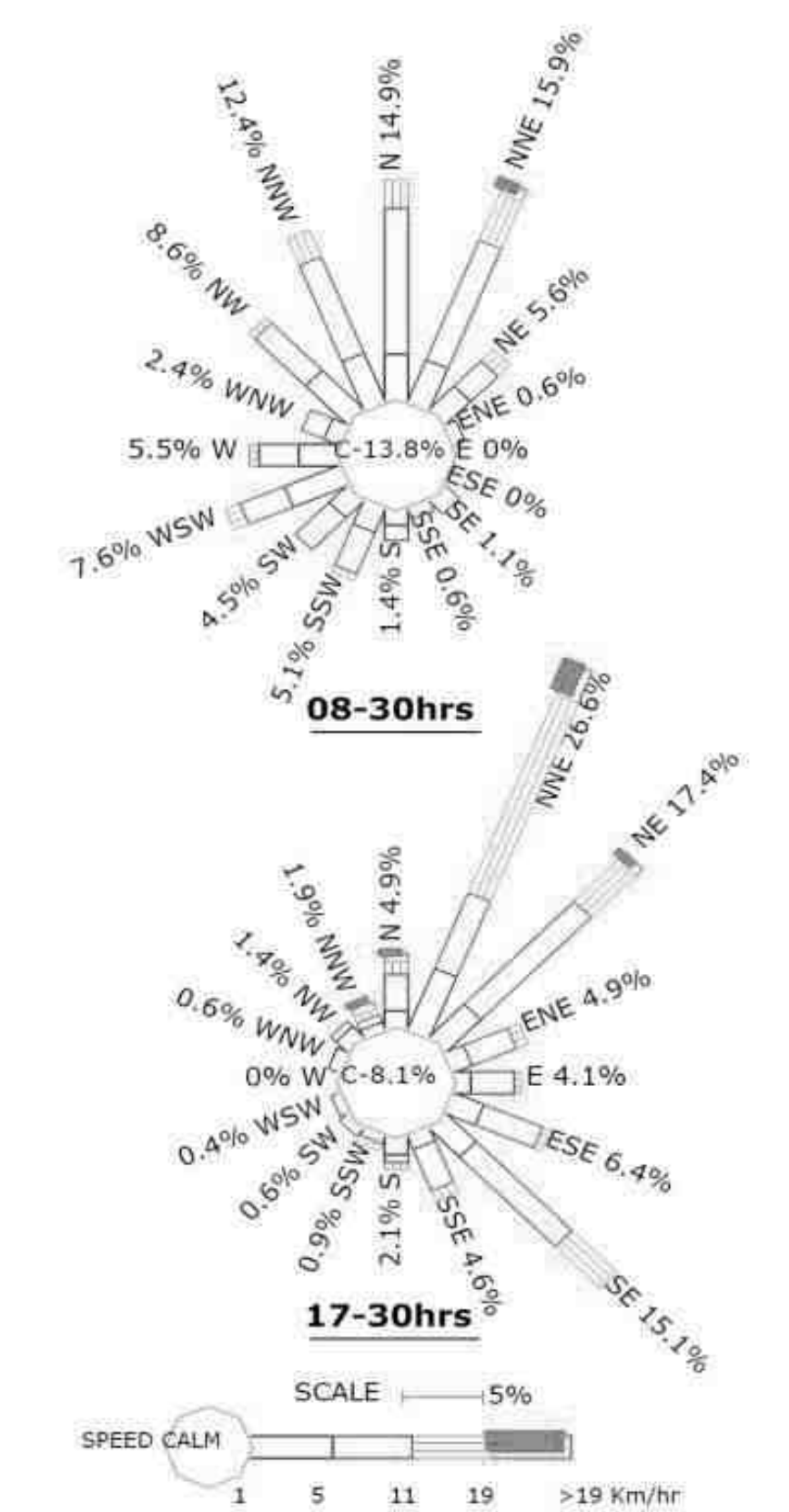


Figure 3-9 Wind rose - post monsoon season (IMD - Puducherry)

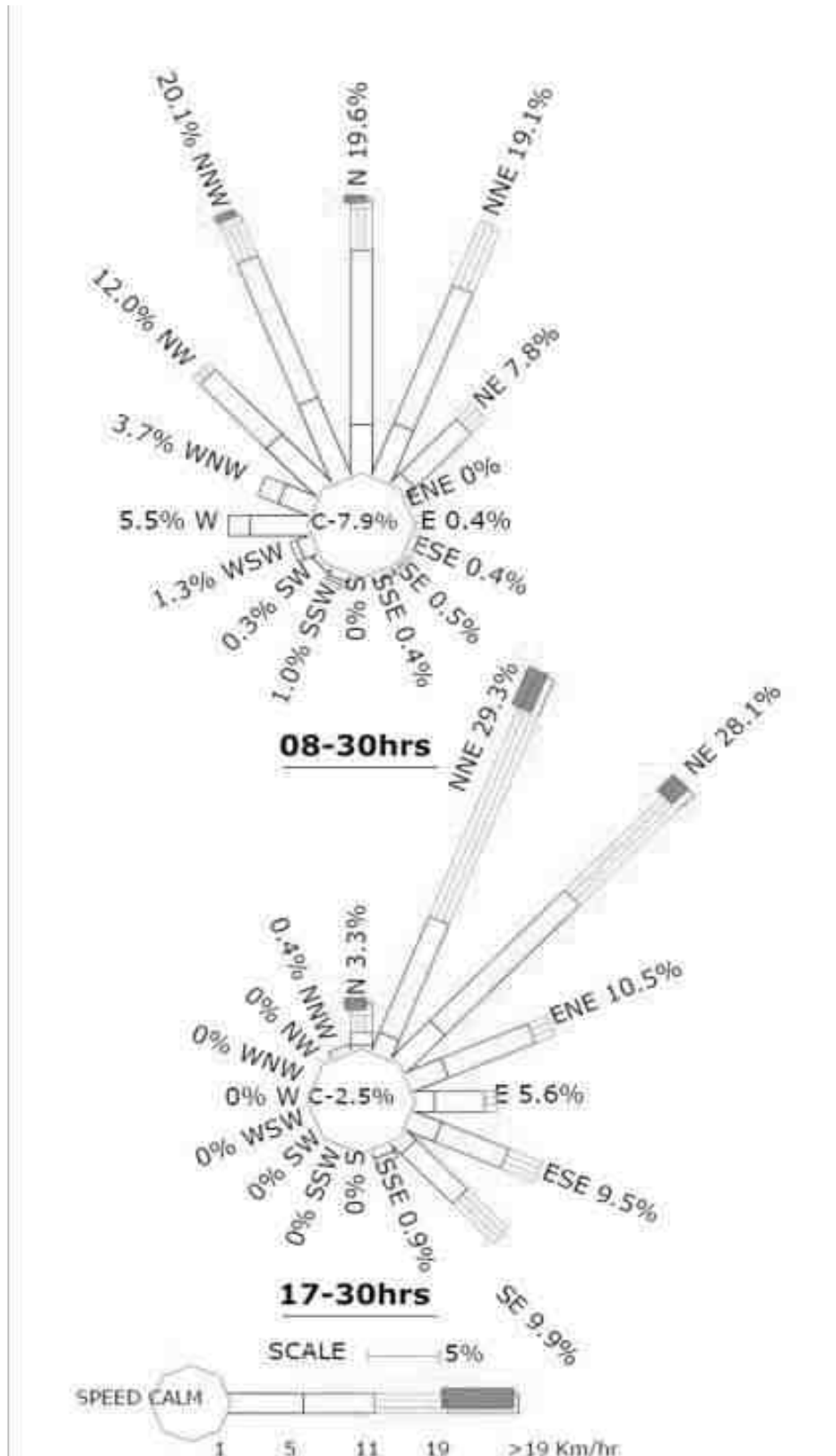


Figure 3-10 Wind rose - winter season (IMD - Puducherry)

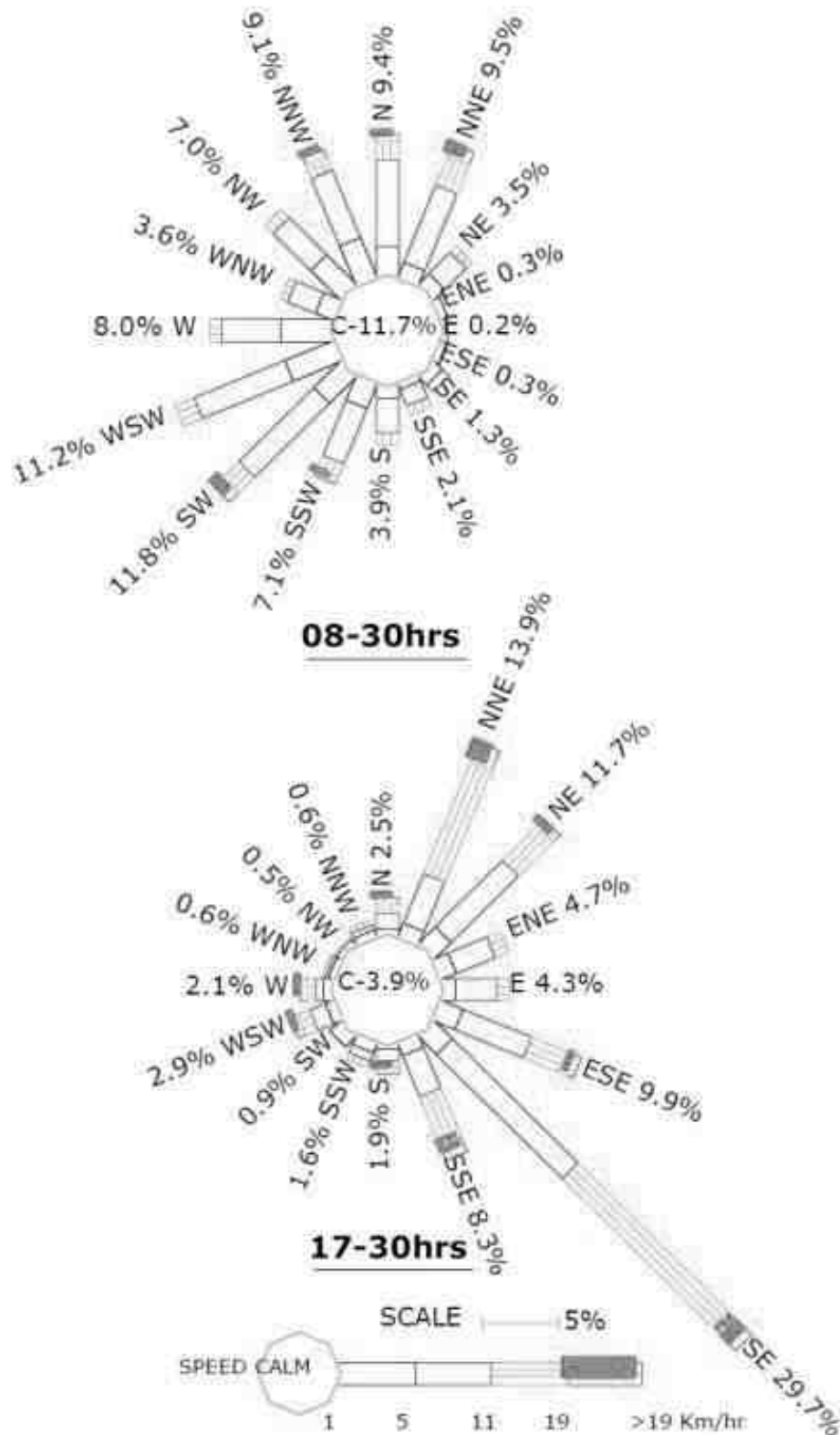


Figure 3-11 Wind rose - annual pattern (IMD - Puducherry)

Table 3-5 Summary of wind pattern – IMD, Puducherry

Season	First Predominant Winds (%)		Second Predominant Winds (%)		% Calm Condition	Predominant Wind Speed (KMPH)
	0830	1730	0830	1730		
Pre-Monsoon	SW (14.7)	SE (53.5)	SSW (14.5)	ESE (18.1)	14.9	1-19
Monsoon	WSW (27.1)	SE (38.3)	SW (26.2)	SSE (13.5)	10.4	1-19
Post-Monsoon	NNE (15.9)	NNE (26.6)	N (14.9)	NE (17.4)	13.8	1-19
Winter	NNW (20.1)	NNE (29.3)	N (19.6)	NE (28.1)	7.9	1-19
Annual	SW (11.8)	SE (29.7)	SW (11.8)	NNE (13.9)	11.7	1-19

Source: Climatological Tables of IMD, Puducherry

3.3.2.3 Comments

The India Meteorological Department (IMD) records the data two times a day viz. 0830 hr and 1730 hr, while the site- specific data has been recorded at an hourly interval. On comparison of site-specific data generated for study period vis-a-vis the IMD data, slight variations were found. The following observations are brought out:

- The temperature recorded on site when compared with the IMD, Slight variations were found. The maximum and minimum temperatures recorded at site during study period were 25.8°C and 33.5°C , whereas the maximum and minimum values recorded at IMD were 37.1°C and 20.6°C;
- The relative humidity was observed to range from 63% to 75% during the study period whereas according to IMD, Puducherry the relative humidity was observed to be in the range from 60% to 84%. No appreciable variations are found in the relative humidity in comparsion with IMD data;
- The data generated at continuous monitoring station at project site when compared with data recorded at IMD, it can be observed that the data generated at the site is broadly compatible, with regional meteorelogy, except minor variation as described above. However, the data cannot be compared on one to one basis as the two stations (IMD and project site) are away and there is elevation difference also.

3.4 AMBIENT AIR QUALITY

The existing status of ambient air quality with respect to the study area for 10 km radius distance for the proposed standalone cement grinding plant forms the baseline information. The key objective for the ambient air quality was to assess the existing air quality status for the study area. This will be helpful during the operation for the proposed standalone cement grinding unit.

The ambient air quality monitoring was conducted from **April to June 2023** for the parameters like PM_{2.5}, PM₁₀, Sulphur dioxide (SO₂), oxides of Nitrogen (NO_x), carbon monoxide (CO), Ozone (O₃), Arsenic, Nickel, Ammonia, Benzene and BaP. This portion shows the methodology adopted for the sampling location, selection of sampling location, analytical techniques and frequency of sampling.

3.4.1 METHODOLOGY ADOPTED FOR AIR QUALITY SURVEY

3.4.1.1 Selection of Sampling Locations

The baseline status of the ambient air quality has been assessed through a scientifically designed ambient air quality monitoring network. The design of monitoring network in the air quality surveillance programme has been based on the following considerations:

- Meteorological conditions on synoptic basis;
- Topography of the study area;
- Representatives of regional background air quality for obtaining baseline status;
- Representatives of likely impact areas

Ambient air quality stations (AAQS) were set up at eight locations with due consideration to the above mentioned points. **Table-3.6** gives the details of ambient air quality monitoring locations. The location of the selected stations with reference to the proposed plant are shown in **Figure – 3.12**.

Table 3-6 Details of ambient air quality monitoring locations

Code	Name of the Location	Distance w.r.t Proposed Plant Boundary (km)	Direction w.r.t Proposed Plant Boundary
AAQ 1	Plant site	--	--
AAQ 2	Naduvanandal	3.04	NNE
AAQ 3	Alaganalur	1.15	ENE
AAQ 4	Salai	1.6	SE
AAQ 5	Tivanur	1.34	SW
AAQ 6	Vilukkam	2.14	W

AAQ 7	Pallikolam	5.45	NW
AAQ 8	Akkur	1.74	NW

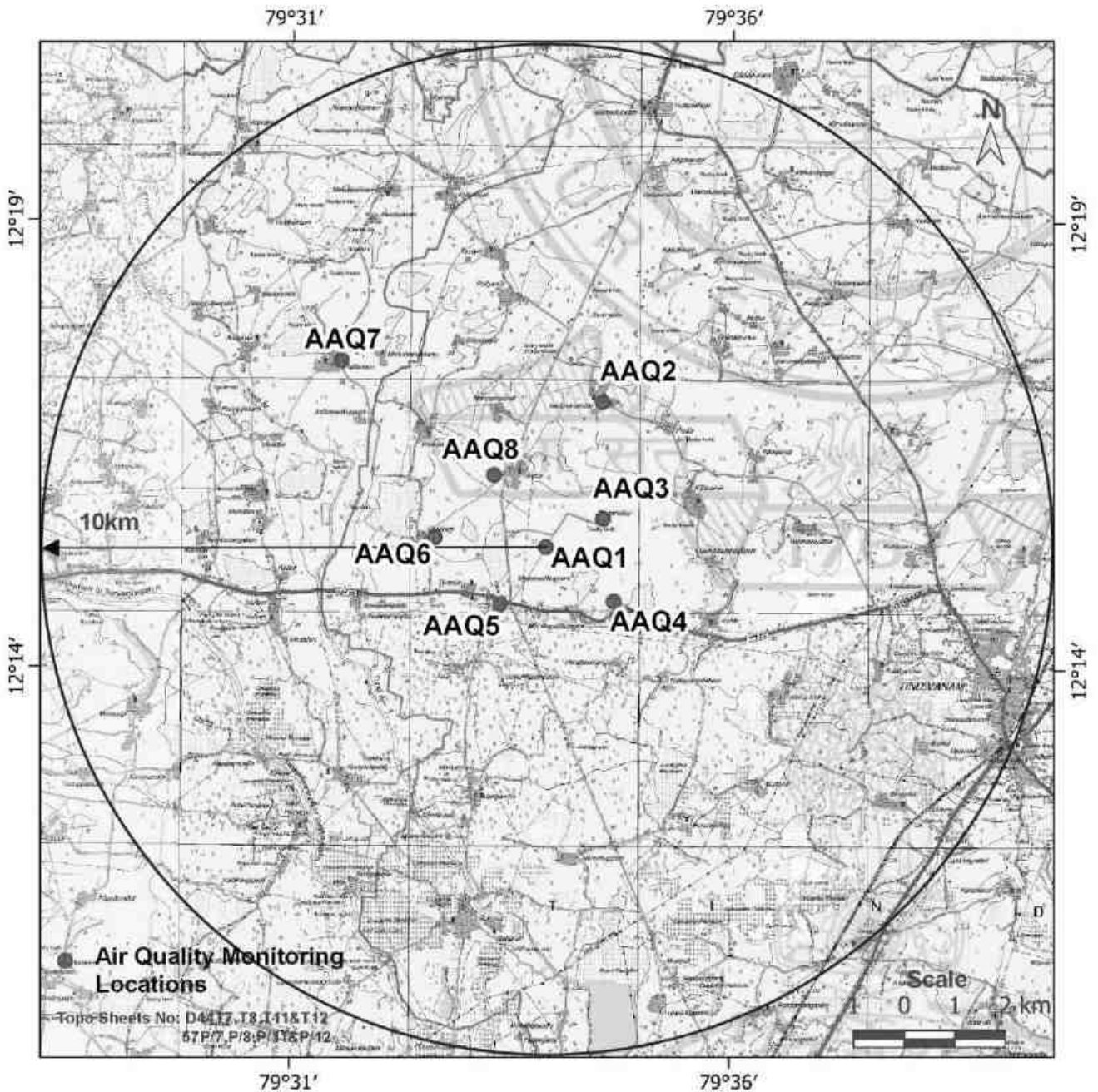


Figure 3-12 Air quality sampling location

3.4.1.2 Frequency and Parameters for Sampling

Ambient air quality monitoring was carried out at each location. The baseline data of air environment was monitored for parameters mentioned below:

- Particulate matter (PM₁₀);
- Particulate matter (PM_{2.5});

- Sulphur dioxide (SO₂);
- Oxides of Nitrogen (NO_x);
- Carbon monoxide (CO);
- Ozone (O₃);
- Arsenic (As);
- Nickel (Ni);
- Ammonia (NH₃);
- Benzene (C₆H₆); and
- BaP

3.4.1.3 Duration of Sampling

The sampling duration for PM₁₀, PM_{2.5}, SO₂ and NO_x are twenty four hourly continuous sampling per day and CO is sampled for eight hour continuous thrice a day for twice a week for the study period. This is to allow a comparison with the present revised standards mentioned in the latest Gazette Notification of the Central Pollution Control Board (CPCB) (November, 2009). The ambient air quality parameters and standards along with their frequency of sampling are given in **Table 3-7**.

Table 3-7 Monitoring parameters and frequency of samplings

Parameters	Sampling Frequency
PM ₁₀	24 hourly sample twice a week for three months
PM _{2.5}	24 hourly sample twice a week for three months
Sulphur dioxide (SO ₂)	24 hourly sample twice a week for three months
Oxides of Nitrogen (NO _x)	24 hourly sample twice a week for three months
Ozone (O ₃)	08 hourly sample twice a week for three months
Ammonia (NH ₃)	24 hourly sample twice a week for three months
Lead (Pb)	24 hourly sample twice a week for three months
Arsenic (As)	24 hourly sample twice a week for three months
Nickel (Ni)	24 hourly sample twice a week for three months
Carbon Monoxide (CO)	08 hourly sample twice a week for three months
Benzene (C ₆ H ₆)	24 hourly sample twice a week for three months
Benzo(a)Pyrene	24 hourly sample twice a week for three months

3.4.1.4 Method of Analysis

The air samples were analyzed as per standards methods specified by Central Pollution Control Board (CPCB), IS:1584 and American Public Health Association (APHA).

3.4.2 INSTRUMENTS USED FOR SAMPLING

Fine Particulate samplers APM-550 instruments have been used for monitoring particulate matter (PM₁₀), Particulate matter (PM_{2.5}) and for gaseous pollutants like SO₂ and NO₂ APM – 411TE has been used along with APM-550.

3.4.3 INSTRUMENTS USED FOR ANALYSIS

The make and model of the instruments used for analysis of the samples collected during the field monitoring are given in **Table-3.8**.

Table 3-8 Instruments used for analysis of samples

Sr. No.	Instrument Name	Make	Model	Parameters
1	Spectrophotometer	Sytronics	SP 104	SO ₂ , NO ₂
2	Electronic Balance	Sartorius	CP225D	PM ₁₀ , PM _{2.5}
3	ICP-AES	VARIAN	RLCCD	Heavy Metals

3.4.4 SAMPLING AND ANALYTICAL TECHNIQUES

The techniques used for ambient air quality monitoring and minimum detectable levels are given in **Table-3.9**

Table 3-9 Techniques used for ambient air quality monitoring

Sr. No	Parameter	Technique	Minimum Detectable Limit
1	PM ₁₀	Respirable Dust Sampling / High Volume Sampling (Gravimetric Method)	5.0 µg/m ³
2	PM _{2.5}	FRM Method/ Low Volume Sampling (Gravimetric Method)	5.0 µg/m ³
3	Sulphur dioxide (SO ₂)	Modified West and Gaeke Method	4.0 µg/m ³
4	Nitrogen di-oxide (NO ₂)	Sodium Arsenite Method	9.0 µg/m ³
5	Carbon monoxide (CO)	Adsorption and Extraction followed by GC-MS Analysis	0.0125 mg/m ³
6	Ozone (O ₃)	Spectrophotometric Method	2.0 µg/m ³
7	Ammonia (NH ₃)	Indo-Phenol Blue Method	20.0 µg/m ³
8	Benzene (C ₆ H ₆)	Adsorption and desorption followed by GC-MS analysis	1 ng/m ³
9	BaP Benzo(a)pyrene	Solvent Extraction followed by GC-MS	1 ng/m ³
10	Arsenic (As)	ICP-MS Method after sampling on EPM Filter Paper	0.2 ng/m ³
11	Nickel (Ni)	ICP-MS Method after sampling on EPM Filter Paper	0.10 ng/m ³
12	Lead (Pb)	ICP-MS Method after sampling on EPM Filter Paper	0.05 ng/m ³

3.4.5 PRESENTATION OF PRIMARY DATA

Various statistical parameters like 98th percentile, average, maximum and minimum values have been computed from the observed raw data for all the AAQ monitoring stations. The results of monitoring carried out are presented in **Annexure-III**. The summary of these results are presented in **Table 3-10**. These are compared with the standards prescribed by Central Pollution Control Board (CPCB).

3.4.5.1 Observations of primary Data

The observations based on summary of ambient air quality results are summarized below:

PM₁₀:

The minimum value of 35.6 $\mu\text{g}/\text{m}^3$ for PM_{10} were observed at Vempoondi (AAQ-6). The maximum value of 71.0 $\mu\text{g}/\text{m}^3$ was observed at Tindivanam (AAQ-7). At all ambient air quality locations, the PM_{10} levels recorded are within the specified standards of 100 $\mu\text{g}/\text{m}^3$.

PM_{2.5}:

The minimum value of 11.8 $\mu\text{g}/\text{m}^3$ for $\text{PM}_{2.5}$ were observed at Vempoondi & Maniyampattu (AAQ-6 & AAQ-8). The maximum value of 24 $\mu\text{g}/\text{m}^3$ were observed at Tindivanam (AAQ-7). At all ambient air quality locations, the $\text{PM}_{2.5}$ levels recorded are within the specified standards of 60 $\mu\text{g}/\text{m}^3$.

SO₂:

The minimum value of 5.8 $\mu\text{g}/\text{m}^3$ for SO_2 were observed at Maniyampattu (AAQ-8). The maximum value of 13.7 $\mu\text{g}/\text{m}^3$ was observed at Tindivanam (AAQ-7). At all ambient air quality locations, the SO_2 levels recorded are within the specified standards of 80 $\mu\text{g}/\text{m}^3$.

NO_x:

The minimum value of 9.20 $\mu\text{g}/\text{m}^3$ for NO_x were observed at Maniyampattu & Proposes Site (AAQ-8 & AAQ-1). The maximum value of 25.20 $\mu\text{g}/\text{m}^3$ was observed at Tindivanam village & Venmaniyathur (AAQ-7 & AAQ-3). At all ambient air quality locations, the NO_x levels recorded are within the specified standards of 80 $\mu\text{g}/\text{m}^3$.

CO:

The minimum value of 214 $\mu\text{g}/\text{m}^3$ for CO were observed at Maniyampattu (AAQ-8) and the maximum value of 335 $\mu\text{g}/\text{m}^3$ was observed at proposed plant site (AAQ-1). At all ambient air quality locations, the CO levels recorded are within the specified standards of 2000 $\mu\text{g}/\text{m}^3$. Ozone (O_3), Ammonia (NH_3), Lead (Pb), Arsenic (As) ng/m^3 , Nickel (Ni) ng/m^3 , Mercury (Hg), Benzene (C_6H_6) and Benzo(a)Pyrene (BaP) ng/m^3 are below detectable limit.

Table 3-10 Summary of ambient air quality results

Parameters		AAQ-1	AAQ-2	AAQ-3	AAQ-4	AAQ-5	AAQ-6	AAQ-7	AAQ-8	Range	CPCB Limits
PM ₁₀	Maximum	50.70	51.34	77.96	72.96	45.99	45.64	80.69	45.52	71.0 – 35.6	100 µg/m ³
	Minimum	35.60	36.02	54.70	51.20	32.27	32.02	56.62	31.94		
	Average	42.70	43.20	65.60	61.40	38.70	38.40	67.90	38.30		
	98%tile	50.45	51.04	77.50	72.8	45.73	45.37	80.23	45.25		
PM _{2.5}	Maximum	16.76	16.99	26.51	26.03	15.21	15.09	26.86	14.97	24.0 – 11.8	60 µg/m ³
	Minimum	11.76	11.92	18.60	18.26	10.67	10.59	18.85	10.50		
	Average	14.10	14.30	22.31	21.9	12.80	12.70	22.60	12.60		
	98%tile	16.66	16.89	26.36	25.87	15.12	15.00	26.70	14.88		
SO ₂	Maximum	7.7	8.3	13.4	11.9	7.6	7.5	13.7	7.0	13.7 – 5.8	80 µg/m ³
	Minimum	6.0	6.2	10.9	9.3	5.9	5.9	10.9	5.8		
	Average	7.0	7.2	12.5	10.8	6.9	6.7	12.4	6.4		
	98%tile	7.6	8.2	13.4	11.9	7.6	7.5	13.7	7.0		
NO ₂	Maximum	13.9	14.3	25.2	23.6	14.9	14.8	25.2	14.8	25.2 – 9.20	80 µg/m ³
	Minimum	9.2	11.4	20.0	16.9	9.3	9.4	20.0	9.2		
	Average	12.1	13.1	22.8	20.3	11.3	11.3	22.7	11.3		
	98%tile	13.9	14.3	25.1	23.6	14.8	14.8	25.1	14.7		
CO	Maximum	335.0	300.0	300.0	309.9	289.0	278.0	300.0	289.0	335 - 214	2000 µg/m ³
	Minimum	234.0	215.0	223.0	224.0	225.0	224.0	223.0	214.0		

	Average	295.8	247.7	248.8	255.1	243.3	241.0	248.5	243.9		
	98%tile	334.0	300.0	300.0	305.0	280.7	275.0	300.0	278.0		

Note: All values are in $\mu\text{g}/\text{m}^3$. Ozone (O_3), VOC, Ammonia (NH_3), Lead (Pb), Arsenic (As) (ng/m^3), Nickel (Ni) (ng/m^3), Mercury (Hg), Benzene (C_6H_6 and Benzo

(a) Pyrene (BaP)(ng/m^3) are below the Detectable Limit

3.5 WATER QUALITY

Water quality parameters of the ground water and surface water has been examined within 10 km radius of the study area for assessing the water environment and evaluate anticipated impact of the proposed cement grinding plant.

The purpose of this study is to:

- to examine the water quality characteristics for critical parameters;
- to analysis the impact of the water quality for the proposed plant and related activities involved.

3.5.1 METHODOLOGY

Reconnaissance survey was undertaken and monitoring locations were finalized based on:

- Drainage pattern;
- Location of residential areas representing different activities/likely impact areas; and
- Likely ares, which can represent baseline conditions.

Eight (8) ground water sources and Four (4) surface water sources covering 10-km radial distance were examined for physico-chemical, heavy metals and bacteriological paramaters in order to assess the effect of industrial and other activities on ground water. No surface water sample was taken as the study of 10-km radius has any surface water sources. The samples were analyzed as per the procedures specified in 'standard methods for the Examination of water and wastewater ' published by American public Health Association (APHA).

Samples for chemical analysis were collected in polyethylene carboys. Samples collected for metal content were acidified with 1 ml HNO₃. Samples for bacteriological analysis were collected in sterilized glass bottle. Selected physico-chemical and bacteriological parameters have been analyzed for projecting the existing water quality status in the study area. Parameters like pH and temperature were analyzed at the time of sample collection.

3.5.2 WATER SAMPLING LOCATIONS

Eight (8) ground water samples and Four (4) surface water samples were collected. These samples were taken as grab samples and were analyzed for various parameters to compare with the standards for drinking water as per IS: 10500 for ground water sources. The water sampling location in the study area are identified and given in **Table- 3.11** and shown in

Figure-3.13 and Figure-3.14. The results of the water quality monitored during the study period are given in **Table- 3.11, Table- 3.12 and Table- 3.13.**

Table 3-11 Water sampling locations

Code	Location	Distance from proposed plant Boundary (km)	Direction w.r.t proposed plant boundary
Ground water (GW)			
GW 1	Plant site	--	--
GW 2	Agoor	1.0	ENE
GW 3	Venmaniyathur	2.5	E
GW 4	Dheevanur	2.3	WSW
GW 5	Vilukkam	2.60	West
GW 6	Vempoondi	4.1	SE
GW 7	Tindivanam	8.0	E
GW 8	Maniyampattu	6.5	WSW
Surface water (SW)			
SW 1	Vilukkam Lake	2.56	NW
SW 2	Kollar Lake	3.3	E
SW 3	Tindivanam	7.0	SE
SW 4	Dheevanur Lake	1.0	N

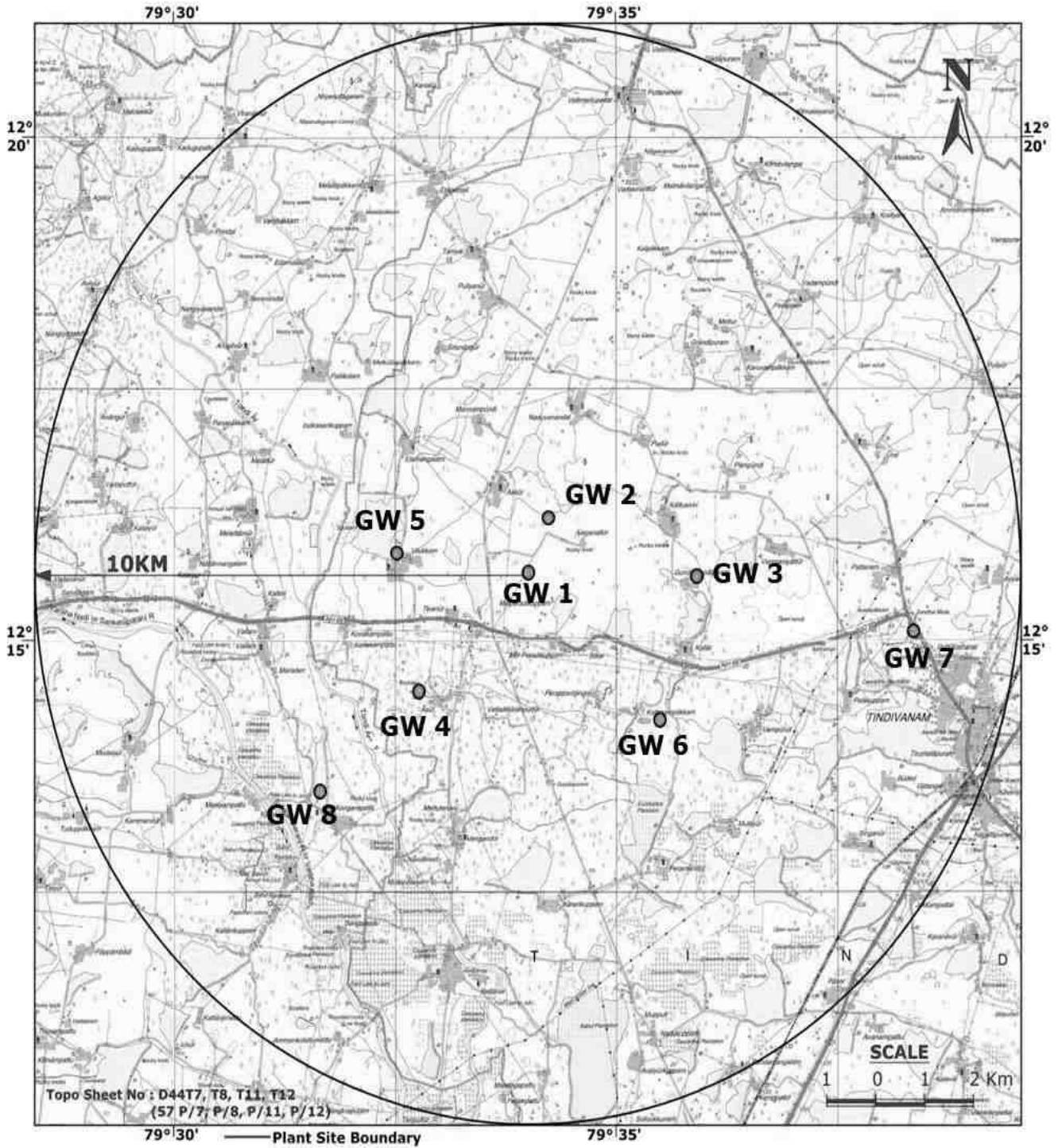


Figure 3-13 Ground water quality sampling locations

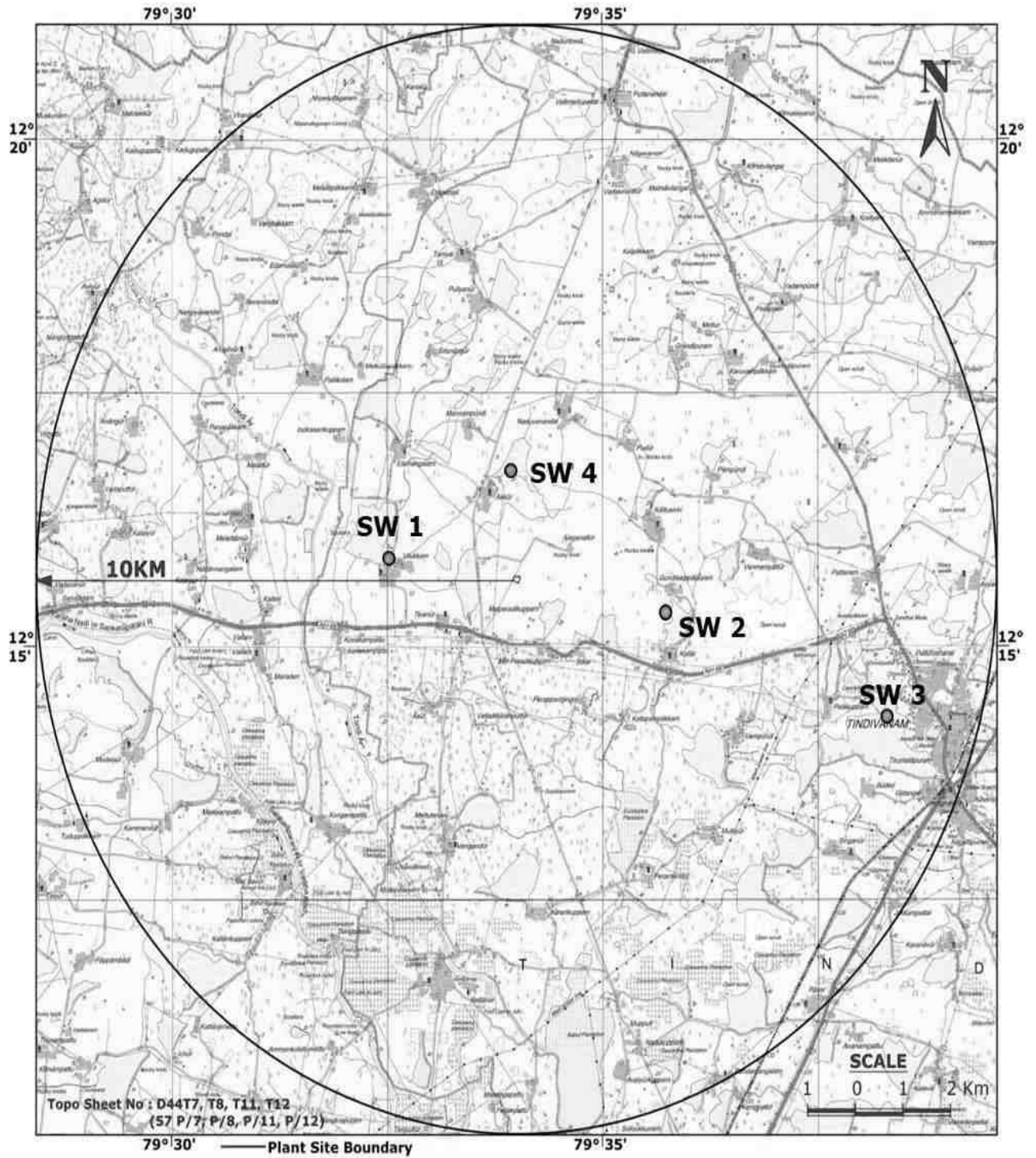


Figure 3-14 Surface water quality sampling locations

Table 3-12 Ground water quality

Sr. No.	Parameters	Unit	IS:10500 / Limits	GW1	GW2	GW3	GW4
1	pH		6.5-8.5(NR)	7.39	7.31	7.58	7.45
2	Colour	Hazen	5(15)	1	2	2	1
3	Taste		Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Odour		Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5	Conductivity	µS/cm	\$	2220	1358	1902	1569
6	Turbidity	NTU	1(5)	4	4	3	4
7	TDS	mg/l	500(2000)	1389	875	1210	989
8	Total Hardness as CaCO ₃	mg/l	200(600)	582	481	335	353
9	Total Alkalinity	mg/l	200(600)	220	250	290	281
10	Calcium as Ca	mg/l	75(200)	172.3	154.2	82.1	94.2
11	Magnesium as Mg	mg/l	30(100)	36.8	23.2	31.5	28.6
12	Residual Chlorine	mg/l	1 min	<0.1	<0.1	<0.1	<0.1
13	Boron	mg/l	0.5 (1)	0.08	0.067	0.065	0.084
14	Chloride as Cl	mg/l	250(1000)	412.5	147.45	275.8	187.4
15	Sulphate as SO ₄	mg/l	200(400)	282.6	188.4	243.2	210.2
16	Fluorides as F	mg/l	1.0(1.5)	0.4	0.3	1.9	0.6
17	Nitrates as NO ₃	mg/l	45(NR)	13.3	28.5	12.5	21.2
18	Sodium as Na	mg/l	\$	242.3	86.3	281.2	195
19	Potassium as K	mg/l	\$	1.9	8.3	3.0	6.0
20	Phenolic compounds	mg/l	0.001 (0.002)	<0.001	<0.001	<0.001	<0.001
21	Cyanides as CN	mg/l	0.05(NR)	<0.02	<0.02	<0.02	<0.02
22	Anionic Detergents	mg/l	0.2(1)	<0.2	<0.2	<0.2	<0.2
23	Mineral Oil	mg/l	0.5 (NR)	<0.01	<0.01	<0.01	<0.01
24	Cadmium as Cd	mg/l	0.01(NR)	<0.003	<0.003	<0.003	<0.003
25	Arsenic as As	mg/l	0.01(0.05)	<0.01	<0.01	<0.01	<0.01
26	Copper as Cu	mg/l	0.05(1.5)	0.054	0.044	0.062	0.034
27	Lead as Pb	mg/l	0.01(NR)	<0.01	<0.01	<0.01	<0.01
28	Manganese as Mn	mg/l	0.1(0.3)	0.092	0.23	0.07	0.057
29	Iron as Fe	mg/l	0.3(NR)	0.26	0.16	0.21	0.11
30	Chromium as Cr	mg/l	0.05(NR)	<0.05	<0.05	<0.05	<0.05
31	selenium as Se	mg/l	0.01(NR)	<0.01	<0.01	<0.01	<0.01
32	Zinc as Zn	mg/l	5(15)	0.26	0.17	0.14	0.12
33	Aluminum as Al	mg/l	0.03(0.2)	<0.01	<0.01	<0.01	<0.01
34	Mercury as Hg	mg/l	0.001(NR)	<0.001	<0.001	<0.001	<0.001
35	Pesticides	mg/l	Absent	Absent	Absent	Absent	Absent
36	E.Coli	mg/l	Absent	Absent	Absent	Absent	Absent
37	Total Coliforms	MNP/100ml	10	<2	<2	<2	<2

Table 3-13 Ground water quality

Sr. No.	Parameters	Unit	IS:10500 / Limits	GW5	GW6	GW7	GW8
1	pH		6.5-8.5(NR)	7.24	7.89	7.43	7.75
2	Colour	Hazen	5(15)	2	1	2	1
3	Taste		Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Odour		Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5	Conductivity	µS/cm	\$	1861	972	1400	965
6	Turbidity	NTU	1(5)	3	2	4	2
7	TDS	mg/l	500(2000)	1186	625	880	612
8	Total Hardness as CaCO ₃	mg/l	200(600)	537	239	494	231
9	Total Alkalinity	mg/l	200(600)	310	220	261	213
10	Calcium as Ca	mg/l	75(200)	145.1	52.3	149.5	50.3
11	Magnesium as Mg	mg/l	30(100)	42.3	26.2	22.3	22.1
12	Residual Chlorine	mg/l	1 min	<0.1	<0.1	<0.1	<0.1
13	Boron	mg/l	0.5 (1)	0.083	0.078	0.063	0.072
14	Chloride as Cl	mg/l	250(1000)	284.8	88.2	149.8	84.3
15	Sulphate as SO ₄	mg/l	200(400)	198.5	128.2	194.9	115.5
16	Fluorides as F	mg/l	1.0(1.5)	1.6	1.0	0.4	1.0
17	Nitrates as NO ₃	mg/l	45(NR)	8.4	4.7	25.4	4.5
18	Sodium as Na	mg/l	\$	180.2	112.3	87.3	110.3
19	Potassium as K	mg/l	\$	2.3	1.5	8.2	1.3
20	Phenolic compounds	mg/l	0.001 (0.002)	<0.001	<0.001	<0.001	<0.001
21	Cyanides as CN	mg/l	0.05(NR)	<0.02	<0.02	<0.02	<0.02
22	Anionic Detergents	mg/l	0.2(1)	<0.2	<0.2	<0.2	<0.2
23	Mineral Oil	mg/l	0.5 (NR)	<0.01	<0.01	<0.01	<0.01
24	Cadmium as Cd	mg/l	0.01(NR)	<0.003	<0.003	<0.003	<0.003
25	Arsenic as As	mg/l	0.01(0.05)	<0.01	<0.01	<0.01	<0.01
26	Copper as Cu	mg/l	0.05(1.5)	0.023	0.035	0.005	0.032
27	Lead as Pb	mg/l	0.01(NR)	<0.01	<0.01	<0.01	<0.01
28	Manganese as Mn	mg/l	0.1(0.3)	0.034	0.028	0.21	0.024
29	Iron as Fe	mg/l	0.3(NR)	0.15	0.09	0.17	0.07
30	Chromium as Cr	mg/l	0.05(NR)	<0.05	<0.05	<0.05	<0.05
31	selenium as Se	mg/l	0.01(NR)	<0.01	<0.01	<0.01	<0.01

Sr. No.	Parameters	Unit	IS:10500 / Limits	GW5	GW6	GW7	GW8
32	Zinc as Zn	mg/l	5(15)	0.15	0.083	0.15	0.081
33	Aluminum as Al	mg/l	0.03(0.2)	<0.01	<0.01	<0.01	<0.01
34	Mercury as Hg	mg/l	0.001(NR)	<0.001	<0.001	<0.001	<0.001
35	Pesticides	mg/l	Absent	Absent	Absent	Absent	Absent
36	E.Coli	mg/l	Absent	Absent	Absent	Absent	Absent
37	Total Coliforms	MNP/100ml	10	<2	<2	<2	<2

Table 3-14 Surface water quality

Sr.No.	Parameters	Units	SW-1	SW-2	SW-3	SW-4
1	pH	-	7.55	7.74	7.62	7.77
2	Colour	Hazen	3	2	2	3
3	Conductivity	µS/cm	605	410	1013	771
4	TDS	mg/l	387	265	647	484
5	DO	mg/l	5.6	5.4	5.7	5.3
6	BOD	mg/l	<3	<3	<3	<3
7	COD	Mg/l	<5	<5	<5	<5
8	Total Hardness as CaCO ₃	mg/l	86	119	379	236
9	Total Alkalinity as CaCO ₃	mg/l	80	115	205	180
10	Calcium as Ca	mg/l	18.6	27.4	78.15	47.2
11	Magnesium as Mg	mg/l	9.7	12.3	44.6	28.6
12	Residual Chlorine	mg/l	<0.2	<0.2	<0.2	<0.2
13	Phosphate as PO ₄	Mg/l	<0.1	<0.1	<0.1	<0.1
14	Sulphates as SO ₄	mg/l	9.2	28.3	98.5	43.2
15	Boron as B	mg/l	0.032	0.024	0.067	0.041
16	Chlorides as Cl	mg/l	15.0	39.9	127.5	109.5
17	Fluorides as F	mg/l	0.3	0.6	1.1	0.8
18	Nitrates as NO ₃	mg/l	6.0	4.7	21.0	4.4
19	Sodium as Na	mg/l	12.4	38.2	58.3	65.6
20	Potassium as K	mg/l	2.3	3.08	1.41	5.24
21	Phenolic Compounds	mg/l	<0.001	<0.001	<0.001	<0.001
22	Cyanides as CN	mg/l	<0.02	<0.02	<0.02	<0.02
23	Anionic Detergents as MBAS	mg/l	<0.2	<0.2	<0.2	<0.2
24	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01
25	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01
26	Copper as Cu	mg/l	<0.01	0.01	0.04	0.021
27	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01
28	Manganese	mg/l	0.07	0.05	0.074	0.054
29	Iron as Fe	mg/l	0.16	0.12	0.24	0.11
30	Chromium as Cr+6	mg/l	<0.05	<0.05	<0.05	<0.05

Sr.No.	Parameters	Units	SW-1	SW-2	SW-3	SW-4
31	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01
32	Zinc as Zn	mg/l	0.26	0.19	0.22	0.17
33	Aluminum as Al	mg/l	0.03	0.02	0.04	0.02
34	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001
35	SAR	-	0.58	1.52	1.30	1.86
36	Insecticides	mg/l	Absent	Absent	Absent	Absent
37	Total Coliforms	MPN/100	1210	940	1560	1360

3.5.3 PRESENTATION OF RESULTS

3.5.3.1 Ground Water Quality

The results for the ground water samples analysed are presented in **Table-3.13** are compared with the IS-10500 standards.

- The analysis results of ground water samples indicate that the pH value was observed to be 7.24 to 7.89, which is well within the specified standards of 6.5 to 8.5.
- Electrical conductivity of surface water samples was observed to be 965 µS/cm to 2220 µS/cm.
- Sulphate were found to be in range of 115.5 to 282.6 mg/l.
- The total dissolved solids were found to be 612 to 1389 mg/l.
- The total hardness were found to be 231 to 582 mg/l.
- Nitrates were found to be in range of 4.50–28.5 mg/l which are within the prescribed limits only.
- The chlorides were found to be 84.3 – 412.5 mg/l .

3.5.3.2 Surface Water Quality

The results for the surface water samples analysed are presented in **Table-3.14** and are compared with the IS-10500 standards.

- The analysis results of surface water samples indicate that the pH value was observed to be 7.55 to 7.77, which is well within the specified standards of 6.5 to 8.5.
- Electrical conductivity of surface water samples was observed to be 410 µS/cm to 1013 µS/cm.
- Sulphates were found to be in range of 9.20 to 98.5 mg/l.
- The total dissolved solids were found to be 265 to 647 mg/l.
- The total hardness were found to be 86 to 379 mg/l.
- Nitrates were found to be in range of 4.4–21.0mg/l which are within the prescribed limits only.

3.6 SOIL CHARACTERISTICS

Its essential to determine the potential of soil in the area and identify the current impacts of urbanization and industrialization on soil quality and also predict impacts, which may arise due to the plant operations. Accordingly, a study of assessment of the baseline soil quality has been carried out.

3.6.1 DATA GENERATION

For studying soil profile of the region, sampling locations were selected to assess the existing soil condition in and around the project area representing various land use conditions. The physical, chemical and heavy metal concentration were determined. The samples were collected by ramming a core-cutter into the soil upto a depth of 90 cm.

The present study of the soil profile establishes the baseline characteristics and this will help in future in identify the incremental concentration if any, due to the operation of the proposed plant. The sampling locations have been identified with the following objectives.

- To determine the baseline soil characteristics of the study area;
- To determine the impact of industrialization on soil characteristics; and
- To determine the impact on soil more importantly from agricultural productivity point of view.

Six locations within 10-km radius of the proposed plant boundry were selected for soil sampling. At each location, soil samples were collected from three different depth viz. 30 cm, 60 cm and 90 cm below the surface and are homogenized. This is the line with IS:2720 and methods of soil Analysis, Part-1,2nd edition,1986 of (American society for Agronomy and Soil Science Society of America). The homogenized samples were analyzed for physical and chemical characteristics. The soil samples were collected during **April to June 2023**.

The samples have been analyzed as per the establised scientific methods for physico-chemical parameters. The heavy metals have been analyzed by using Atomic Absorption Spectrophotometer and Inductive Coupled Plasma Analyzer.

The details of the soil sampling locations are given in **Table–3.15**and are shown in **Figure-3.15**.

Table 3-15 Details of soil sampling locations

Code	Location	Distance from proposed plant Boundary (km)	Direction w.r.t proposed plant boundary
S1	Plant site	--	--
S2	Agoor	1.0	ENE

S3	Venmaniyathur	2.5	E
S4	Dheevanur	2.3	WSW
S5	Vilukkam	2.60	West
S6	Tindivanam	8.0	E

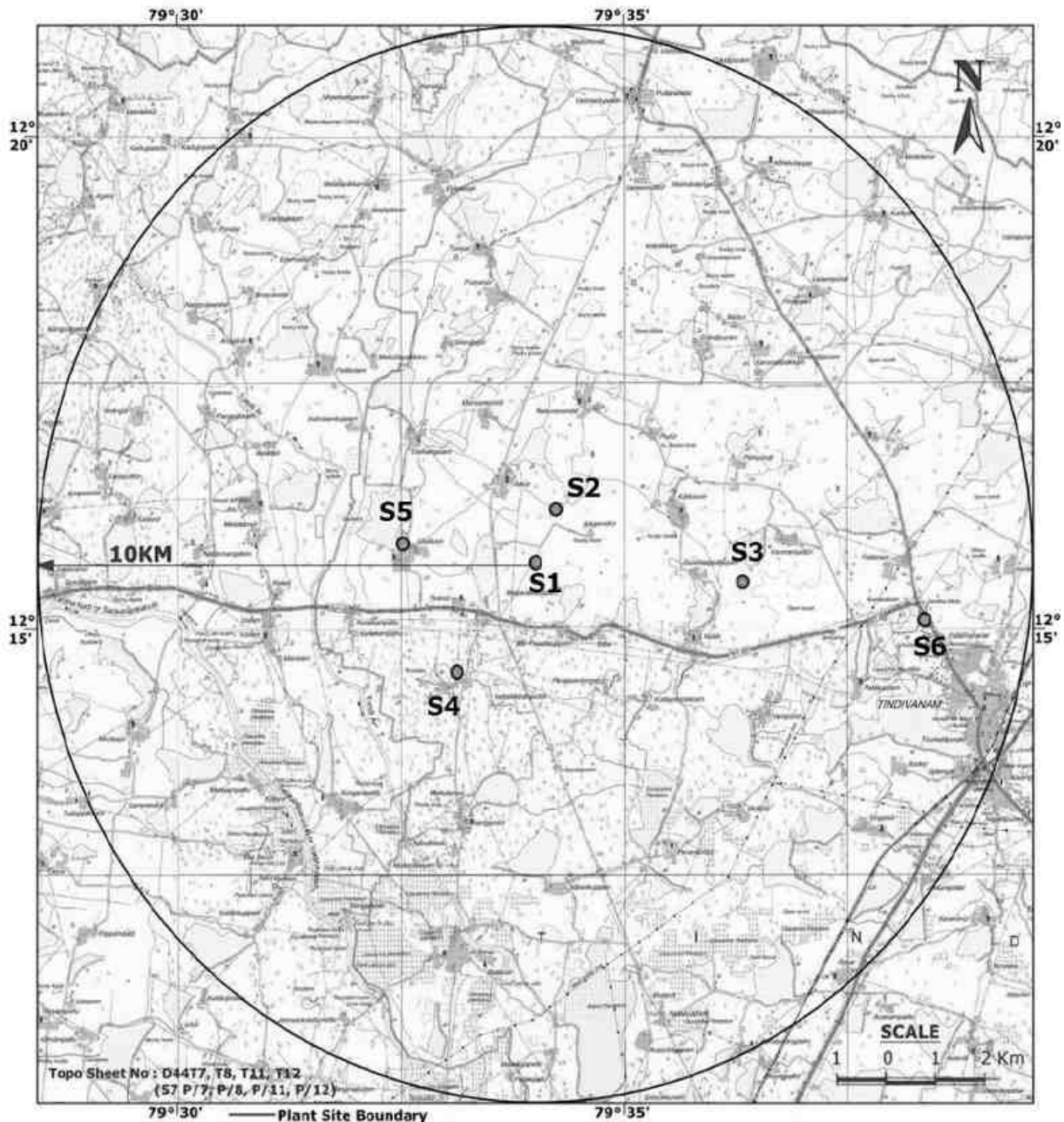


Figure 3-15 Soil sampling locations

3.6.2 BASELINE SOIL STATUS

The results of soil samples collected at all locations within the study area are given in **Table 3-16**. It has been observed that the texture of the soil is mostly "sandy clay" in the study area.

The common color of the soil is pale brown. The pH of the soil quality ranged from 8.0-8.89, indicating that the soil is alkaline in nature. The bulk density of soil ranges in between 1.16 gm/cc – 1.38 gm/cc.

The organic carbon content in the study area observed as 0.35% to 0.74%. The electrical conductivity of the soil was observed to be in range of 98-210 $\mu\text{S}/\text{cm}$, with the maximum 210 $\mu\text{S}/\text{cm}$ were observed in the Tindivanam (S6) and the minimum 90 $\mu\text{S}/\text{cm}$ observed in the Vilukkam (S5).

Available nitrogen was observed to be 82.4 kg/ha to 254.2 kg/ha. Minimum concentration is observed at proposed Dheevanur (S4) and the maximum observed concentration at Tindivanam (S6). Available phosphorous was observed to be 47.40 kg/ha to 74.30 kg/ha in the study area.

Available Potassium was observed as 178.3 kg/ha to 487.0 kg/ha in the study region. The minimum value observed at Vilukkam (S5) and the maximum was observed at Tindivanam (S6).

Table 3-16 Soil analysis results

S. No	Parameters	Unit	S1	S2	S3	S4	S5	S6
1	Texture	-	Clay	Clay	Sandy Clay	Sandy Clay	Sandy Clay	Clay
2	Sand	%	21	18	46	49	45	19
3	Silt	%	17	24	18	22	17	20
4	Clay	%	62	58	36	29	38	61
5	Bulk density	g/cc	1.21	1.16	1.32	1.35	1.38	1.16
6	pH (1:5 aq.extract)	-	8.86	8	8.6	8.1	8.17	8.89
7	Conductivity(1:5 aq.extract)	$\mu\text{S}/\text{cm}$	157	112	166	125	98	210
8	Exchangeable calcium as Ca	mg/kg	1486	1173	2356	2187	995	3214
9	Exchangeable Magnesium as Mg	mg/kg	645	967	1368	1534	568	1847
10	Exchangeable Sodium as Na	mg/kg	258.6	212	351.8	186.6	122.3	356.4
11	Sodium Absorption Ratio (SAR)	----	0.19	0.21	0.38	0.27	0.31	0.32
12	Available Nitrogen as N	kg/ha	125.4	164.2	135.2	82.4	98.3	254.2

S. No	Parameters	Unit	S1	S2	S3	S4	S5	S6
13	Available Phosphorus as P	kg/ha	56.8	74.3	49.8	51.3	47.4	63.5
14	Available potassium as K	kg/ha	285	386.5	241.5	204.8	178.3	487
15	Organic Carbon	%	0.68	0.61	0.39	0.43	0.35	0.74
16	Organic Matter	%	1.17	1.05	0.67	0.74	0.6	1.28
17	Water soluble chlorides as Cl	mg/kg	364	296	192	199	283	432
18	Water soluble sulphages as SO ₄	mg/kg	147.5	132.2	84.5	98.4	115.3	157.6
19	Aluminium as Al	%	1.9	0.75	1.85	0.69	0.42	1
20	Iron as Fe	%	1.72	0.7	1.36	0.68	0.24	0.68
21	Manganese as Mn	mg/kg	252.1	72.7	130.9	169	49.7	137.2
22	Boron as B	mg/kg	16	7.2	11.6	7.7	4.8	8.2
23	Zinc as Zn	mg/kg	32.7	21.2	33.3	13.7	12.1	24.1
24	Total Chromium as Cr	mg/kg	35.9	19.3	33.2	23	9.6	23.4
25	Lead as Pb	mg/kg	3.48	0	0	0	0.35	0.84
26	Nickel as Ni	mg/kg	20.3	7.7	28.2	10.1	4.4	10.7
27	Arsenic as As	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
28	Mercury as Hg	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
29	Cadmium as Cd	mg/kg	0.6	0.1	0.2	0	0.2	0.1
30	Exchangeable Sodium	Meq/100g	1.44	1.23	1.8	0.93	0.6	2.07
31	Exchangeable Potassium	meq/100g	1.13	1.54	0.96	0.81	0.71	1.94
32	Exchangeable Calcium	meq/100g	9.52	7.84	13.83	12.56	5.59	21.47
33	Exchangeable Magnesium	meq/100g	6.89	10.77	13.39	14.68	5.32	20.57
34	Cation Exchange Capacity	meq/100g	18.98	21.37	29.98	28.98	12.21	46.05

3.7 NOISE LEVEL SURVEY

The objective of noise monitoring in the study area is to assess the baseline noise and assess the impact of the total noise except to be generated by proposed project.

3.7.1 IDENTIFICATION OF SAMPLING LOCATIONS

A preliminary reconnaissance survey has been undertaken to identify the major noise generating sources in the area. Noise at different noise generating sources has been identified based on the residential, industrial and commercial activities in the area. The noise monitoring locations are given in **Table – 3.17** and shown in **Figure- 3.16**.

Table 3-17 Details of noise monitoring locations

Code	Location	Distance from proposed plant Boundary (km)	Direction w.r.t proposed plant Boundary
N1	Plant site	--	--
N2	Naduvanandal	3.04	NNE
N3	Alaganalur	1.15	ENE
N4	Salai	1.6	SE
N5	Tivanur	1.34	SW
N6	Vilukkam	2.14	W
N7	Pallikolam	5.45	NW
N8	Akkur	1.74	NW

3.7.2 METHODOLOGY OF DATA GENERATION

Sound Pressure Level (SPL) were measured at all locations. For every 24 hours, the reading were noted. The day noise levels have been monitored during 6 am to 10 pm and night level during 10 pm to 6 am at all the location covered in 10 km radial distance of the study area.

Noise levels were measured using integrated sound level meter manufactured by Quest Technologies, USA (Model No.2900). The integrating sound level meter is an integrating/logging type with octave Filter attachment (model OB- 100) with frequency range of 31.5 to 16000 Hz. This instrument is capable of measuring the Sound Pressure Level (SPL), L_{eq} and octave band frequency analysis.

The noise levels were monitored on working days only, sundays and Public holidays were excluded. During each hour L_{eq} were directly computed by the instrument based on the sound pressure levels. L_{day} (L_d), L_{night} (L_n) and L_{dn} values were computed using corresponding

hourly Leq of day and night respectively. Monitoring was carried out at "A" response and fast mode. The statistical analysis is done for measured noise level at ten locations. The parameters are analyzed for L₁₀, L₅₀, L₉₀, L_{eq}, L_{day}, L_{night} and L_{dn}. The statistical analysis results are given in **Table – 3.18**.

Table 3-18 Noise levels dB(A) in the study area

Code	Location	L ₁₀	L ₅₀	L ₉₀	L _{eq}	L _{day}	L _{night}	L _{dn}
N1	Plant site	44.6	41.0	37.2	41.9	42.8	39.0	46.2
N2	Agoor	50.0	45.5	42.1	46.5	48.5	43.6	51.1
N3	Venmaniyathur	52.6	48.7	45.0	49.7	50.5	46.9	54.0
N4	Dheevanur	54.8	51.0	47.2	52.0	53.2	49.3	56.5
N5	Vilukkam	52.9	48.7	44.8	49.8	50.8	46.4	53.8
N6	Vempoondi	55.5	51.7	47.9	52.6	54.3	50.0	57.3
N7	Tindivanam	52.6	47.8	44.2	49.0	51.1	45.3	53.2
N8	Maniyampattu	52.0	48.1	44.2	49.1	50.0	45.4	52.8

3.7.3 OBSERVATION OF RESULTS

- **Daytime Noise Levels (L_{day})**

The daytime (L_{day}) noise level at all the noise locations are observed to be in the range of 42.8 dB (A) to 54.3 dB (A). The maximum noise level of 54.3 dB(A) was observed at Vempoondi (N6) and the minimum noise level of 42.8 dB(A) were observed to be at Proposed plant site (N1). Its observed that the day time noise levels are in accordance to the prescribed limit of 55 dB (A).

- **Night Noise Levels (L_{night})**

The night time (L_{night}) noise level at all the noise locations are observed to be in the range of 39.0 dB (A) to 50.0 dB (A). The maximum noise level of 50.0 dB(A) was observed at Vempoondi (N6) and the minimum noise level of 39.0 dB(A) were observed to be at proposed plant site (N1).

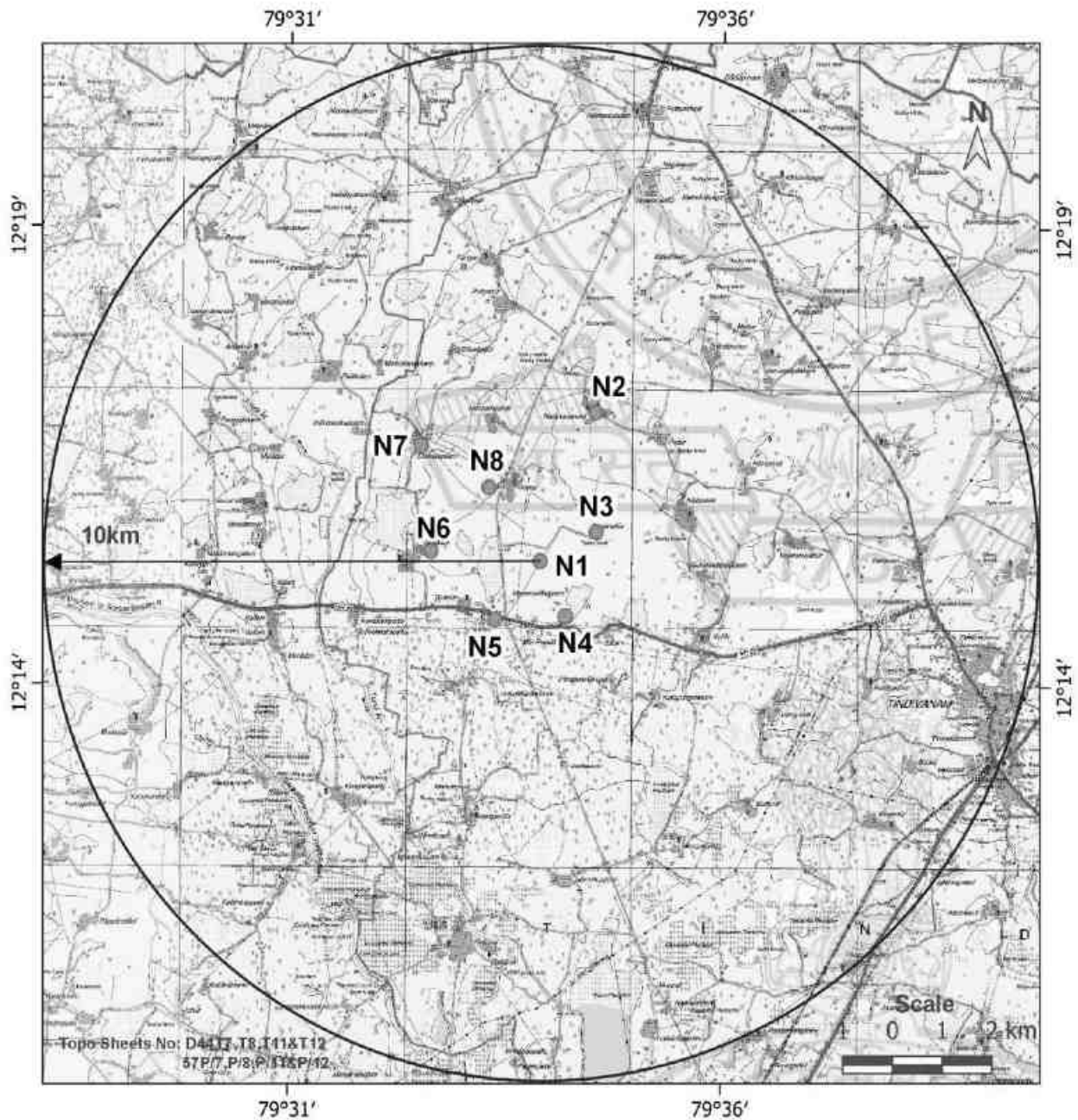


Figure 3-16 Noise sampling locations

3.8 ECOLOGICAL SURVEY

3.8.1 INTRODUCTION

Ecological evaluation aims at developing and applying methodologies to assess the relevance of an area for nature conservation. As such, it is to support the assessment of the impact of a proposed development by providing guidance on how to describe the ecological features within the area affected, how to value them, and how to predict the value losses caused by the development. The evaluation of the ecological significance of an area can be undertaken from different perspectives and consequently with different objectives. One of such perspectives

focuses on the conservation of the biological diversity or biodiversity. Among the human activities that pose the highest threat to the conservation of biodiversity are the developmental projects in particular. Such projects represent artificial elements that cut through the landscape and interfere with the natural habitat and its conditions by emissions that may be solid, liquid and or gaseous. This in turn influences the abundance and distribution of plant and animal species, i.e., the biodiversity of the areas impacted. Most of the background data needs to be acquired from the governmental agencies or the scientific literature. This information is typically complemented by field visit, site surveys and sample collection.

The description of the actual ecological assessment provided by the ecological baseline study serves to set a reference for the subsequent impact analysis. Moreover, it helps decision-makers and EIA reviewers to become familiar with the environmental features and the needs of the study area. The present report address the review of the published secondary data and the results of field sampling conducted during **April to June 2023**.

3.8.2 OBJECTIVES OF THE ECOLOGICAL STUDIES

The present study was undertaken with the following objectives to assess both terrestrial and aquatic habitats of the study area:

- To assess the nature and distribution of vegetation in and around the existing project site.
- To assess the flora and fauna in the study area.
- To understand the ecology of the water bodies.
- To ascertain the migratory routes of fauna, presence of breeding grounds and sensitive habitats in the study area, if any.
- To assess the presence of protected areas in the study area.
- To review the information from secondary sources and discuss the issues of concern with the relevant authority and stakeholders.

3.8.3 METHODOLOGY

To achieve the above objectives a detailed study of the area was undertaken with the existing site as its centre. The different methods adopted were as follows:

- Generation of primary data by undertaking systematic ecological studies in the study area;
- Primary data collection for flora through random sampling method for trees,

shrubs and herbs from the selected locations to know the vegetation cover qualitatively.

- To spot the fauna in the study area and also to identify the fauna by secondary indicators such as pugmarks, scats, fecal pallets, calls and other signs.
- For ecological information, the secondary sources such as local officials, villagers and other stakeholders were interviewed.
- Sourcing secondary data with respect to the study area from published literature.

The list of Terrestrial and Aquatic sampling locations in the study area is presented in **Table-3.19** and shown in **Figure-3.17**.

Table 3-19 List of ecological sampling locations

S.No	Sampling points	Coordinates
Core Zone		
1	Core zone 1-Near gate	12° 14' 54.69" N, 79° 36' 58.34" E
2	Core zone 2- Middle portion	12° 15' 41.88" N, 79° 34' 01.96" E
Buffer zone		
1	Aragav	12° 15' 12.76" N 79° 31' 45.11" E
2	Tadumur	12° 17' 16.73" N 79° 30' 17.08" E
3	Vilukkam	12° 15' 33.59" N 79° 32' 42.08" E
4	Vilukkam Lake (2.56 km E)	12° 15' 42.37" N 79° 32' 32.23" E
5	Peradikuppam	12° 15' 42.19" N 79° 32' 32.43" E
6	Kollar	12° 14' 56.46" N 79° 34' 39.77" E
7	Venmaniyathur	12° 15' 00.02" N 79° 35' 50.03" E
8	Vempundi	12° 15' 43.62" N 79° 37' 15.76" E
9	Palakuppam	12° 14' 50.13" N 79° 37' 38.05" E
10	Ural	12° 14' 34.50" N 79° 37' 35.95" E
11	Thindivanam	12° 14' 22.83" N 79° 39' 21.14" E
12	Gopalpuram	12° 15' 12.98" N 79° 38' 09.49" E
13	Pulaiyanur*	12° 13' 01.66" N 79° 34' 30.75" E
14	Vadampundi	12° 11' 58.23" N 79° 33' 19.85" E
15	Dheevanur Lake (0.96 km W)	12° 15' 23.82" N 79° 33' 34.39" E
16	Agoor	12° 15' 28.65" N 79° 32' 59.94" E
17	Pampundi	12° 16' 37.04" N 79° 34' 00.63" E
18	Puliyur	12° 18' 19.93" N 79° 33' 59.36" E

3.8.4 GENERAL ECOLOGY OF THE STUDY AREA

The area is a degraded scrub land intermixed with agriculture fields. There is no reserved forest land located in the study area. The region is a rural area with few developmental activities that include cottage industries, stone quarries and roads.



Figure 3-17 Field photographs during sampling

3.8.5 FLORA OF CORE ZONE

The core area is mostly Barren land and some part of the land consists green patches. The flora of the core area is mainly covered by the shrubs, under shrubs and herbs. Species such as *Prosopis juliflora*, *Acacia auriculoformis*, *calotrophis gigantic*, *Opuntia stricta*, *Datura metel* and Trees like Khejur (*phoenix dactylifera*), onla (*Embllica officinalis*), imli

(*Tamarindus indicus*), Aam (*Mangifera indica*). The graphical representation for floral diversity is shown in **Figure-3.18**.

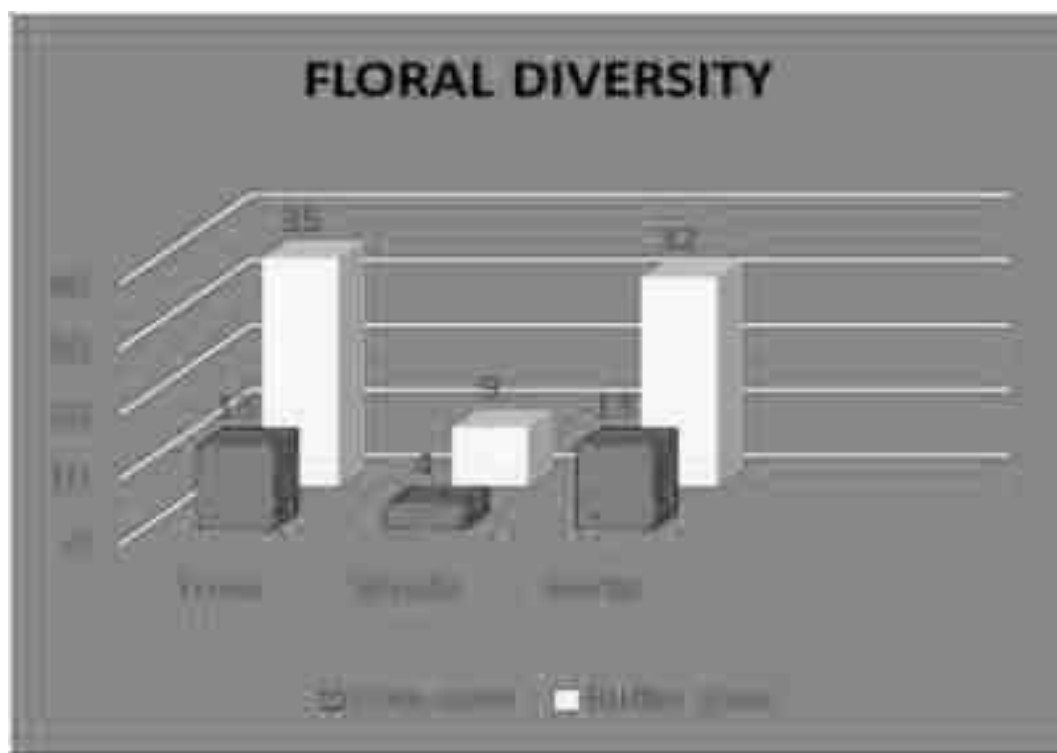


Figure 3-18 Status of floral diversity

The list of flora is given in **Table- 3.20**.

Table 3-20 List of flora in the core area

S.No	Scientific name	Common/ Vernacular name	Family	Nature
TREE SPECIES				
1	<i>Mangifera indica</i>	Mango/ Aam/ Ma/ Maangaa	Anacardiaceae (Cashew family)	ENT
2	<i>Borassus flabellifer</i>	Palmyra palm/ Taad/ Talam/ Panai maram	Arecaceae (Palm family)	ENT
3	<i>Cassia fistula</i>	Golden shower tree/ Amaltas/ Vishu konnai/ Konrai	Caesalpiniaceae (Gulmohar family)	DNB
4	<i>Ricinus communis</i>	Castor bean/ Arandi/ Amanakku	Euphorbiaceae (Castor family)	PNT
5	<i>Butea monosperma</i>	Flame of the forest/ Vakrapushp/ Murukkan maram	Fabaceae (Pea family)	DNT
6	<i>Gliricidia sepium</i>	Mexican lilac/ Madre tree/ Seema konna/ Seemai agathi	Fabaceae (Pea family)	DIT
7	<i>Azadirachta indica</i>	Neem/Turakabevu/Veppa maram/ Limba	Meliaceae (Neem family)	ENB
8	<i>Samanea saman</i>	Rain tree/ Gulabi siris/ Thoongumoonji maram	Mimosaceae (Touch-me-not family)	DIT
9	<i>Artocarpus heterophyllus</i>	Jackfruit tree/ Katahal/ Palaa/ Chakka	Moraceae (Mulberry family)	ENT
10	<i>Moringa oleifera</i>	Drumstick tree/ Senjana/	Moringaceae	DNT

S.No	Scientific name	Common/ Vernacular name	Family	Nature
		Murungai	(Drumstick family)	
11	Syzygium cumuni	Java plum/ Jamun/ Naaval	Myrtaceae (Bottlebrush family)	ENT
12	Psidium guajava	Guava/ Amrood/ Perakkai/ Segappu koyyaa	Myrtaceae (Bottlebrush family)	EIT
13	Ailanthus excelsa	Indian tree of heaven/ Mahanimb/ Perumaram	Simaroubaceae (Quassia family)	DNB
SHRUB SPECIES				
1	Calotropis gigantea	Crown flower/ Safed aak/ Erukku	Apocynaceae (Oleander family)	ENS
2	Opuntia elatior	Prickly pear/ Chappal-sendh/ Pattanattukkalli	Cactaceae (Cactus family)	PIS
3	Senna auriculata	Tanner's cassia/ Tarwar/ Avarampoo	Caesalpiniaceae (Gulmohar family)	PNS
4	Manihot esculenta	Tapioca/ Shakarkand/ Maravallikkilanku/ Allvalli kizhangu	Euphorbiaceae (Castor family)	PNS
HERB SPECIES				
1	Crossandra infundibuliformis	Crossandra/ Priyadarsha/ Kanakamparam	Acanthaceae (Acanthus family)	ENH
2	Amaranthus cruentus	Red amaranth/ African spinach/ Chaulai/ Kirai	Amaranthaceae (Amaranth family)	AN _T H
3	Ourea lanata	Mountain knot grass/ Chaaya/ Poolaipoondu/ Ulinai	Amaranthaceae (Amaranth family)	PNH
4	Tridax porcumbens	Tridax daisy/ Kumra/ Thatha chedi	Asteraceae (Sunflower family)	AN _T H
5	Xanthium strumarium	Rough cocklebur/ Chota Dhatura/ Marul-umattai	Asteraceae (Sunflower family)	ANH
6	Coleus amboinicus	Indian mint/ Patharchur/ Panikkurkka/ Karpuravalli	Lamiaceae (Mint family)	PNH
7	Ocimum sanctum	Holy basil/ Tulsi/ Tulasi	Lamiaceae (Mint family)	PNH
8	Abelmoschus esculentus	Ladies finger/ Okra/ Bhindi/ Ventai/ Bendekkaay	Malvaceae (Mallow family)	ANH
9	Musa paradisiaca	Banana/ Kela/ Vaazha	Musaceae (Banan family)	PNH
10	Cynodon dactylon	Bermuda grass/ Dobri/ Arugampillu	Poaceae (grass family)	PNH
11	Solanum nigrum	Black nightshade/ Mokoil/ Manatakkali/ Mulaku- thakkali	Solanaceae (Potato family)	ANH
12	Lantana camara	Lantana/ Raimuniya/ Unni chedi	Verbenaceae (Verbena family)	PN _T H
13	Zingiber officinale	Ginger/ Adrak/ Inji	Zingiberaceae (Ginger family)	PNH

3.8.6 FLORA OF THE BUFFER ZONE

Most commonly found species in the buffer zone and along the road side were Neem (*Azadirachta indica*), *Ficus bengalensis*, *ficus religiosa*, *phenix spp*, *opuntia*, *Emblica officinalis*, *ziziphus Eucalyptus*. The list of flora is given in **Table- 3.21**.

Table 3-21 List of flora in the buffer area

Sl. no	Scientific name	Common/ Vernacular name	Family	Nature
TREE SPECIES				
1	<i>Anacardium occidentale</i>	Cashew/ Kaju/ Andima/ Kasumavu	Anacardiaceae (Cashew family)	EIT
2	<i>Mangifera indica</i>	Mango/ Aam/ Ma/ Maangaa	Anacardiaceae (Cashew family)	ENT
3	<i>Borassus flabellifer</i>	Palmyra palm/ Taad/ Talam/ Panai maram	Arecaceae (Palm family)	ENT
4	<i>Cocos nucifera</i>	Coconut/ Nariyal/ Tenga	Arecaceae (Palm family)	ENT
5	<i>Phoenix sylvestris</i>	Wild date palm/ Khajur/ Inthupaanai	Arecaceae (Palm family)	ENT
6	<i>Spathodea campanulata</i>	Fountain tree/ Rugtoora/ Patadi/ Thanneerkaimaram	Bignoniaceae (Jacaranda family)	EIT
7	<i>Kigelia Africana</i>	Sausage tree/ Balam khira/ Yaanaipudukku	Bignoniaceae (Jacaranda family)	DIT
8	<i>Tecoma stans</i>	Yellow balls/ Piliya/ Sonnapatti	Bignoniaceae (Jacaranda family)	PIT
9	<i>Cassia fistula*</i>	Golden shower tree/ Amaltas/ Vishu konnai/ Konrai	Caesalpiniaceae (Gulmohar family)	DNB
10	<i>Tamarindus indica</i>	Tamarind/ Imli/ Puli	Caesalpiniaceae (Gulmohar family)	DN _T T
11	<i>Casuarina equisetifolia</i>	Whistling pine/ Junglisaru/ Savukku maram	Casuarinaceae (Casuarina family)	PNT
12	<i>Ricinus communis</i>	Castor bean/ Arandi/ Amanakku	Euphorbiaceae (Castor family)	PNT
13	<i>Butea monosperma</i>	Flame of the forest/ Vakrapushp/ Murukkan maram	Fabaceae (Pea family)	DNT
14	<i>Gliricidia sepium</i>	Mexican lilac/ Madre tree/ Seema konna/ Seemai agathi	Fabaceae (Pea family)	DIT
15	<i>Dalbergia sissoo</i>	Indian rosewood/ Shisham/ Chichamaram	Fabaceae (Pea family)	DNT
16	<i>Couroupita guianensis</i>	Cannon ball tree/ Naagalingam	Lecythidaceae (Barringtonia family)	DIT
17	<i>Thespesia populnea</i>	Indian tulip tree/ Paras Pipal/ Cilanti/ Puvarasu	Malvaceae (Mallow family)	ENT
18	<i>Azadirachta indica</i>	Neem/Turakabevu/Veppa maram/ Limba	Meliaceae (Neem family)	ENB

Sl. no	Scientific name	Common/ Vernacular name	Family	Nature
19	<i>Prosopis juliflora</i>	Algaroba/ Junglee kikar/ Seemai karuvelam	Mimosaceae (Touch me not family)	DIT
20	<i>Acacia nilotica indica</i>	Babool/ Gum Arabic/ Karivelam	Mimosaceae (Touch-me-not family)	ENT
21	<i>Adenanthera pavonina</i>	Red bead tree/ Rakta chandan/ Aaanai kundumani	Mimosaceae (Touch-me-not family)	DNT
22	<i>Samanea saman</i>	Rain tree/ Gulabi siris/ Thoongumoonji maram	Mimosaceae (Touch-me-not family)	DIT
23	<i>Artocarpus heterophyllus</i>	Jackfruit tree/ Katahal/ Palaa/ Chakka	Moraceae (Mulberry family)	ENT
24	<i>Ficus benghalensis</i>	Banyan tree/ Barh/ Alai	Moraceae (Mulberry family)	ENT
25	<i>Ficus religiosa</i>	Peepal/ Aswattha/ Arayal/ Araca-maram	Moraceae (Mulberry family)	DNB
26	<i>Moringa oleifera</i>	Drumstick tree/ Senjana/ Murungai	Moringaceae (Drumstick family)	DNT
27	<i>Eucalyptus citriodora</i>	Lemon scented gum/ Safeda/ Talanoppi	Myrtaceae (Bottlebrush family)	EIT
28	<i>Eucalyptus tereticornis</i>	Forest red gum/ Blue gum/ Thailamaram	Myrtaceae (Bottlebrush family)	EIT
29	<i>Syzygium cumuni</i>	Java plum/ Jamun/ Naaval	Myrtaceae (Bottlebrush family)	ENT
30	<i>Psidium guajava</i>	Guava/ Amrood/ Perakkai/ Segappu koyyaa	Myrtaceae (Bottlebrush family)	EIT
31	<i>Phyllanthus emblica</i>	Amla/ Indian gooseberry/ Aonla/ Nellikai	Phyllanthaceae (Amla family)	DNT
32	<i>Ziziphus mauritiana</i>	Indian jujube/ Ber/ Kattu Elandhai	Rhamnaceae (Ber family)	DNM
33	<i>Manilkara zapota</i>	Noseberry/ Chikoo/ Chappotta	Sapotaceae (Mahua family)	PIT
34	<i>Ailanthus excelsa</i>	Indian tree of heaven/ Mahanimb/ Perumaram	Simaroubaceae (Quassia family)	DNB
35	<i>Tectona grandis</i>	Teak/ Sagun/ Thekkumaram	Verbenaceae (Verbena family)	DNT
SHRUB SPECIES				
1	<i>Agave amica</i>	Tuberose/ Rajnigandha/ Nelasampangi	Asparagaceae (Asparagus family)	PIS
2	<i>Calotropis gigantea</i>	Crown flower/ Safed aak/ Erukku	Apocynaceae (Oleander family)	ENS
3	<i>Capsicum annum</i>	Chilli/ Mirch/ Pacha mulaga	Solanaceae (Potato family)	PIS
4	<i>Cissus quadrangularis</i>	Veldt grape/ Asthibhanga/ Pirantai/ Vaccira-vallli	Vitaceae (Grape family)	PNS
5	<i>Gossypium</i>	Cotton/ Kapas/ Parutthi	Malvaceae (Mallow)	PNS

Sl. no	Scientific name	Common/ Vernacular name	Family	Nature
	arboreum		family)	
6	Jasminum officinale	Jasmine/ Chameli/ Mallikai	Oleaceae (Jasmine family)	PNS
7	Manihot esculenta	Tapioca/ Shakarkand/ Maravallikkilanku/ Allvalli kizhangu	Euphorbiaceae (Castor family)	PNS
8	Opuntia elatior	Prickly pear/ Chappal-sendh/ Pattanattukkalli	Cactaceae (Cactus family)	PIS
9	Senna auriculata	Tanner's cassia/ Tarwar/ Avarampoo	Caesalpiniaceae (Gulmohar family)	PNS
1	Abelmoschus esculentus	Ladies finger/ Okra/ Bhindi/ Ventai/ Bendekkaay	Malvaceae (Mallow family)	ANH
2	Allium cepa	Onion/ Pyaz/ Vengayam	Alliaceae (Onion family)	PNH
3	Amaranthus cruentus	Red amaranth/ African spinach/ Chaulai/ Kirai	Amaranthaceae (Amaranth family)	ANTH
4	Arachis hypogaea	Groundnut/ Chinabadam/ Mungphali/ Nila-k-katalai	Fabaceae (Pea family)	ANTH
5	Coleus amboinicus	Indian mint/ Patharchur/ Panikkurkka/ Karpuravalli	Lamiaceae (Mint family)	PNH
6	Coriandrum sativum	Coriander/ Dhaniya/ Kotthu malli	Apiaceae (Carrot family)	ENH
7	Crossandra infundibuliformis	Crossandra/ Priyadarsha/ Kanakamparam	Acanthaceae (Acanthus family)	ENH
8	Curcuma longa	Turmeric/ Haldi/ Manjal	Zingiberaceae (Ginger family)	PNH
9	Cynodon dactylon	Bermuda grass/ Dobri/ Arugampillu	Poaceae (grass family)	PNH
10	Eleusine coracana	Finger millet/ Mandua/ Ragi/ Aariyam	Poaceae (Grass family)	AIH
11	Helianthus annuus	Sunflower/ Surajmukhi/ Suryaakaanti	Asteraceae (Sunflower family)	ANTH
12	Lantana camara	Lantana/ Raimuniya/ Unni chedi	Verbenaceae (Verbena family)	PNTH
13	Mimosa pudica	Touch-me-not/ Lajwanti/ Thottaccurungi	Mimosaceae (Touch-me-not family)	PNTH
14	Musa paradisiaca	Banana/ Kela/ Vaazha	Musaceae (Banan family)	PNH
15	Nicotiana tabacum	Tobacco/ Tambaku/ Pukayilai	Solanaceae (Potato family)	AIH
16	Ocimum sanctum	Holy basil/ Tulsi/ Tulasi	Lamiaceae (Mint family)	PNH
17	Oryza sativa	Paddy/ Chaval/ Arishi/ Nellu	Poaceae (Grass family)	PNH
18	Ouret lanata	Mountain knot grass/ Chaaya/	Amaranthaceae	PNH

Sl. no	Scientific name	Common/ Vernacular name	Family	Nature
		Poolaiipoondu/ Ulinai	(Amaranth family)	
19	Pennisetum glaucum	Bajra/ Pearl millet/ Cumbu/ Kambu	Poaceae (grass family)	AIH
20	Saccharum officinarum	Sugarcane/ Eekh/ Karumbu	Poaceae (Grass family)	ANH
21	Solanum lycopersicum	Tomato/ Tamatar/ Thakkali	Solanaceae (Potato family)	PIH
22	Solanum melongena	Brinjal/ Baingan/ Kattiri	Solanaceae (Potato family)	ANH
23	Solanum nigrum	Black nightshade/ Mokoi/ Manatakkali/ Mulaku-thakkali	Solanaceae (Potato family)	ANH
24	Tagetes erecta	Marigold/ Genda/ Chamantippoo	Asteraceae (Sunflower family)	AIH
25	Tridax porcumbens	Tridax daisy/ Kumra/ Thatha chedi	Asteraceae (Sunflower family)	ANTH
26	Vigna mungo	Black gram/ Urd bean/ Urad/ Uluntu	Fabaceae (Pea family)	ANH
27	Xanthium strumarium	Rough cocklebur/ Chota Dhatura/ Marul-umattai	Asteraceae (Sunflower family)	ANH
28	Zea mays	Maize/ Corn/ Makka/ Cholam	Poaceae (Grass family)	AIH
29	Zingiber officinale	Ginger/ Adrak/ Inji	Zingiberaceae (Ginger family)	PNH
30	Citrullus lanatus	Watermelon/ Tarbooz/ Tarppasannippalam	Cucurbitaceae (Pumpkin family)	ANC
31	Coccinia grandis	Ivy gourd/ Kundru/ Kovai/ Tondikay	Cucurbitaceae (Pumpkin family)	PNC
32	Piper betle	Betel vine/ Paan/ Vettilai	Piperaceae (Pepper family)	PNC

P: Perennial; N: Native; NT: Naturalised; D: Deciduous; E: Evergreen; B: Big Canopy; I: Introduced; M- Medium/ small tree

3.8.7 STATUS OF FAUNA

Avian fauna was assessed by undertaking several field trials in and around the core and buffer zones during early mornings and early dusk. Amphibians were searched near paddy lands, other agricultural fields, near the stagnant water pools and small perennial and seasonal stream areas. Reptiles were searched also by lifting of stones, at rock crevices and wall spaces of structures etc. The faunal diversity of the core zone as well as the buffer zone is tabulated below as that of the study area wherein those that were present in core zone are specifically denoted. 24 species of mammals (9 in core and 15 in buffer zone), 122 species of birds (13 in core and 109 in buffer zone), 7 species of reptiles (3 in core and 4 in buffer zone)

and 3 varieties of amphibian (1 in core and 2 in buffer zone) are identified in the study area. Seven numbers of Schedule I species as per The Wildlife (Protection) Act, 1972 and one species listed as endangered (IUCN-EN) are observed. The graphical representation for faunal diversity is shown in **Figure-3.19**.

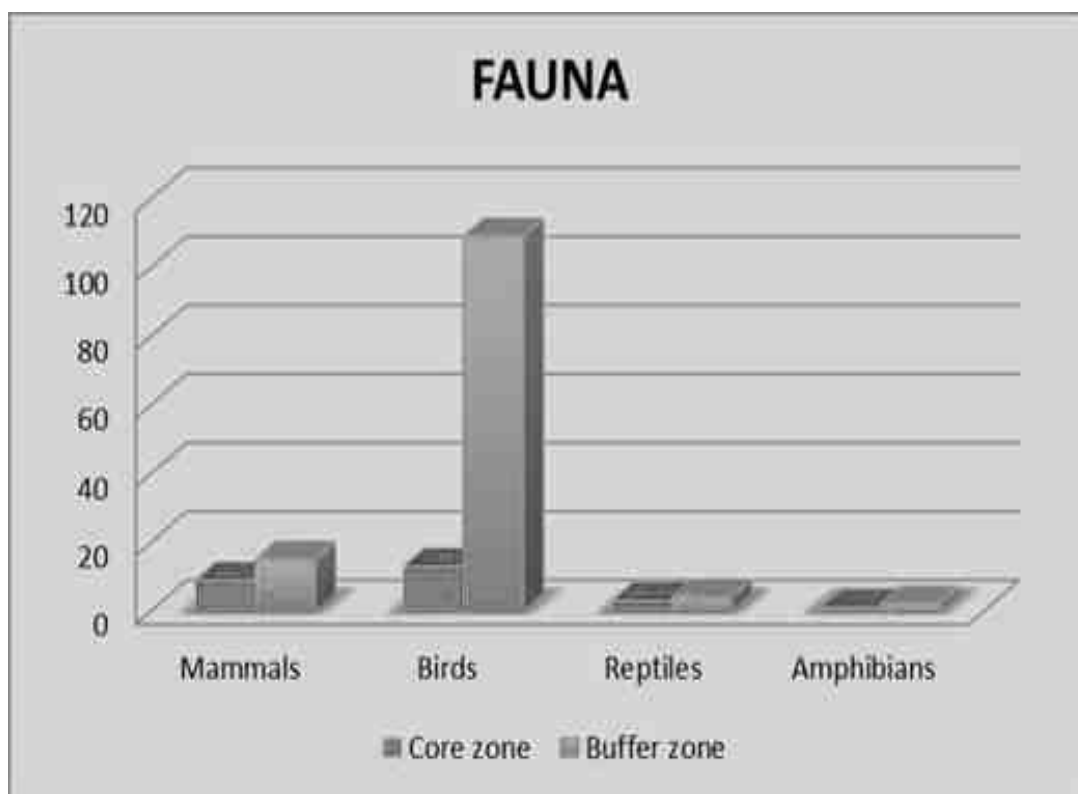


Figure 3-19 Status of fauna

3.8.8 FAUNA OF THE CORE AND BUFFER ZONE

Primary field studies were conducted near villages, waste lands, along the water bodies within 10 km radius of the project boundary and secondary data was collected through interaction with local officials. The details of the same are presented in **Table- 3.22**.

Table 3-22 List of fauna in the buffer zone

Sl. no	Species	CZ	BZ	Common name	WPA Sch.
MAMMALS					
1	<i>Rousettus leschenaultii</i>	-	+	Fruit Bat	V
2	<i>Herpestes edwardsi</i> *	+	+	Indian grey mongoose	II
3	<i>Hystrix indica</i>	-	+	Indian porcupine	IV
4	<i>Lepus nigricollis</i>	-	+	Indian hare/ Khargosh	IV
5	<i>Vulpes bengalensis</i>	-	+	Indian fox/ Bengal fox	II
6	<i>Rattus rattus</i> *	+	+	Common house rat/ Roof rat	V

Sl. no	Species	CZ	BZ	Common name	WPA Sch.
7	<i>Mus booduga</i> *	+	+	Common Indian field mouse	V
8	<i>Funambulus palmarum</i> *	+	+	common palm Squirrel	IV
9	<i>Suncus murinus</i> *	+	+	House shrew	IV
10	<i>Felis catus</i> *	+	+	Cat	—
11	<i>Bos taurus indicus</i> *	+	+	Cow / Pasu	—
12	<i>Ovis aries</i> *	+	+	Domesticated Sheep	—
13	<i>Canis lupus familiaris</i> *	+	+	Dog	—
14	<i>Capra aegagrus hircus</i> *	-	+	Goat	—
15	<i>Sus scrofa domesticus</i> *	-	+	Pig	—
BIRDS					
1	<i>Milvus migrans</i> *	+	+	Black eared kite	IV
2	<i>Elanus caeruleus</i> *	-	+	Black winged kite	I
3	<i>Acquila fasciata</i>	-	+	Bonelli's eagle	I
4	<i>Hieraaetus pennatus</i>	-	+	Booted eagle	I
5	<i>Aquila heliaca</i>	-	+	Eastern imperial eagle	I
6	<i>Neophron percnopterus</i>	-	+	Egyptian vulture	IV
7	<i>Clanga clanga</i> *	-	+	Greater spotted eagle	I
8	<i>Acrocephalus dumetorum</i> *	-	+	Blyth's reed warbler	IV
9	<i>Iduna caligata</i> *	-	+	Booted warbler	IV
10	<i>Acrocephalus stentoreus</i>	-	+	Clamorous reed warbler	IV
11	<i>Eremopterix griseus</i>	-	+	Ashy crowned sparrow lark	IV
12	<i>Melanocorypha bimaculata</i>	-	+	Bimaculated lark	IV
13	<i>Galerida cristata</i> *	-	+	Crested lark	IV
14	<i>Alcedo atthis</i> *	-	+	Common kingfisher	IV
15	<i>Halcyon pileata</i> *	+	+	black capped kingfisher	IV
16	<i>Anser indicus</i>	-	+	Bar headed goose	IV
17	<i>Sarkidiornis melanotos</i> *	-	+	Comb duck	IV
18	<i>Anas crecca</i> *	-	+	Common teal	IV
19	<i>Aythya nyroca</i>	-	+	Ferruginous duck	IV
20	<i>Spatula querquedula</i>	-	+	Garganey	IV
21	<i>Anas poecilorhynca</i>	-	+	Indian spot billed duck	IV
22	<i>Bubulcus ibis</i> *	+	+	Cattle egret	IV
23	<i>Ixobrychus cinnamomeus</i>	-	+	Cinnamon bittern	IV
24	<i>Ardea alba</i> *	-	+	Great egret	IV

Sl. no	Species	CZ	BZ	Common name	WPA Sch.
25	<i>Ardea cinerea</i>	-	+	Grey heron	IV
26	<i>Ardeola grayii</i> *	-	+	Indian pond heron	IV
27	<i>Burhinus indicus</i>	-	+	Indian thick knee	IV
28	<i>Lalage melaschistos</i>	-	+	Black winged cuckooshrike	IV
29	<i>Vanellus indicus</i> *	-	+	Red wattled lapwing	IV
30	<i>Anastomus oscitans</i>	-	+	Asian openbill stork	IV
31	<i>Prinia socialis</i> *	+	+	Ashy prinia	IV
32	<i>Orthotomus sutorius</i>	-	+	Common tailor bird	IV
33	<i>Prinia gracilis</i> *	-	+	Graceful prinia	IV
34	<i>Streptopelia decaocto</i> *	-	+	Eurasian collared dove	IV
35	<i>Columba livia</i> *	+	+	Common/ Blue Rock Pigeon	IV
36	<i>Coracias garrulus</i>	-	+	European roller	IV
37	<i>Coracias benghalensis</i>	-	+	Indian roller	IV
38	<i>Corvus splendens</i> *	+	+	House crow	V
39	<i>Corvus macrorhynchos</i> *	+	+	Large billed crow	IV
40	<i>Eudynamis scolopacea</i> *	+	+	Indian Koel	IV
41	<i>Cuculus canorus</i> *	+	+	Common cuckoo	IV
42	<i>Hierococcyx varius</i>	-	+	Common hawk cuckoo	IV
43	<i>Centropus sinensis</i> *	-	+	Greater coucal	IV
44	<i>Dicrurus macrocercus</i> *	+	+	Black drongo	IV
45	<i>Granativora melanocephala</i>	-	+	Black headed bunting	IV
46	<i>Lonchura malacca</i>	-	+	Black headed munia	IV
47	<i>Falco amurensis</i> *	+	+	Falcon	IV
48	<i>Falco sabbuteo</i>	-	+	Eurasian hobby	IV
49	<i>Grus grus</i>	-	+	Common crane	IV
50	<i>Grus virgo</i>	-	+	Demoiselle crane	IV
51	<i>Hirundo rustica</i>	-	+	Barn swallow	IV
52	<i>Ptyonoprogne concolor</i>	-	+	Dusky crag martin	IV
53	<i>Lanius vittatus</i>	-	+	Bay-backed shrike	IV
54	<i>Lanius cristatus</i>	-	+	Brown shrike	IV
55	<i>Lanius excubitor</i>	-	+	Great grey shrike	IV
56	<i>Lanius schach</i>	-	+	Long tailed shrike	IV
57	<i>Chlidonias niger</i>	-	+	Black tern	IV
58	<i>Chroicocephalus ridibundus</i>	-	+	Black headed gull	IV

Sl. no	Species	CZ	BZ	Common name	WPA Sch.
59	<i>Chroicocephalus brunnicephalus</i>	-	+	Brown headed gull	IV
60	<i>Argya caudata</i> *	-	+	Common babbler	IV
61	<i>Turdoides striatus</i> *	-	+	Jungle babbler	IV
62	<i>Psilopogon haemacephalus</i>	-	+	Coppersmith Barbet	IV
63	<i>Merops orientalis</i> *	+	+	Green bee eater	IV
64	<i>Motacilla citreola</i>	-	+	Citrine wagtail	IV
65	<i>Phoenicurus ochruros</i>	-	+	Black red start	IV
66	<i>Luscinia svecica</i>	-	+	Bluethroat	IV
67	<i>Oenanthe fusca</i> *	-	+	Brown rock chat	IV
68	<i>Oenanthe deserti</i>	-	+	Desert wheatear	IV
69	<i>Saxicoloides fulicata</i> *	-	+	Indian robin	IV
70	<i>Passer domesticus</i> *	-	+	House sparrow	IV
71	<i>Pelecanus crispus</i>	-	+	Dalmatian pelican	IV
72	<i>Pelecanus onocrotalus</i>	-	+	Great white pelican	IV
73	<i>Nycticorax nycticorax</i>	-	+	Black crowned night heron	IV
74	<i>Phalacrocorax carbo</i>	-	+	Great cormorant	IV
75	<i>Pavo cristatus</i>*	-	+	Indian peacock	I
76	<i>Francolinus pondicerianus</i>	-	+	Grey francolin	IV
77	<i>Phoenicopterus roseus</i>	-	+	Greater flamingo	IV
78	<i>Phylloscopus collybita</i> *	-	+	Common chiffchaff	IV
79	<i>Dinopium benghalense</i>	-	+	Black rumped flameback	IV
80	<i>Ploceus benghalensis</i>	-	+	Black breasted weaver	IV
81	<i>Podiceps cristatus</i>	-	+	Great crested grebe	IV
82	<i>Psittacula krameri</i> *	+	+	Rose ringed parakeet	IV
83	<i>Pterocles exustus</i>	-	+	chestnut bellied sandgrouse	IV
84	<i>Porphyrio porphyrio</i> *	-	+	Purple swamphen	IV
85	<i>Zapornia akool</i> *	-	+	Brown crake	IV
86	<i>Fulica atra</i> *	-	+	Common coot	IV
87	<i>Himantopus himantopus</i> *	-	+	Black winged stilt	IV
88	<i>Limosa lapponica</i>	-	+	Bar tailed godwit	IV
89	<i>Limosa limosa</i>	-	+	Black tailed godwit	IV
90	<i>Tringa nebularia</i> *	-	+	Common greenshank	IV
91	<i>Actitis hypoleucos</i>	-	+	Common sandpiper	IV
92	<i>Gallinago gallinago</i> *	-	+	Common snipe	IV

Sl. no	Species	CZ	BZ	Common name	WPA Sch.
93	<i>Calidris ferruginea</i> *	-	+	Curlew sandpiper	IV
94	<i>Calidris alpina</i> *	-	+	Dunlin	IV
95	<i>Culicicapa ceylonensis</i>	-	+	Grey headed canary fly catcher	IV
96	<i>Acridotheres ginginianus</i>	-	+	Bank myna	IV
97	<i>Sturnia pagodarum</i>	-	+	Brahminy starling	IV
98	<i>Sturnia malabarica</i>	-	+	Chestnut tailed starling	IV
99	<i>Acridotheres tristis</i> *	+	+	Common myna	IV
100	<i>Sturnus vulgaris</i>	-	+	Common starling	IV
101	<i>Sylvia nana</i>	-	+	Asian desert warbler	IV
102	<i>Curruca crassirostris</i>	-	+	Eastern orphean warbler	IV
103	<i>Threskiornis melanocephalus</i>	-	+	Black headed ibis	IV
104	<i>Platalea leucorodia</i> *	-	+	Eurasian spoonbill	I
105	<i>Plegadis falcinellus</i>	-	+	Glossy ibis	IV
106	<i>Pseudibis papillosa</i> *	-	+	Red headed ibis	IV
107	<i>Turnix suscitator</i>	-	+	Barred buttonquail	IV
108	<i>Upupa epops</i> *	-	+	Common hoopoe	IV
109	<i>Tephrodornis pondicerianus</i>	-	+	Common woodshrike	IV
REPTILES					
1	<i>Calotes versicolor</i> *	+	+	Common garden lizard	IV
2	<i>Chamaeleon zeylanicus</i> *	+	+	Green Lizard	II
3	<i>Hemidactylus flaviviridis</i> *	+	+	House Gecko	IV
4	<i>Naja naja</i>	—	+	Indian cobra	II
AMPHIBIANS					
1	<i>Euphlyctis hexadactyla</i>	-	+	Indian pond frog	IV
2	<i>Duttaphrynus melanostictus</i> *	+	+	Common Indian toad	IV
RET SPECIES (BIRDS)					
1	<i>Elanus caeruleus</i> *	--	--	Black winged kite	Sch.I
2	<i>Acquila fasciata</i>	--	--	Bonelli's eagle	Sch.I
3	<i>Hieraaetus pennatus</i>	--	--	Booted eagle	Sch.I
4	<i>Aquila heliaca</i>	--	--	Eastern imperial eagle	Sch.I
5	<i>Clanga clanga</i> *	--	--	Greater spotted eagle	Sch.I

*CZ: Core Zone, BZ: Buffer Zone

3.8.9 CONCLUSION

From the field observations it can be concluded that in the study area are under anthropogenic pressure and show signs of degradation in the form of tree cutting, lopping, grazing and collection of NTFPs and habitat fragmentation. As per MOEF and Forest Department of Tamilnadu state reveals that there are no Wildlife sanctuaries, National parks/biosphere reserves in 10 km radius from the proposed plant site boundary. As per the records of the Botanical Survey of India there are no plants of conservation importance in the study area. It can be concluded that there is seven species belonging Sch-I, two species of Sch-II (Indian grey mongoose and Indian fox/ Bengal fox/House) and rest of species belongs Sch-III, Sch-IV and Sch-V of Wildlife Protection Act, 1972. As of now, no specific conservation action plan is required, however Schedule II and III and other schedule IV birds are protected by the Indian Wildlife (Protection) Act, 1972.

All the wildlife above listed will be protected by the district Wildlife authorities as per Indian Wildlife (Protection) Act, 1972 and state government conservation rules.

3.9 LAND USE STUDIES

The objectives of the land use studies are:

- Establishment of the existing land use pattern;
- Assessments of the likely impacts due to the proposed project on the land use pattern of the study area; and
- Making recommendations for optimizing the future land use pattern after the project in the study area.

The land use pattern have been studied based on review of the secondary data provided in 2011 District Census Handbook of Villuppuram District, Tamilnadu.

3.9.1 LAND USE BASED ON DISTRICT CENSUS HANDBOOK (2011)

The land use pattern of the study area is given in **Table-3.23**.

Table 3-23 Land use pattern of the study area

Sr.No	Particulars of Landuse	0-3 km (ha)	3-7 km (ha)	7-10 km (ha)	0-10 km (ha)
1	Forest land	0	0	0	0
2	Irrigated land	591.8	3015.8	4379.1	8276.2
3	Un- irrigated land	685.5	1995.6	3350.7	6136.2
4	Cultivable waste land	169.6	375.3	164.5	728

5	Area not available for cultivation	415.7	290.7	617.7	1346.7
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- *Forest*

No forest and comes under 10 Km radius boundary from the proposed project site.

- *Land Under cultivation*

In the study area, altogether 14412.40 Ha land (irrigated and un-irrigated) is used for cultivation, in which the irrigated land works out to be 8276.2 Ha and un-irrigated land to be 6136.2 Ha.

- *Cultivable Waste land*

The land area under this category to be 728 Ha of the study area.

- *Area not available for cultivation*

The land area under this category work out to be 1346.7 Ha of the study area.

3.9.2 LAND USE PATTERN BASED ON REMOTE SENSING DATA

Remote sensing satellite imageries were collected and interpreted for the 10-km radius study area for analysing the Land use pattern of the study area. Based on the satellite data, Land use/ Land cover maps have been prepared.

3.9.2.1 Land use/Land cover classification system

The present Land use/Land cover maps were prepared based on the classification system of National standards. For explanation for each of the Land use category, the details as given in **Table-3.25** were considered.

3.9.2.2 Data Requirements

IRS Resourcesat-2 of L4FMX multispectral satellite data was acquired and it was used for the mapping and interpretation. Besides, other collateral data as available in the form of maps, charts, census records, other reports and especially topographical survey of India maps are used. In addition to this, ground truth survey was also conducted to verify and confirm the ground features. The land use and land cover classification system is given in **Table-3.24**.

Table 3-24 Land use/land cover classification system

Sr. No.	Level-1	Level-2
1	Built-up Land	Town/cities
		Villages

		Institution/Industry/Godown etc
		Plotted Area/Layout
2	Agriculture Land	Double Crop Land/Irrigated Area
		Plantations
		Fallow
3	Forest	Evergreen/Semi evergreen
		Deciduous
		Forest Plantation
4	Wastelands	Rocky/Stony Waste
		Land with /without scrubs
		Saline/sandy & Marshy/swampy
5	Water Bodies	River/Stream
		Lake/Reservoir/Tanks
6	Others	Orchard/Other Plantation
		Shifting cultivation
		Salt Pans, Snow covered/Glacial
		Barren/Vacant Land

3.9.2.3 Methodology

The methodology adopted for preparation of Land use/Land cover thematic map is as follows:

- Digital interpretation of IRS Resourcesat-2 L4FMX-5m resolution Digital data using ERDAS software programme; and
- Field observations

The methodology adopted for preparation of land use/ land cover thematic map is monoscopic visual interpretation of geo coded scenes of IRS Resourcesat-2 L4FMX-5m resolution satellite and field observations are taken. The various steps involved in the study are preparatory field work, field survey and post field work.

3.9.2.4 Pre field Interpretation of Satellite Data

The False Color Composite (FCC) of IRS Resourcesat-2 L4FMX-5m resolution satellite data are used for pre field interpretation work. Taking the help of topo sheets, geology, and geomorphology and by using the image elements the features are identified and delineated the boundaries roughly. Each feature is identified on image by their image elements like tone, texture, color, shape, size, pattern and association. A tentative legend in terms of Land Use/Land Cover, physiography and erosion was formulated. The sample areas for field check are selected covering all the physiography, Land use/Land cover feature cum image characteristics.

- *Ground Truth Collection*

Both topo sheets and imagery were taken for field verification and a transverse plan using existing road network was made to cover as many representative sample areas as possible to observe the broad Land use features and to adjust the sample areas according to field conditions. Detailed field observations and investigations were carried out and noted the Land use features on the imagery.

- *Post Field Work*

The base maps of the study area were prepared, with the help of Survey of India topo sheets. Preliminary interpreted Land use and the Land cover features boundaries from IRS Resourcesat-2 L4FMX-5m resolution False Color Composite were modified in light of field information and the final thematic details were transferred onto the base maps. The final interpreted and classified thematic map was cartographed. The cartographic map was coloured with standard colour coding and detailed description of feature with standard symbols. All the classes noted and marked by the standard legend on the map.

3.9.2.5 Final Output

The final output would be the Land use/Land cover map numerals were given different colour code for each category as shown in map. Area estimation of all features of Land use/Land cover categories was noted.

3.9.2.6 Observations

The following are the main interpreted land use/land cover classes of the study area and their respective areas are given in hectares in **Table 3.24** for the year 2023. The thematic map of study area and land use pattern within 10 km radius based on IRS Resourcesat-2 L4FMX- 5m resolution is shown in **Figure-3.21** and graphical representation for land use land cover classification is shown in **Figure-3.20**. The land-use land-cover map of the study area is represented in **Figure-3.22**.

- **Build up land**

Total built-up land comprises of 4.56% of settlements and 0.19% of industry/institutional land.

- **Forest**

Total forest of the study area comprises of 0.22% of dense/Open forest, 0.60% of degraded scrub and 0.09% of forest blanks.

- **Agricultural Land**

Agricultural land comprises of 1.51% of plantation, 20.88% of irrigated/double crop, 26.15% of other agricultural land/single crop and 32.78% of fallow land.

- **Waste Land**

Total waste land of the study area comprises of 1.58% of land with scrub and 0.81% of rocky/stony/barren land.

- **Water Body**

Total water body land comprises of 1.0% of stream/river/canal and 10.54% of tank/reservoir/pond.

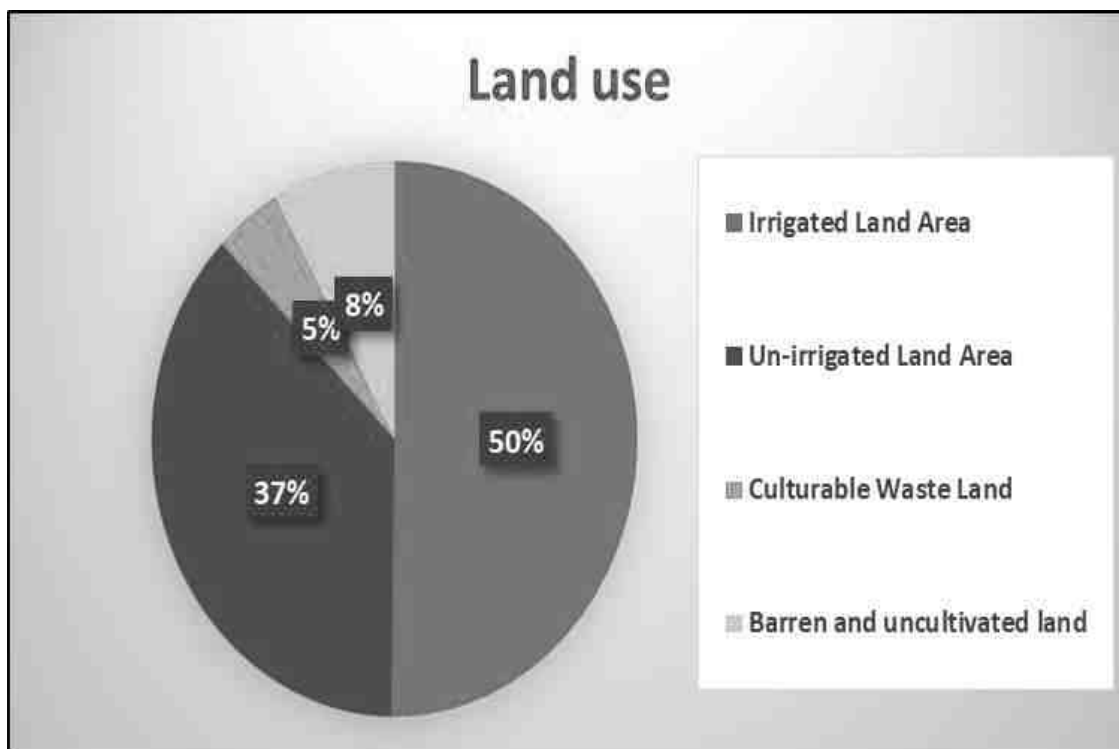


Figure 3-20 Graphical representation for land use classification

Table 3-25 Land use breakup details

Sr.No.	Level-I	Level-II	Area (Hectares)	Area (%)
1	Built-up Land			
		Village/Settlements/Town	1442.43	4.56
		Industry/Institutional Land	61.01	0.19
2	Forest			
		Dense/Open Forest	0.00	0.00
3	Agricultural land			
		Plantation	478.48	1.51
		Irrigated/Double Crop	6599.78	20.88
		Other Agriculture Land/Single Crop	8265.34	26.15
		Fallow Land	10361.51	32.78

Sr.No.	Level-I	Level-II	Area (Hectares)	Area (%)
4	Waste Land			
		Land with/without Scrub	499.48	1.58
		Rocky/Stony/Barren Land	255.45	0.81
5	Water Body			
		Stream/River/Canal	316.54	1.00
		Tank/Reservoir/Pond	3331.96	10.54
Total			31611.97	100.00

Source: Satellite Imagery

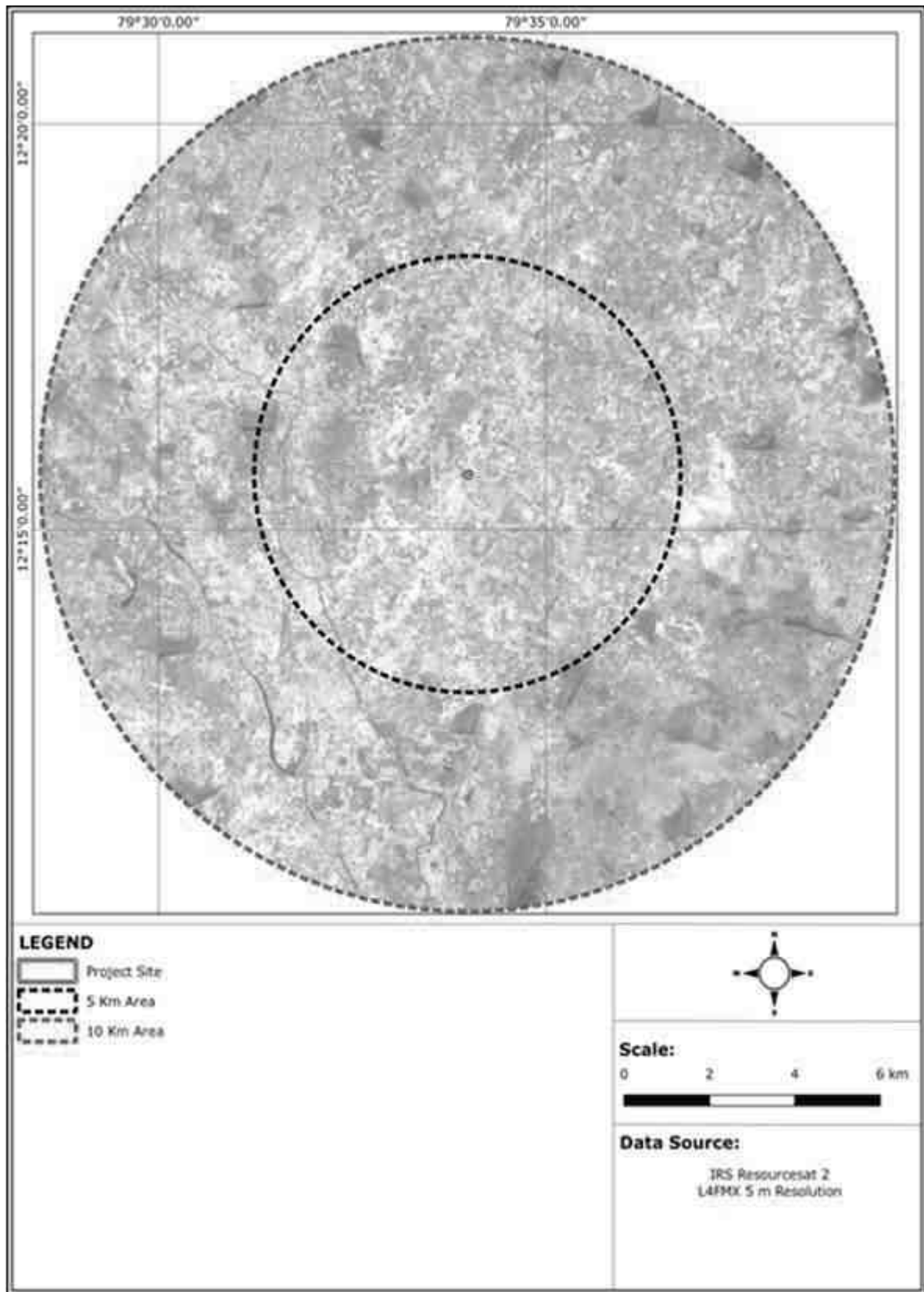


Figure 3-21 Raw satellite image of 10 km study area

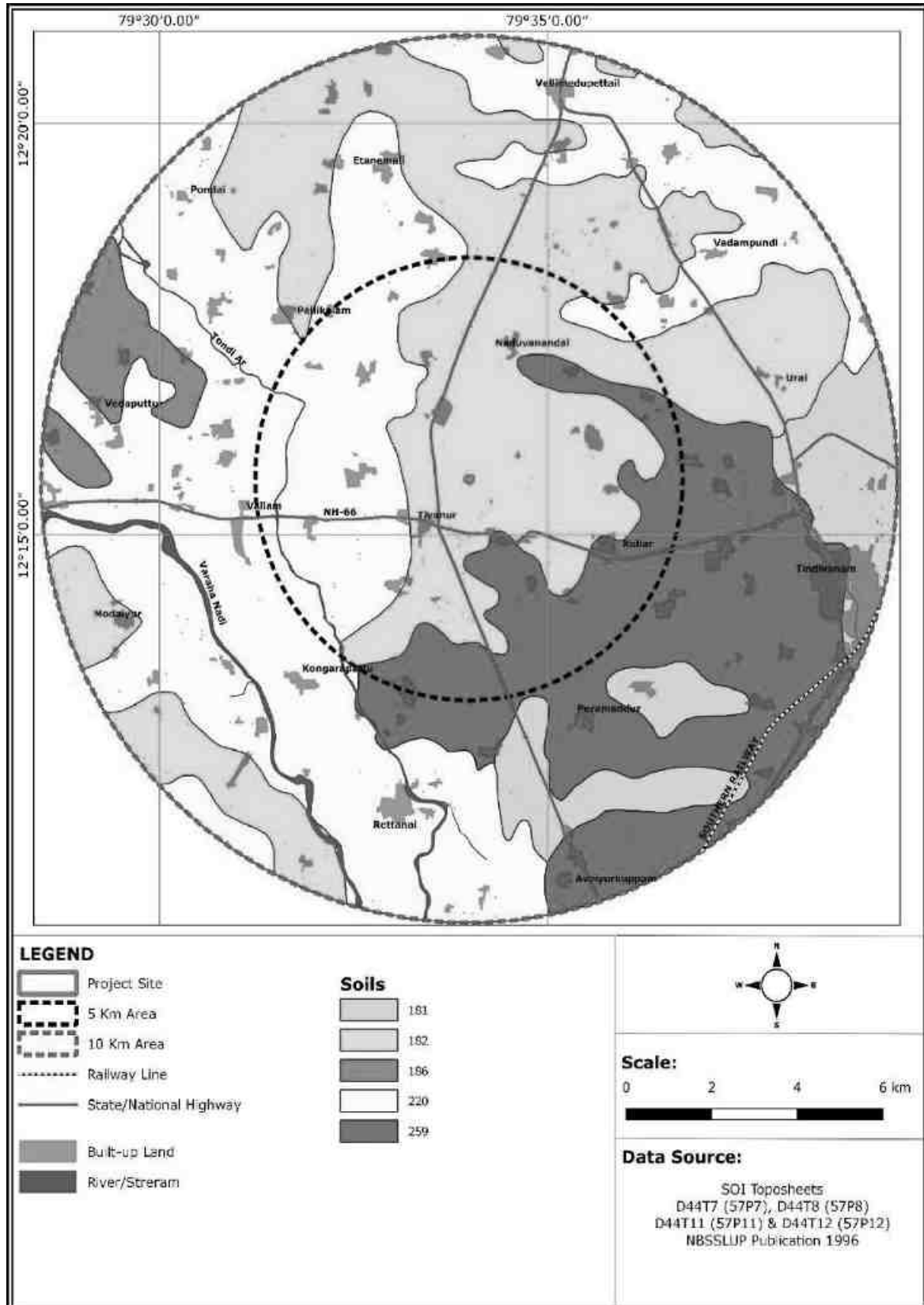


Figure 3-22 Land use/land cover map of 10 km radius based on satellite data

3.10 DEMOGRAPHY AND SOCIO- ECONOMICS

3.10.1 DEMOGRAPHIC ASPECTS

3.10.1.1 Distribution of population

As per 2011 census the study area consisted of 1,10,975 persons. The distribution of population in the study area of 10 km radial distance from the proposed plant site is shown in **Table- 3.26.**

Table 3-26 Distribution of population in the study area

Description	0-3 Km	3 -7 Km	7 – 10 Km	0 - 10 km
No. of households	3359	7678	13390	24427
Total population	15649	35067	60259	110975
Total Male	7827	17610	30184	55621
Total Female	7822	17457	30075	55354
Average household	4.7	4.6	4.5	4.5
% male to the total population	50.0	50.2	50.1	50.1
% Female to the total population	50.0	49.8	49.9	49.9
Sex Ratio (no of females per 1000 males)	999.36	991.31	996.39	995.20

Source : District Census Handbook - Villuppuram District, 2011

3.10.1.2 Average Household Size

The study area had an average family size of 4.5 persons per household in 2011 census. The moderate family size when compared with the other parts of the district.

3.10.1.3 Sex Ratio

The configuration of male and female indicates that the males contribute to about 50.1% and females 49.9% of the total population. The sex ratio i.e.the number of females per 1000 males indirectly reveals certain sociological aspects in relation with female birth, infant mortality among female children and single family structure, a resultant of migration of industrial workers. The study area on an average has 995.20 females per 1000 males as per 2011 census reports.

3.10.2 SOCIAL STRUCTURE

As per census, in the study area of 28% belongs to the Scheduled Caste (SC) and 1.4% belongs to the Scheduled Tribes (ST) showing that 31.8% of population belongs to socially weaker section. The distribution of population in the study area by social structure is shown in **Table- 3.27.**

Table 3-27 Distribution of population by social structure

Description	0-3 Km	3 -7 Km	7 - 10 Km	0 - 10 km
Scheduled caste	4674	11980	18631	35285
% to the total population	29.9	34.2	30.9	31.8
Schedule Tribes	204	417	948	1569
% to the total population	1.3	1.2	1.6	1.4
Total SC and ST population	4878	12397	19579	36854
% to the total population	31.2	35.4	32.5	33.2
Other castes population	10771	22670	40680	74121
Total population	15649	35067	60259	110975

Source : District Census Handbook - Villuppuram District, 2011

3.10.3 LITERACY LEVELS

The study area shows literacy rate is found to be 55.40%. The male literate to the total population was found to be 33.13% in the study area. The female literate to the total population is quite low as per census 2011 reports. In the study area, the male literacy is found out to be 50.12%, whereas the female literacy rate, which is observed to be 49.88% in the study area as per census 2011 census. The distribution of literate and literacy rate in the study area is shown in **Table- 3.28**.

Table 3-28 Distribution of literate and literacy rates

Description	0-3 Km	3 -7 Km	7 - 10 Km	0 - 10 km
Total Literate	8347	19162	33976	61485
Male population	7827	17610	30184	55621
Female population	7822	17457	30075	55354
Average Literacy (%)	53.34	54.64	56.38	55.40
Male Literate	5026	11480	20259	36765
% to study area literate	32.12	32.74	33.62	33.13
% to total male population	50.02	50.22	50.09	50.12
Female literate	3321	7682	13717	24720
% to study area literate	21.22	21.91	22.76	22.28
% to total female population	49.98	49.78	49.91	49.88

Source: District Census Handbook - Villuppuram District, 2011

3.10.4 OCCUPATIONAL STRUCTURE

The occupational structure of the study area were studied. As per census 2011 census records the main workers were found to be 51.11% of the total population. The marginal workers and non-workers were constitute to 9.44% and 48.89% of the total population. The occupational

structures indicates the non – workers shows the predominant population in the present study area. The occupational structure of the study area is shown in **Table- 3.29**.

Table 3-29 Occupational structure

Description	0-3 Km	3 -7 Km	7 – 10 Km	0 - 10 km
Total Population	15649	35067	60259	110975
Total main workers	8332	18556	29832	56720
% to total population	53.24	52.92	49.51	51.11
Marginal Workers	2003	2697	5778	10478
% to total population	12.80	7.69	9.59	9.44
Non- workers	7317	16511	30427	54255
% to total population	46.76	47.08	50.49	48.89

Source: District Census Handbook - Villuppuram District, 2011

3.11 TRAFFIC ASSESSMENT

With the proposed project, the transportation is likely to increase the road network during the operational phase on the nearest road. The influence of the traffic are examined based of adequency of the existing road network.

The traffic study was coordinated to find the existing traffic volume in the NH-77 from Gingee to Tindivanam Road which is set to be 811 PCU.hr. The traffic monitoring location is presented in **Figure-3.23& Figure-3.24**.

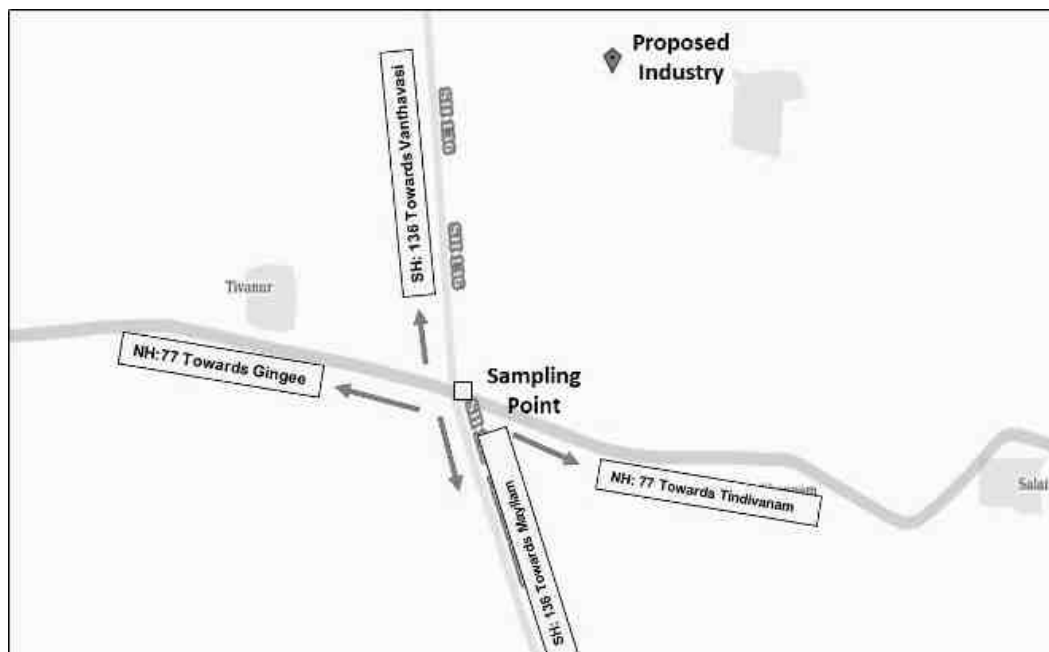


Figure 3-23 Traffic monitoring locations



Figure 3-24 Photographs of Traffic monitoring location

3.11.1 LOCATION DETAILS

Table 3-30 Details of the plant location

Sr. No.	Particulars	Details		
		Points	Latitude	Longitude
1.	Site co-ordinates	A	12°15'39.07" N	79°33'56.02"E
		B	12°15'42.69" N	79°33'57.99" E
		C	12°15'42.04" N	79°34'00.04" E
		D	12°15'42.93" N	79°34'00.43" E
		E	12°15'42.36" N	79°34'02.23" E
		F	12°15'39.12" N	79°34'00.81" E
2.	Elevation above MSL	78 m		
3.	Nearest Highway	NH 77: Gingee to Tindivanam (1.2 km,S) SH 5: Vanthavasi to Mayilam (0.7 km, E)		
4.	Nearest Railway Station	Thindivanam Station (9.9 km SE)		
5.	Nearest Airport	Puducherry Airport (42.21 km, SE)		
6.	Seismicity Zone	Zone-III as per IS: 1893 (Part-1) 2002		

3.11.2 DATA GENERATION

The vehicles passing through the road (in both ways) were counted separately for 24 hours at one selected location from 0600 hrs to 0600 hrs next day continuously. Category-wise vehicle counting has been done continuously and recorded in the traffic volume count on hourly basis under respective categories.

3.11.3 ROAD CONNECTIVITY TO THE PROJECT

The project site is located 1.2 Km away from NH-77 which is connecting Tindivanam & Chenji. The traffic generated by the proposed project. Though pressure develops, the connecting road is sufficient to handle the pressure.

3.11.3.1 Categorization of Traffic

The engine driven vehicles were categorized into various heads viz. Trucks/Bus, Light Carriage Vehicles (LCV), Car/Jeep, Multi Axle Vehicles, Two/Three Wheelers and Cycles/others.

3.11.3.2 Sampling Locations

The one location is represented in Table-3.31.

Table 3-31 Details of the traffic monitoring location

LocationCode	Location Details
T-1	National Highway - 77

Table 3-32 Road geometric scenario

Road	Road width (m)	Lanes	Surface Condition	Street lights	Road Markings	Road signs	Remarks
NH 77- Gingee to Tindivanam	7.5	2	Good	A	P	P	-

Table 3-33IRC guidelines

No of traffic lanes and widths	Traffic flow	Capacity in PCU's per hour for various traffic conditions		
		Roads with no frontage access, no standing vehicles, very little cross traffic	Roads with frontage access but no standing vehicles and high capacity intersections	Roads with free frontage access, parked vehicles and heavy cross traffic
2 - lane (7 – 7.5 m)	One way	2400	1500	1200
	Two way	1500	1200	750
3 – lane (10.5 m)	One way	3600	2500	2000
4 - lane (14 m)	One way	4800	3000	2400
	Two way	4000	2500	2000
6 – lane	One way*	3600	2500	2200

No of traffic lanes and widths	Traffic flow	Capacity in PCU's per hour for various traffic conditions		
		Roads with no frontage access, no standing vehicles, very little cross traffic	Roads with frontage access but no standing vehicles and high capacity intersections	Roads with free frontage access, parked vehicles and heavy cross traffic
(21 m)	Two way	6000	4200	3600
<i>*denotes for three lanes in predominant direction of flow</i>				

Table 3-34IRC – LOS Guidelines

V/C	LOS	Performance
0.0 - 0.2	A	Excellent
0.2 - 0.4	B	Very Good
0.4 - 0.6	C	Good / Average / Fair
0.6 - 0.8	D	Poor
0.8 - 1.0	E	Very Poor
1.0 & above	F	Worst

V= Volume in PCUs/hr & C= Capacity in PCUs/ hr

** Note: Capacity as per IRC Guidelines*

The hourly vehicular traffic densities for continuous normal day at each location observed during the study period and the same are presented in below tables:

Location Number : T-1

Details of Location : NH 77-Gingee to Tindivanam

Table 3-35Traffic Densities

Time	Two Wheeler	Auto Rickshaw	Car/ Utility	Buses& Other heavy Vehicles	Total Vehicles	Total PCUS
09.00 AM to 10.00 AM	478	25	92	43	638	485
10.00 AM to 11.00 AM	452	30	51	61	594	490
11.00 AM to 12.00 PM	408	37	53	83	581	543
12.00 PM to 01.00 PM	438	23	56	82	599	544
01.00 PM to	437	30	61	67	595	510.5

Time	Two Wheeler	Auto Rickshaw	Car/ Utility	Buses& Other heavy Vehicles	Total Vehicles	Total PCUS
02.00 PM						
02.00 PM to 03.00 PM	318	17	50	87	472	487
03.00 PM to 04.00 PM	330	21	72	95	518	543
04.00 PM to 05.00 PM	429	20	76	90	615	580.5
05.00 PM to 06.00 PM	441	34	80	84	639	586.5
06.00 PM to 07.00 PM	537	56	67	96	756	679.5
07.00 PM to 08.00 PM	534	54	72	119	779	750
08.00 PM to 09.00 PM	453	29	54	130	666	699.5
09.00 PM to 10.00 PM	211	11	40	86	348	414.5
10.00 PM to 11.00 PM	121	9	34	43	207	232.5
11.00 PM to 12.00 AM	127	4	8	20	159	135.5
12.00 AM to 01.00 AM	85	2	27	17	131	122.5
01.00 AM to 02.00 AM	82	3	39	4	128	95
02.00 AM to 03.00 AM	38	2	16	3	59	46
03.00 AM to 04.00 AM	65	2	9	7	83	64.5
04.00 AM to 05.00 AM	134	16	14	7	171	118
05.00 AM to 06.00 AM	141	19	19	21	200	171.5
06.00 AM to	117	13	87	40	257	278.5

Time	Two Wheeler	Auto Rickshaw	Car/ Utility	Buses& Other heavy Vehicles	Total Vehicles	Total PCUS
07.00 AM						
07.00 AM to 08.00 AM	212	31	94	66	403	429
08.00 AM to 09.00 AM	492	35	103	115	745	729
Total	7080	523	1274	1466	10343	9735

Table 3-36 Present traffic scenario

Road	V	C*	Existing V/C Ratio	LOS
Gingee to Tindivanam	405.6	1500	0.27	B

V= Volume in PCUs/hr & C= Capacity in PCUs/ hr

** Note: Capacity as per IRC Guidelines*

3.11.3.3 Traffic flow Assessment

The total traffic generated for the proposed activity is 405.6 PCUs (405.6+24=429.6). The flow of vehicles in the proposed activity doesn't not create any significant impacts to the environment. There will be a frequent movement of trucks in the plant premise for the transportation of raw material and products but after the proposed activities only a small increase in truck numbers which would not cause a significant impact.

Table 3-37 Traffic Scenario – After Establishment

Road	V	C*	Modified V/C Ratio	LOS
NH 77-Gingee to Tindivanam	429.6	1500	0.2716	B

V= Volume in PCUs/hr & C= Capacity in PCUs/ hr

** Note: Capacity as per IRC Guidelines*

After the proposed activity, the traffic generated due to the industrial activity would be 429.6 PCU. On combining with the existing traffic condition, the V/C ratio was found to be 0.2716 and Level of Service is very good.

3.11.3.4 Conclusion

The level of service (LOS) of the Gingee to Tindivanam (NH-77) is 'B' which is very good. After considering the transportation of trucks and other vehicles due to the proposed activity.

CHAPTER - IV ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

4 ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

4.1 GENERAL

Various operations involved in proposed establishment of the standalone grinding unit have been studied before implementation of project to identify, predict and evaluate impacts on various environmental components discussed below.

Environmental impacts both direct and indirect on various environmental attributes due to existing as well as proposed activity will be created in the surrounding environment, during the pre-operational, operational and post-operational phase.

Identification of possible impacts specific to an activity is an important task since this helps in focusing attention upon relevant environmental parameters and relating them with the activities involved. The following parameters are of significance in the Environmental Impact Assessment and are discussed in detail.

1. Land Environment
2. Air Environment
3. Water Environment
4. Solid Waste
5. Noise Environment
6. Biological Environment
7. Socio-economic Environment

4.2 ANTICIPATED IMPACTS DURING CONSTRUCTION PHASE & PROPOSED MITIGATION MEASURES

The proponent has proposed to develop a cement grinding plant to manufacture Pozzolanic Portland Cement (PPC), Ordinary Portland Cement (OPC), Portland Slag Cement (PSC) of 500 TPD capacity at S.F.No:30/2,30/3&30/4, Dheevanur Village, Thindivanam (Tk), Villuppuram District, Tamil Nadu. The proposed plant features 3 ball mills of capacities 1 x 5 TPH and 2 Nos. of 1x 10 TPH for grinding purposes.

The impacts of construction phase are temporary in nature and subside once the construction activities get over. Major pollutants generated from construction & commissioning activities are particulate matter (PM10 and PM2.5), NOx, SO2 and volatile organic compounds. Generation of dust from construction activities will be main cause of increase in PM10 and PM2.5 particle. The impacts of construction phase on various environmental attributes are tabulated below:

Table 4-1 Construction phase: Impact & Mitigation measures

S. No.	Environmental Attribute	Impact	Mitigation measures
1	Soil	<ul style="list-style-type: none"> Fuel leakages on soil during vehicular activities; 	<ul style="list-style-type: none"> All temporary structures, surplus materials and wastes to be completely removed on completion of works The leveling to be done Proper care will be taken that there is no spill that would cause soil contamination
2	Air Quality	<ul style="list-style-type: none"> Exhaust emission from vehicles. Exhaust from construction machinery Heavy dust generation Emission of greenhouse gases 	<ul style="list-style-type: none"> Regular sprinkling of water will be done at the construction site. Vehicles will be kept in good order to minimize automobile exhaust.
3	Noise levels	Noise generation due to heavy machinery and vehicular movement	<ul style="list-style-type: none"> The noise produced during the construction, and commissioning activities will have significant impact on the existing ambient noise levels. The construction work will be carried out during the daytime. The machineries to be used will be of least noise generation for the post-construction phase. Moreover, 3-row greenbelt will be developed to minimize the travel noise impact beyond the factory boundary.
4	Water quality	Ground water as well as surface water contamination due to improper management of wastes.	<ul style="list-style-type: none"> Water requirement will be met from borewell at site. Impact on water quality during construction phase may be due to non-point discharges of solids from soil

S. No.	Environmental Attribute	Impact	Mitigation measures
			<p>loss and sewage generated from the construction work force stationed at the site. Further, the construction in the project will be more related to mechanical fabrication, assembly and hence the water requirements would be small.</p> <ul style="list-style-type: none"> • Temporary sanitation facilities will be set up for disposal of sanitary sewage generated by the work force as per the prevailing labor laws. The overall impact on water environment during construction phase due to proposed expansion is likely to be short term and insignificant.
5	Ecology	<ul style="list-style-type: none"> • No national park, wildlife sanctuary, biosphere reserve exists within 10 km area of the project. Agriculture fields dominate the terrestrial ecology. • The impact on the surrounding ecology during the operation of the project will mainly occur from the deposition of dust generated due to construction activities onto the nearby vegetation. 	<ul style="list-style-type: none"> • The incremental emission of air pollutants is not likely to induce any significant changes in the terrestrial ecology. • Broad foliage tree- species will be used for the green-belt. • The species able to absorb pollution, dust emission etc. will be planted along the periphery of the plant. This will screen air pollutants.
6	Socio-economics	<p>The project will have positive impact on the socio-economics of the area.</p> <p>Local laborers particularly unskilled labours will be offered employment during construction as well as</p>	<p>The locals would get opportunities for employment due to the project.</p> <p>The socio-economic conditions of the area will improvise.</p> <p>In addition to the opportunity of getting employment as construction laborers, the local population would also have employment opportunities based on the</p>

S. No.	Environmental Attribute	Impact	Mitigation measures
		post-construction phase.	educational qualification like petty commercial establishments, small contracts/sub-contracts and supply of construction materials for buildings and ancillary infrastructures etc.
7	Human Health	Increase in various types of diseases like High Blood pressure (HBP), Hypertension, respiratory diseases, cardiovascular diseases etc. due to dust emissions.	<ul style="list-style-type: none"> Regular checkups as per Factory Act are recommended. PPE given to workmen to reduce occupational health hazards.

Table 4-2 Identification of Impacts during Construction Phase

Parameter/ Activity	Air	Water	Land	Noise	Ecology	Health & Safety	Socio Economic
Site cleaning	✓	x	✓	✓	✓	✓	x
Leveling and road laying	✓	x	✓	✓	x	✓	x
Earthwork comprising of excavation, grading, trenching	✓	x	✓	✓	x	✓	x
Transportation of construction materials	✓	x	✓	✓	✓	✓	x
Civil work	✓	✓	✓	✓	x	✓	x
Mechanical	✓	x	✓	✓	x	✓	✓
Employment	x	✓	x	x	x	✓	✓
Domestic Activities by workers	x	✓	✓	x	x	✓	x
Greenbelt development	✓	✓	✓	✓	✓	✓	✓

Note: (✓):Possibility of Impact (x): No impact will occur

Table 4-3 Prediction of Impacts during Construction Phase

Parameter/ Activity	Air	Water	Land	Noise	Ecology	Health & Safety	Socio Economic
Site cleaning	(-ve)	-	(-ve)	(-ve)	(-ve) ST	(-ve) ST	-

Parameter/ Activity	Air	Water	Land	Noise	Ecology	Health & Safety	Socio Economic
	ST		ST	ST			
Leveling and road laying	(-ve) ST	-	(-ve) ST	(-ve) ST	-	(-ve) ST	-
Earthwork comprising of excavation, grading, trenching	(-ve) ST	-	(-ve) ST	(-ve) ST	-	(-ve) ST	-
Transportation of construction materials	(-ve) ST	-	(-ve) ST	(-ve) ST	(-ve) ST	(-ve) ST	-
Civil work	(-ve) ST	(-ve) ST	(-ve) ST	(-ve) ST	-	(-ve) ST	-
Mechanical	(-ve) ST	-	-	-	-	(-ve) ST	-
Employment	-	(-ve) ST	-	-	-	(-ve) ST	(+ve) LT
Greenbelt development	(+ve) LT	(+ve) LT	(+ve) LT	(+ve) LT	(+ve) LT	(+ve) LT	(+ve) LT
Note:(+ve):Positive Impact; (-ve):Negative Impact; ST: Short Term; LT: Long Term							

4.2.1 LAND ENVIRONMENT

The land required for the proposed project activity is about 1.877 ha (4.64 acres). Out of these 0.789 ha will be used for the plant facilities. The land identified is near Dheevanur Village, Thindivanam (Tk), Viluppuram District, Tamil Nadu. No tree felling is envisioned in the proposed plant site. Hence, there is no revealing impact is envisaged on the existing land use.

Measures for minimizing and/or offsetting adverse impacts identified

- Optimization of land requirement through proper site lay out design will be basic criteria at the design phase.

4.2.2 IMPACT ON AIR QUALITY

The specific amount of particulate matters (SO₂, NO_x & PM) will be turned out from the proposed construction activities. The construction phase will contained the fine amount of earthwork, civil construction and material handling. These particulate matters may be coarse and settle within the short distance. The construction of the NO_x and CO increases due to the

movement of the vehicular activities. The effect of this action would be temporary and its keep within the bounds to the construction phase. These activities will be authorized only inside the project site and excepted to insignificant in the outside premises area.

Aspects/Activity	Impact	Management
Movement of equipment at site and dust emitted during the levelling, grading, earthwork, foundation works and exhaust emissions from vehicles.	<ul style="list-style-type: none"> Decreased visibility Respiratory illness Marginal increase in the levels of SO₂, NO_x, PM and CO. 	<ul style="list-style-type: none"> PUC Certified vehicles will be used. PPEs (helmet, earmuff, ear plug etc) will be provided to workers. Impacts on air due to the construction activities will be minimal or negligible. Proper maintenance of vehicles and construction equipment will help in controlling the gaseous emissions. Water sprinkling on roads and construction site will prevent fugitive dust. Sprinkling of water at frequent intervals by preferably using truck-mounted sprinklers; Sprinkling of water will be done along the roads and work zone areas to reduce the fugitive dust; Green belt area has been grown with evergreen trees helps to reduce the fugitive emissions generated in the industrial premise; and Company owned vehicles are being used for transporting raw material and end products. The vehicles are maintained with good management practices to reduce the air pollution in the premise.

4.2.3 IMPACT ON WATER QUALITY

Water required during the construction phase of 2-5 KLD will be met from private suppliers. Domestic wastewater generated from labour work force will be treated in mobile toilets.

Aspects/Activity	Impact	Management
<ul style="list-style-type: none"> Water demand during construction works and workers. Non-point discharge of solids from the soil loss and sewage generated from the construction 	Ground water contamination due to improper management	<ul style="list-style-type: none"> The earthwork (cutting and filling) will be avoided during the rainy season and will be completed during the summer season. Stone pitching on the slopes and construction of concrete drains for storm water to minimize soil erosion in the area will be undertaken; and

<p>workforce stationed at the site. Further, the construction will be more related to mechanical fabrication, assembly and; hence the water requirement would be small.</p>		<ul style="list-style-type: none"> • Soil binding and fast-growing vegetation will be grown within the plant premises to arrest the soil erosion. • Optimum use of water will be done for construction activities required for proposed expansion project as there will be upgradation of reheating furnace and additional machineries will be installed. • Water demand will be met through tanker water supply. • No stagnant water will be allowed at the site. • Proper and effective Environmental Management Planning will be implemented to minimize the temporary effects.
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4.2.4 IMPACT ON NOISE LEVELS

The operation of the excavators and construction machineries may arise the noise level upto 60 - 70 Db (A) at 1.0 m distance during the construction activities. It may be adopted that the noise levels at 1.0-km from the proposed plant site will be considerably less. Thus, it to be noticed that noise level will be slightly high during the construction phase.

Aspects/Activity	Impact	Management
<p>Vehicular traffic, loading and unloading of construction material, handling of equipment and materials</p>	<ul style="list-style-type: none"> • Constant loud noise can adversely affect human & animal health • Physical impact on health: deafness, Respiratory agitation, high blood pressure, headaches • Psychological impact: stress, fatigue, depression, anxiety. 	<ul style="list-style-type: none"> • Provision of protective devices like ear muff/plugs to the workers. • Regular & preventive maintenance of Vehicles and construction machinery. • Moveable noise barriers will be considered. • Equipment's are maintained appropriately to keep the noise level within 80-85 dB (A). Wherever possible, equipment has been provided with silencers and mufflers. Construction activities will be restricted to day time only.

4.2.5 IMPACT ON TERRESTRIAL ECOLOGY

Most of the land is spotted as the barren, since there is no felling of trees is envisaged. During the construction phase, there is no loss of biomass is identified. Due to the construction activities,

the migration of labour force take place in the nearby areas, since leads to the minor pressure on trees because of increase in domestic fuel demand. To prevent the felling of trees in nearby areas, alternate fuel will be provided for the requirement of the labor force. No major fauna is present in the proposed plant site, hence no significant impact is envisaged on terrestrial ecology due to the proposed cement grinding unit.

4.2.6 DEMOGRAPHY AND SOCIO-ECONOMICS

During the construction activities, the local peoples would get the opportunities for the proposed plant. The local people would get the opportunities in connected services like commercial establishments, small contracts/sub – contracts and supply of construction materials etc.,

Aspects/Activity	Impact	Management
Generation of employment opportunities for locals.	Impact on human health due to deterioration of air quality, increase in noise levels, contamination of ground water/surface water etc. due to improper disposal of waste.	<ul style="list-style-type: none"> • There will be requirement of skilled and semi-skilled workers for construction activities, supply of raw materials & auxiliary facilities. It would marginally improve the economic status of the people • The socio-economic conditions of the area will improve. • Thus, it will boost up the commercial and economical status of the locality to some extent. Thus, overall impacts on socio-economic environment due to the existence of plant are long term and positive in nature. • There will not be major changes in the land use pattern as it is existing project situated in converted industrial area. • The project will prove to be environmentally sustainable with implementation of affective EMP & post-project environmentally monitoring.

Facilities for Construction Work force

First Aid: At work place, first aid facilities shall be maintained at a readily accessible place with necessary appliances including sterilized cotton wool etc. shall be available. Ambulance facilities shall be kept readily available at workplace to take injured person to the nearest hospital.

Potable Water: Sufficient supply of cold water fit for drinking shall be provided at suitable places.

Sanitary Facility: Within the precinct of work place, latrines and urinals shall be provided at accessible place. These shall be cleaned at least twice during working hours and kept in a good sanitary condition. The contractor shall conform to the sanitary requirements of local medical and health authorities at all times.

Canteen: A canteen on a moderate scale shall be provided for the benefit of workers.

Security: SPC shall provide necessary security to work force in co-ordination with state authorities

4.3 IMPACTS DURING OPERATIONAL PHASE

The process involved in proposed standalone cement grinding unit has predominant impact on the air quality and quantity of impacts on the components of environment. All the aspects are identified and considered for impact assessment in terms of quality and quantity with its distribution in time and space. And, accordingly the mitigation measures will be adopted by the plant management.

Table 4-4 Identification of Impacts during post construction Phase

Parameter/ Activity	Air	Water	Land	Noise	Ecology	Health & Safety	Socio Economic
Raw material & product storage and handling	✓	x	x	✓	x	✓	x
Transportation of raw materials and finished products	✓	✓	x	✓	✓	✓	x
Production	✓	✓	x	✓	x	✓	x
Emergencies or disaster	✓	✓	x	✓	✓	✓	✓
Breakdown of critical systems	✓	✓	x	✓	x	✓	✓
Employment	x	x	x	x	x	✓	✓
Greenbelt development	✓	✓	✓	✓	✓	✓	✓
Infrastructure development & CSR activities	x	x	x	x	✓	✓	✓
Note: (✓): Possibility of Impact (x): No impact will occur							

Table 4-5 Prediction of Impacts during post construction Phase

Parameter/ Activity	Air	Water	Land	Noise	Ecology	Health & Safety	Socio Economic
Raw material & product storage and handling	(-ve) ST	-	-	(-ve) ST	(-ve) ST	(-ve) ST	-
Transportation of raw materials and finished products	(-ve) ST	(-ve) ST	-	(-ve) ST	(-ve) ST	(-ve) ST	-
Production	(-ve) ST	(-ve) ST	-	(-ve) ST	-	(-ve) ST	(+ve) LT
Emergencies or disaster	(-ve) ST	(-ve) ST	-	(-ve) ST	(-ve) ST	(-ve) ST	(-ve) LT
Breakdown of critical systems	(-ve) ST	(-ve) ST	-	(-ve) ST	-	(-ve) ST	(-ve) ST
Employment	-	-	-	-	-	(+ve) LT	(+ve) LT
Greenbelt development	(+ve) LT	(+ve) LT	(+ve) LT	(+ve) LT	(+ve) LT	(+ve) LT	(+ve) LT
Infrastructure development & CSR activities	-	-	-	-	-	(+ve) LT	(+ve) LT

Note: (√):Possibility of Impact (x): No impact will occur

4.4 IMPACT ON LAND USE

There are no historical / tourist / archaeologically important places in the study area. Likewise, there are no endangered, threatened or rare plant species at the proposed plant site or within 10 km radius of the proposed plant site that needs to be protected. No detectable impacts on terrestrial life are anticipated. No migration route to avifauna is observed or recorded. The development of greenbelt will help to attract the avifauna. No major changes are envisaged in land use pattern, hence no impact is envisaged in land use.

4.4.1 IMPACT ON SOIL VIS-A-VIS SOLID WASTE

No other waste is generated rather than the domestic waste in the proposed plant. Hence all the dust particles is collected by the air control equipment and its automatically recycled into the process. The domestic biodegradable solid waste will be utilized as the manure for the greenbelt

development. The proposed plantation scheme with diversified species not only will increase the biomass, soil fertility, productivity but also works as pollution sinks and control of Soil erosion. Hence the likely impact on the soil characteristics due to the proposed cement grinding unit will be insignificant.

4.4.2 TOPOGRAPHY AND CLIMATE

The proposed site for the cement grinding unit is a barren land. There will not be any micro or macro climatic changes as there will not be any thermal imbalance. It can be concluded that the cement grinding and packing unit will not cause any adverse impact on the topography and climate due to its operation.

4.5 AIR ENVIRONMENT

Being a proposed standalone grinding unit, the major air pollutants are Particulate Matter's (PM). The fugitive dust and gaseous emissions expected are from raw material handling area, grinding area, loading and unloading area, hopper and DG-set areas.

The dust emissions, if any from the above areas will be fugitive in nature and maximum during summer season (when the wind velocities are likely to be high) and almost nil during the monsoon season. The dust emissions are likely to be confined to the place of generation only. The quantification of these fugitive emissions from the area sources is difficult as it depends on lot of factors such as dust particles size, specific gravity of dust particles, wind velocity, moisture content of the material and ambient temperature etc. Also, there is a high level of variability in these factors. Hence, these are not amenable for mathematical dispersion modelling. However, by proper usage of dust suppression measures, dust generation and dispersion will be reduced.

Prediction of impacts on air environment has been carried out by employing mathematical model based on a steady state Gaussian Plume Dispersion model designed for multiple point sources for short term. In the present case, AERMOD-designed for multiple point sources for short term and developed by United States Environmental Protection Agency (USEPA) has been used for simulations from point sources. The model simulations deal with dispersion of three major pollutants viz., Sulphur Dioxide (SO₂), Oxides of Nitrogen (NO_x) and Particulate matter emitted from the stacks.

4.5.1 AIR POLLUTION IMPACT PREDICTION THROUGH MODELLING

4.5.1.1 Air Environment

Base line data reveals that ambient air quality in the study area for the Parameters PM, SO₂ & NO_x, are well within the permissible Limits as prescribed by the National Ambient Air Quality Standards (NAAQS) for Industrial Area, Residential, Rural & Other areas.

The major air pollutant from the proposed activity is PM, SO₂, NO_x and CO emissions.

4.5.1.2 Meteorological Data

The meteorological data for a 3 month, i.e. from 01/04/2023 to 30/06/2023 was considered for the study. Data included for AERMET were daily wind speed, wind direction, temperature, relative humidity, air pressure, precipitation, and solar radiation recorded during the period. AERMET reformats meteorological data so that it can be used as input for AERMOD model.

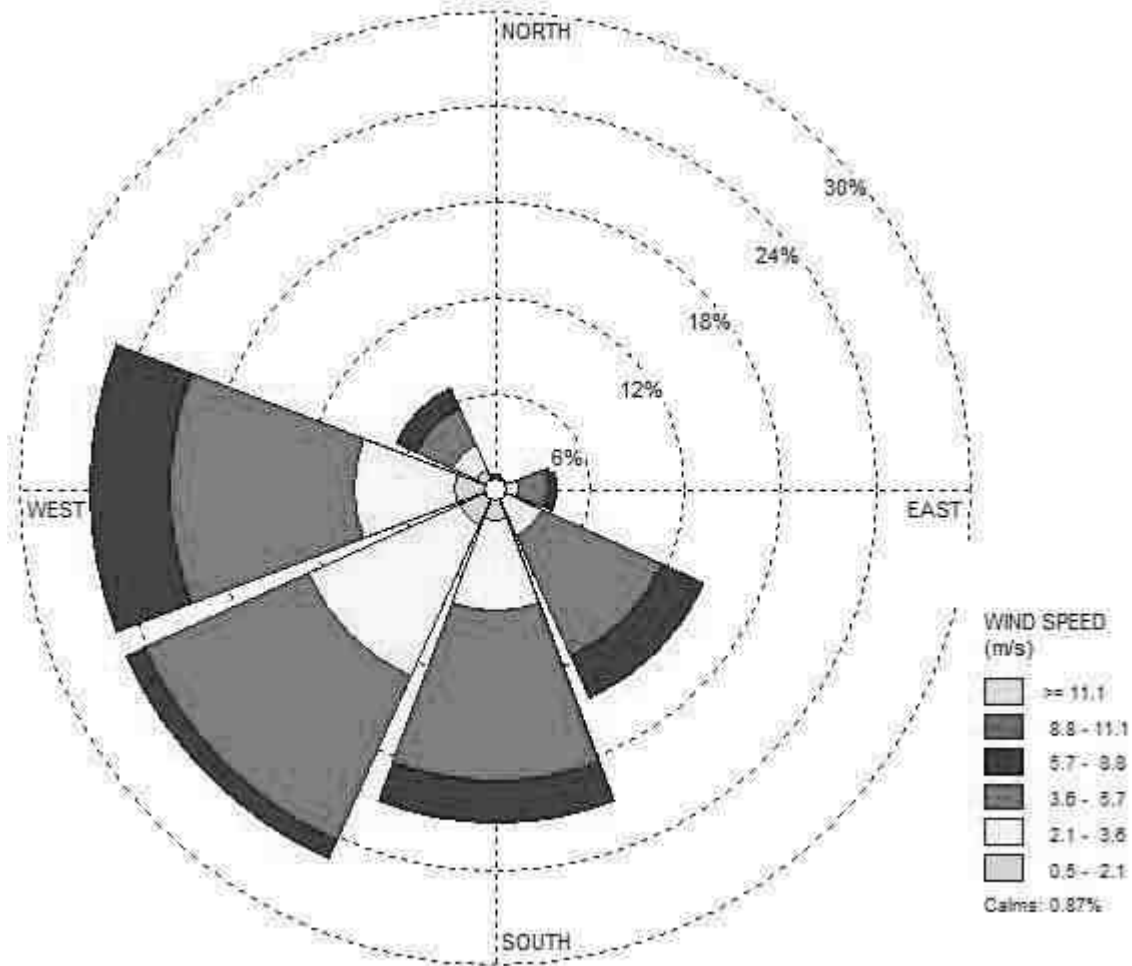


Figure 4-1 Wind rose diagram of Meteorological data considered for Modelling (April to June 2023)

4.5.1.3 AERMET Process

For the 3 phase AERMET processing of the meteorological data, specifications of the land use in the area are required to determine the terrain roughness for modelling. The land use was characterized for in and around the site. The surface characteristics for the site and surroundings were selected and used to calculate the Albedo, Bowen ratio and surface roughness parameters.

4.5.1.4 AERMOD Process

AERMOD Software Version 8.0.5 was used for air dispersion modelling and is applicable to a wide range of buoyant or neutrally buoyant emissions up to a range of 50 km. In addition to more straight forward cases, AERMOD is also suitable for complex terrain and urban dispersion scenarios.

AERMOD is a steady-state plume model. In the stable boundary layer (SBL), it assumes the concentration distribution to be Gaussian in both the vertical and horizontal. In the convective boundary layer (CBL), the horizontal distribution is also assumed to be Gaussian, but the vertical distribution is described with a bi-Gaussian probability density function (pdf). This behavior of the concentration distributions in the CBL was demonstrated by Willis and Deardorff (1981) and Briggs (1993). Additionally, in the CBL, AERMOD treats “plume lofting,” whereby a portion of plume mass, released from a buoyant source, rises to and remains near the top of the boundary layer before becoming mixed into the CBL. AERMOD also tracks any plume mass that penetrates into the elevated stable layer, and then allows it to re-enter the boundary layer when and if appropriate. For sources in both the CBL and the SBL AERMOD treats the enhancement of lateral dispersion resulting from plume meander. The emissions from proposed stacks are estimated and used for the air dispersion modeling as shown in **Table 4.6** controlled emissions, respectively. Maximum incremental values for PM, SO₂ and NO_x have been represented as pictorial concentration contours and as tabular concentration values in following sections.

4.5.1.5 Emissions

Table 4-6 Emission from the proposed project stack

SL. NO.	Source	Fuel Type	Stack Details					Emissions (g/s)			
			No. of Stack	Height (m)	Temp (°C)	Dia (m)	Exit Velocity (m/s)	PM	SO2	NOx	CO
1	Ball mill - I (5 TPH)	-	1	11	80	0.5	15	0.0054	-	-	-
2	Ball mill - II (10 TPH)	-	1	11	80	0.5	15	0.0109	-	-	-
3	Ball Mill - III (10 TPH)	-	1	11	80	0.5	15	0.0109	-	-	-
4	DG - 125 kVA	HSD	1	10	195	0.2	9.8	0.0015	0.0014	0.0218	0.0047
5	DG - 125 kVA	HSD	1	10	195	0.2	9.8	0.0015	0.0014	0.0218	0.0047
Total								3.03E-02	2.89E-03	4.36E-02	9.41E-03

Note:

1. DG emission calculation based on the capacity.
2. DG height is calculated based on the formula:
Height of building is assumed as 7 m.
 - i. DG Stack Height (H) = Height of the building (h) + 0.2 SQRT(DG set capacity in KVA).

Source:

1. AP-42: Compilation of Air Emissions Factors.

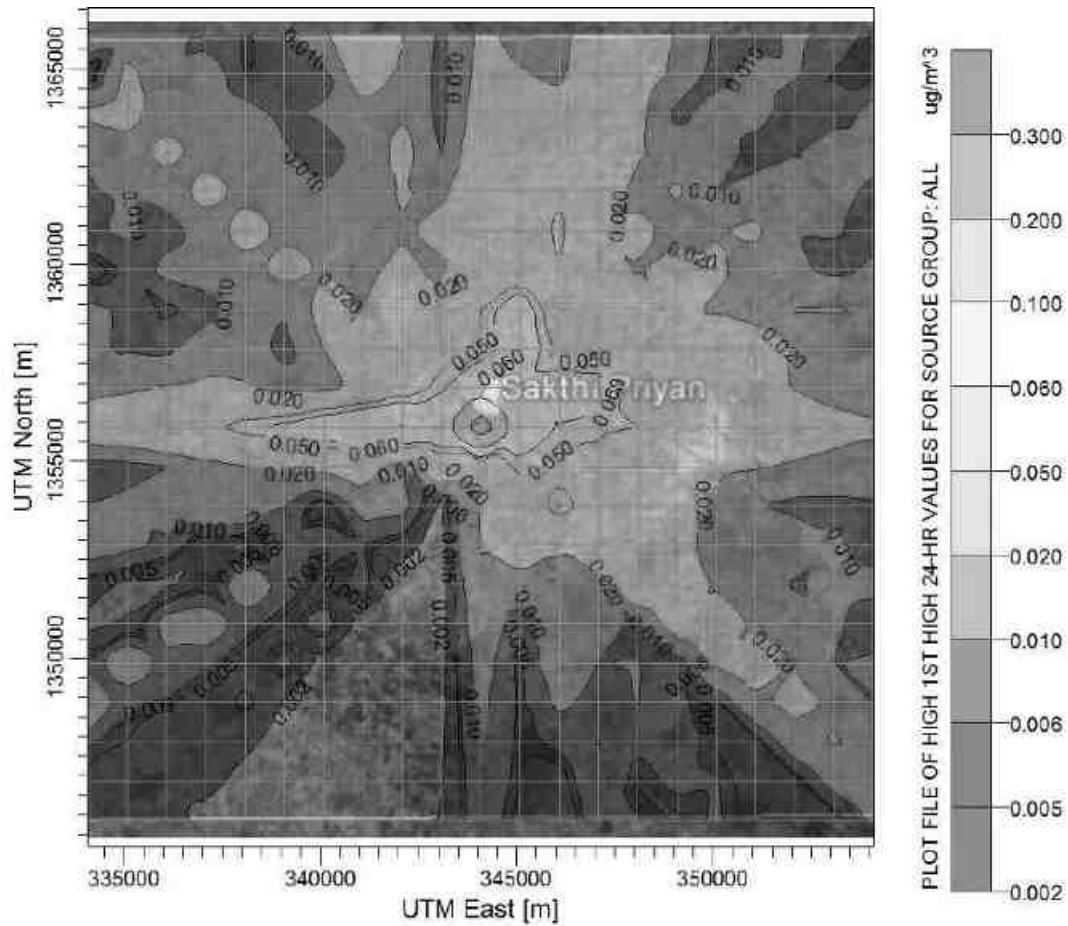


Figure 4-2 Predicted 24-Hrs' GLC's of PM within 10 km Radius of the Study Area

Table 4-7 Estimated Top 10 Highest Concentrations of PM Obtained through Modeling

S. No	UTM coordinates (m)		Conc. ($\mu\text{g}/\text{m}^3$)	Distance from Centre of Project Site (~Km)	Direction from Centre of Project Site
	E	N			
1.	344084	1355873	0.25843	Within site	Within site
2.	342084	1355873	0.10059	2	W
3.	341084	1355873	0.09462	3	W
4.	344084	1356873	0.09289	1	N
5.	343084	1355873	0.08778	1	W
6.	345084	1355873	0.08718	1	E
7.	345084	1357873	0.07933	2.24	NNE
8.	340084	1355873	0.07878	4	W
9.	345084	1358873	0.07774	3.16	NNE
10.	346084	1356873	0.07329	2.24	ENE

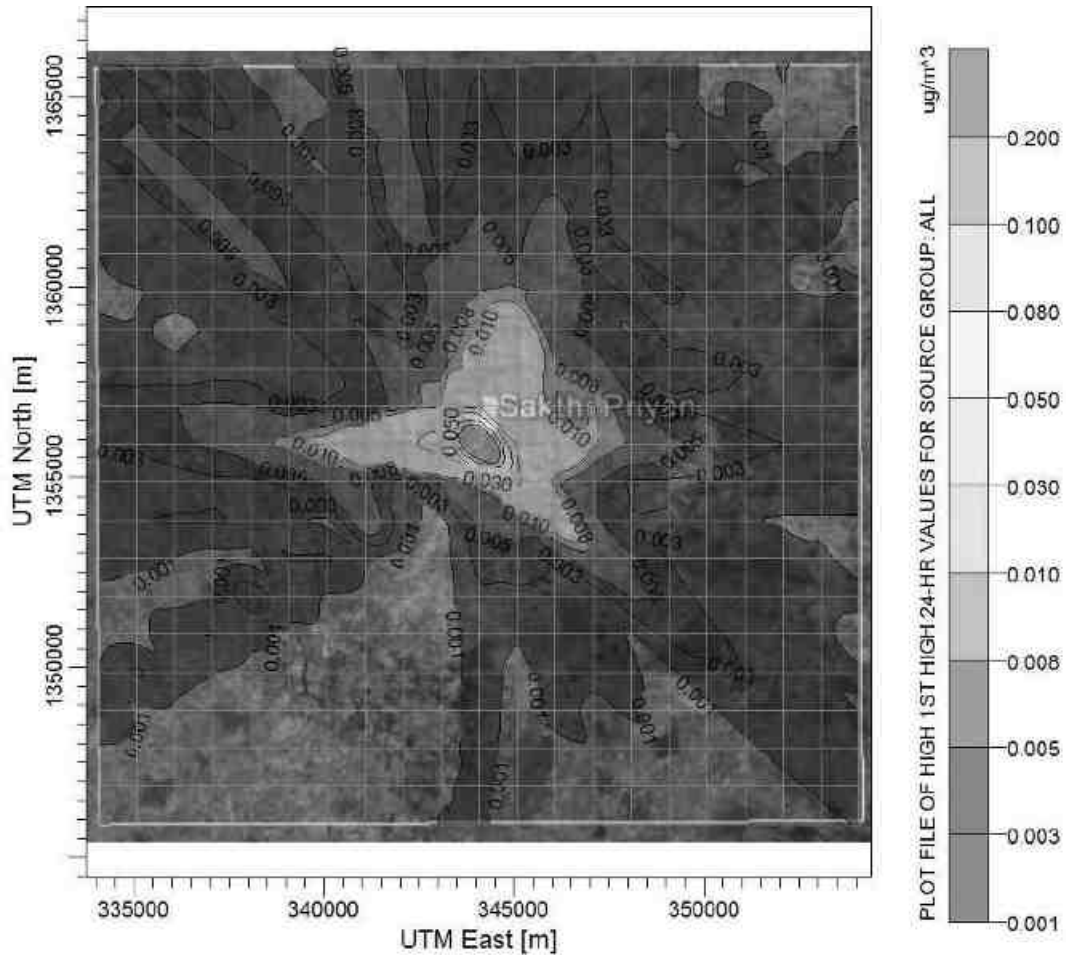


Figure 4-3 Predicted 24-Hrs' GLC's of SO₂ within 10 km Radius of the Study Area
Table 4-8 Estimated Top 10 Highest Concentrations of Sulphur Di Oxide Obtained through Modeling

S. No	UTM coordinates (m)		Conc. (µg/m ³)	Distance from Centre of Project Site (~Km)	Direction from Centre of Project Site
	E	N			
1.	344084	1355873	0.18148	Within site	Within site
2.	343084	1355873	0.04058	1	W
3.	345084	1354873	0.03195	1.41	SE
4.	344084	1356873	0.03008	1	N
5.	345084	1355873	0.02915	1	E
6.	342084	1355873	0.02639	2	W
7.	345084	1356873	0.02225	1.41	NE
8.	346084	1355873	0.01683	2	E
9.	341084	1355873	0.01668	3	W
10.	345084	1358873	0.01563	3.16	NNE

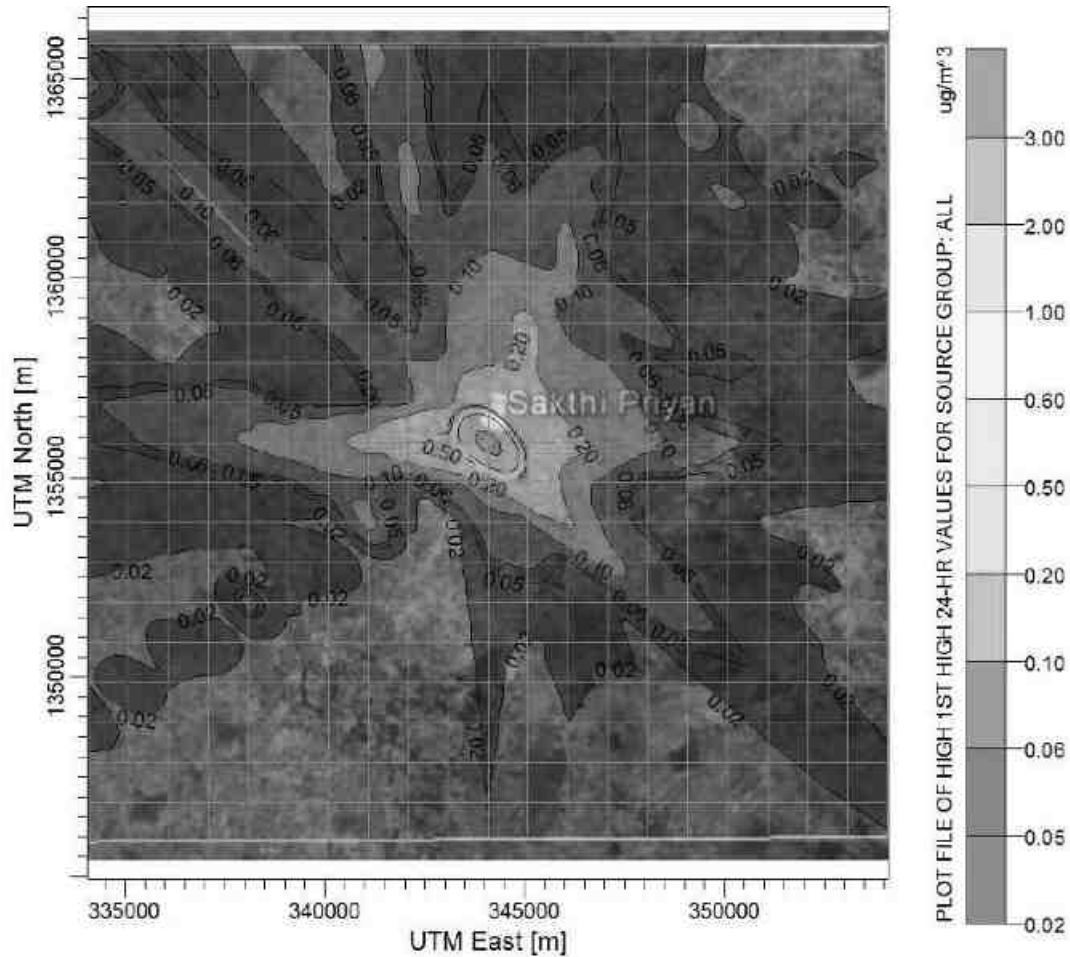


Figure 4-4 Predicted 24-Hrs' GLC's of NO_x within 10 km Radius of the Study Area

Table 4-9 Estimated Top 10 Highest Concentrations of Oxides of Nitrogen Obtained through Modeling

S. No	UTM coordinates (m)		Conc. (µg/m ³)	Distance from Centre of Project Site (~Km)	Direction from Centre of Project Site
	E	N			
1.	344084	1355873	2.74429	Within site	Within site
2.	343084	1355873	0.61366	1	W
3.	345084	1354873	0.48311	1.41	SE
4.	344084	1356873	0.45489	1	N
5.	345084	1355873	0.44082	1	E
6.	342084	1355873	0.39912	2	W
7.	345084	1356873	0.33653	1.41	NE
8.	346084	1355873	0.25448	2	E
9.	341084	1355873	0.25217	3	W
10.	345084	1358873	0.23637	3.16	NNE

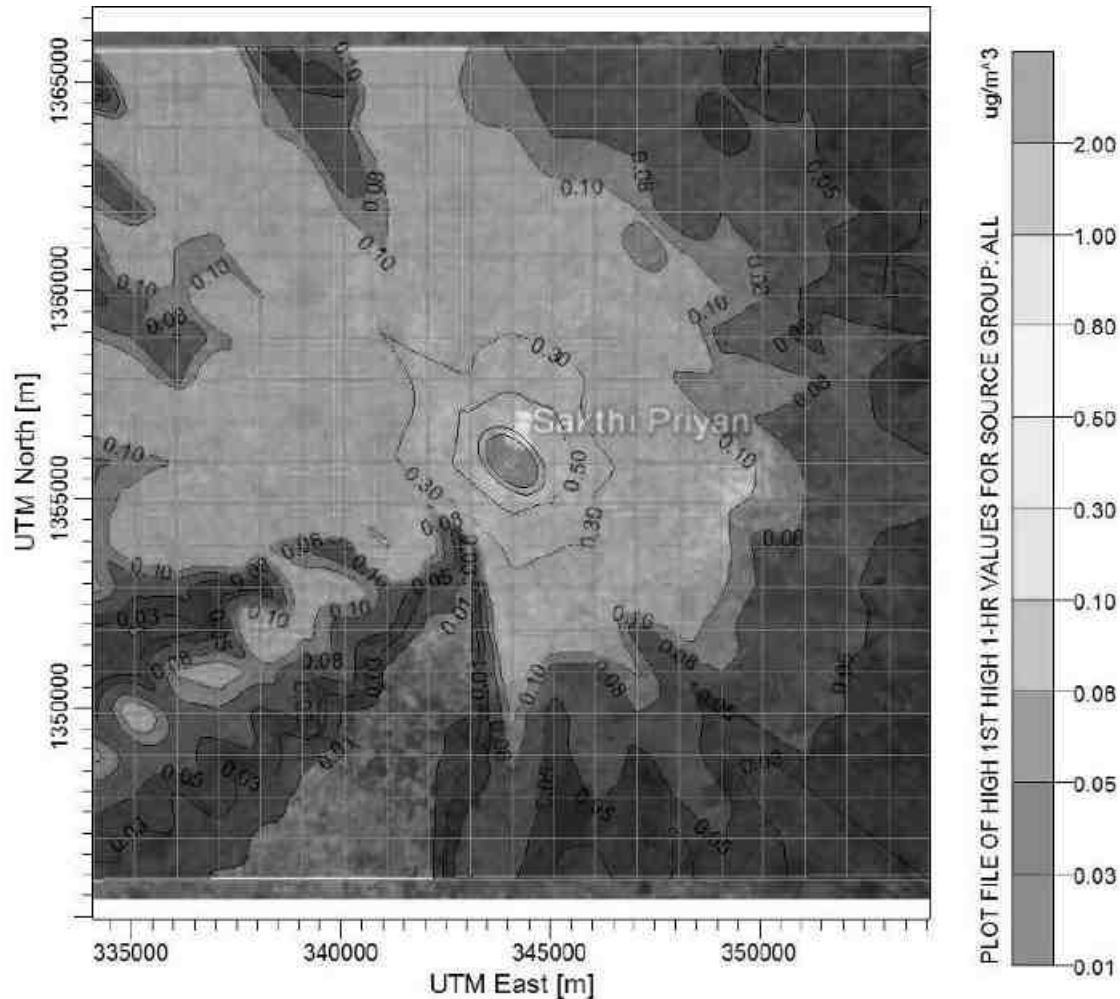


Figure 4-5 Predicted 1-Hrs' GLC's of CO within 10 km Radius of the Study Area
Table 4-10 Estimated Top 10 Highest Concentrations of CO Obtained through Modeling

S. No	UTM coordinates (m)		Conc. ($\mu\text{g}/\text{m}^3$)	Distance from Centre of Project Site (~Km)	Direction from Centre of Project Site
	E	N			
1.	344084	1355873	1.71232	Within site	Within site
2.	344084	1356873	0.70806	1	N
3.	345084	1355873	0.62355	1	E
4.	343084	1355873	0.57436	1	W
5.	343084	1356873	0.55262	1.41	NW
6.	345084	1356873	0.54129	1.41	NE
7.	344084	1354873	0.53972	1	S
8.	345084	1354873	0.47928	1.41	SE
9.	344084	1357873	0.43136	2	N
10.	342084	1355873	0.41908	2	W

4.5.1.5.1 Conclusion

Maximum pollutant concentrations of PM, SO₂ and NO_x observed due to proposed for an 24hr-average period have been studied and CO observed due to proposed for an 1hr-average period have been studied. The total increase in concentrations above baseline status to estimate the percentage increase and summarized in Table 4-11 Total Maximum GLCs from the Stack Emissions
Table 4-11.

Table 4-11 Total Maximum GLCs from the Stack Emissions

Pollutant	Max. Base line Conc. (µg/m ³)	Estimated Incremental Conc. (µg/m ³)	Total Conc. (µg/m ³)	NAAQ standard (µg/m ³)
PM	71.0	0.25	71.25	100
SO ₂	13.7	0.18	13.88	80
NO _x	25.2	2.74	27.94	80
CO	335	1.71	336.71	4000

4.5.1.6 Line Source

Table 4-12 Emission from the proposed project transportation

S.No	Type of Vehicle	No. of Vehicle	Emissions (g/s)		
			PM	NO _x	CO
1	Bike	30	3.00E-04	6.00E-03	3.33E-02
2	Car	2	2.00E-05	5.56E-04	3.29E-03
3	Bus	1	2.22E-05	1.02E-03	8.89E-03
4	Truck	3	6.67E-05	3.07E-03	2.67E-02
Total			4.09E-04	1.06E-02	7.22E-02

Source:

Indian Emission Regulations by the Automotive Research Association of India

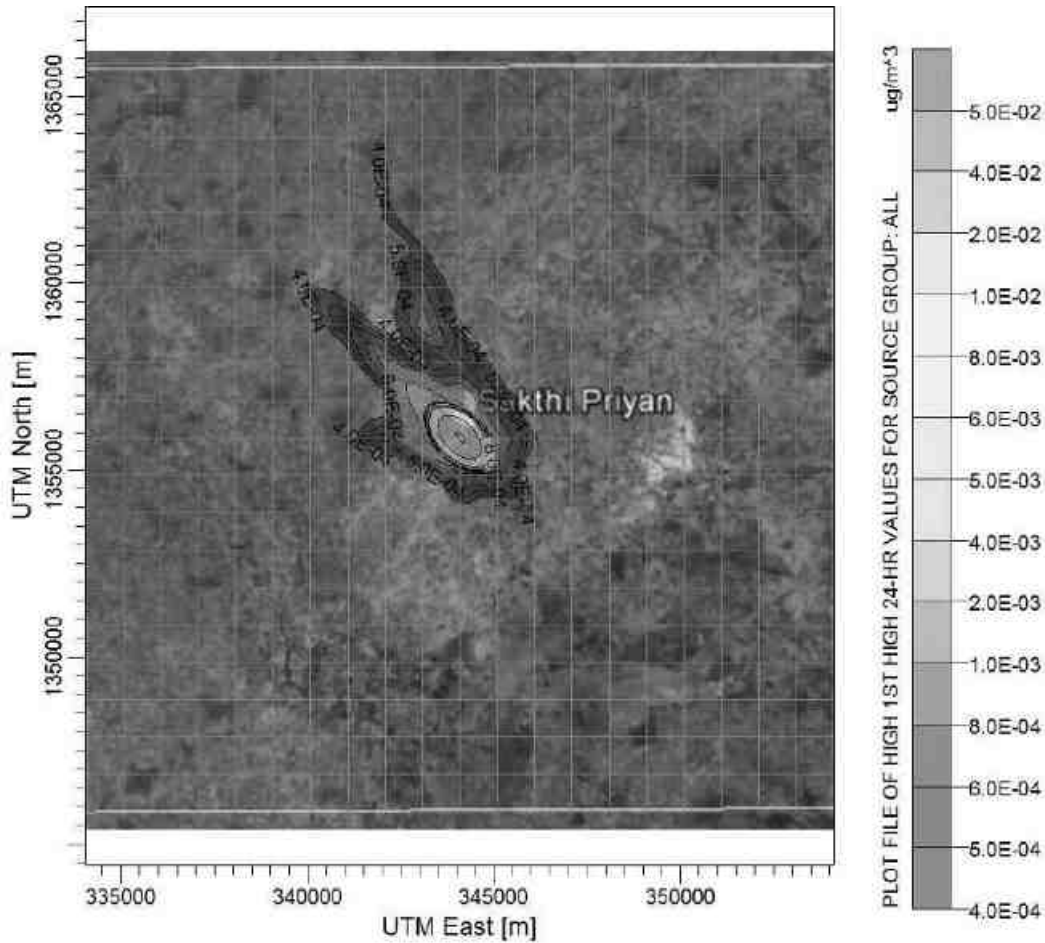


Figure 4-6 Predicted 24-Hrs' GLC's of PM within 10 km Radius of the Study Area
Table 4-13 Estimated Top 10 Highest Concentrations of PM Obtained through Modeling

S. No	UTM coordinates (m)		Conc. ($\mu\text{g}/\text{m}^3$)	Distance from Centre of Project Site (~Km)	Direction from Centre of Project Site
	E	N			
1.	344084	1355873	0.0455	Within site	Within site
2.	343084	1356873	0.00298	1.41	NW
3.	343084	1355873	0.00165	1	W
4.	344084	1356873	0.00137	1	N
5.	343084	1358873	0.00117	3.16	NNW
6.	342084	1357873	0.00111	2.82	NW
7.	345084	1355873	0.00107	1	E
8.	343084	1359873	0.00085	4.16	NNW
9.	345084	1354873	0.00081	1.41	SE
10.	344084	1354873	0.00073	1	S

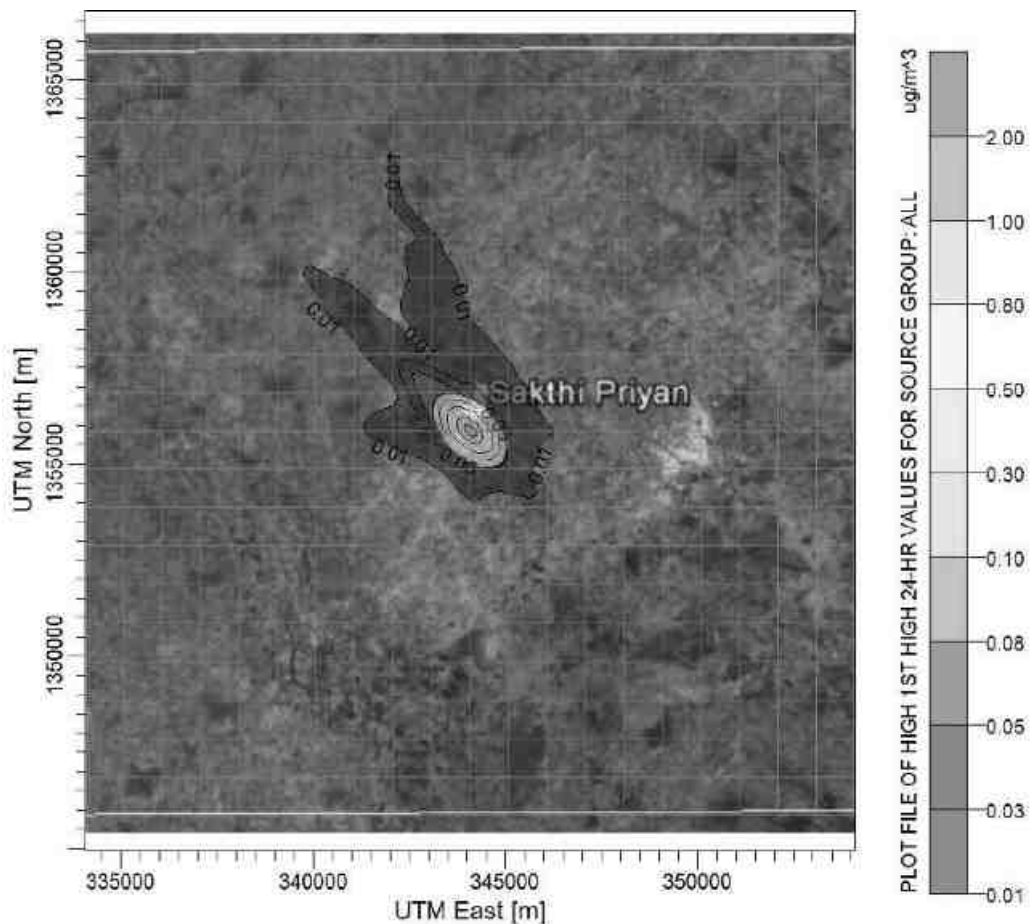


Figure 4-7 Predicted 24-Hrs' GLC's of NO_x within 10 km Radius of the Study Area
Table 4-14 Estimated Top 10 Highest Concentrations of Oxides of Nitrogen Obtained through Modeling

S. No	UTM coordinates (m)		Conc. (µg/m ³)	Distance from Centre of Project Site (~Km)	Direction from Centre of Project Site
	E	N			
1.	344084	1355873	1.18413	Within site	Within site
2.	343084	1356873	0.07769	1.41	NW
3.	343084	1355873	0.04295	1	W
4.	344084	1356873	0.03568	1	N
5.	343084	1358873	0.03043	3.16	NNW
6.	342084	1357873	0.02897	2.82	NW
7.	345084	1355873	0.02772	1	E
8.	343084	1359873	0.02202	4.16	NNW
9.	345084	1354873	0.02116	1.41	SE
10.	344084	1354873	0.01894	1	S

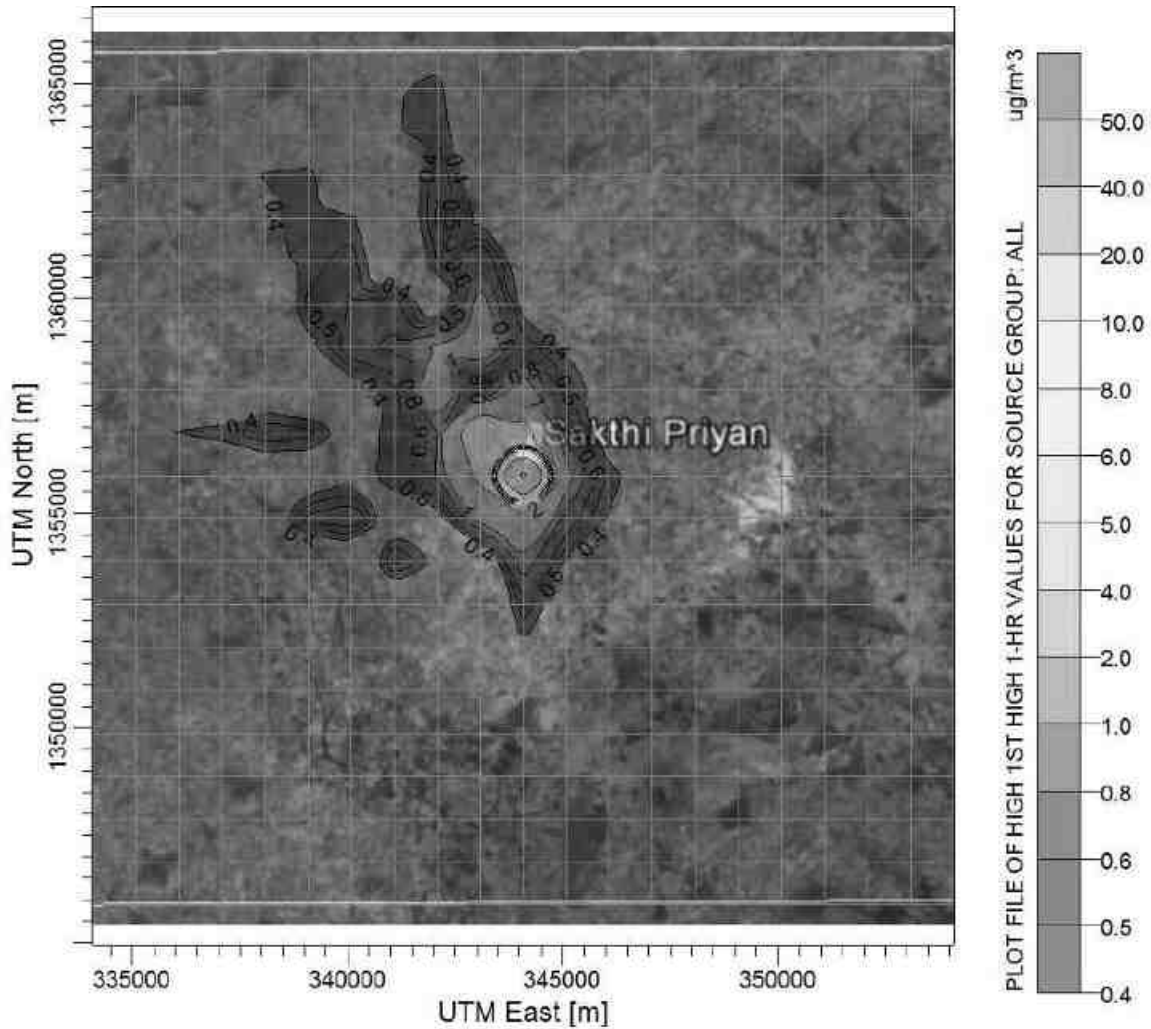


Figure 4-8 Predicted 1-Hrs' GLC's of CO within 10 km Radius of the Study Area

Table 4-15 Estimated Top 10 Highest Concentrations of CO Obtained through Modeling

S. No	UTM coordinates (m)		Conc. ($\mu\text{g}/\text{m}^3$)	Distance from Centre of Project Site (~Km)	Direction from Centre of Project Site
	E	N			
1.	344084	1355873	43.04282	Within site	Within site
2.	343084	1356873	3.50356	1.41	NW
3.	344084	1356873	2.33485	1	N
4.	343084	1355873	2.30185	1	W
5.	344084	1354873	1.73196	1	S
6.	342084	1357873	1.46279	2.82	NW
7.	343084	1358873	1.34501	3.16	NNW
8.	344084	1357873	1.20587	2	N
9.	343084	1359873	1.16724	4.12	NNW
10.	345084	1355873	1.14152	1	E

4.5.1.6.1 Conclusion

Maximum pollutant concentrations of PM and NO_x observed due to proposed for an 24hr-average period have been studied and CO observed due to proposed for an 1hr-average period have been studied. The total increase in concentrations above baseline status to estimate the percentage increase and summarized in **Table 4-16**.

Table 4-16 Total Maximum GLCs from the Transportations Emissions

Pollutant	Max. Base line Conc. (µg/m³)	Estimated Incremental Conc. (µg/m³)	Total Conc. (µg/m³)	NAAQ standard (µg/m³)
PM ₁₀	71.0	0.04	71.04	100
NO _x	25.2	1.18	26.38	80
CO	335	43.04	378.04	4000

4.5.1.7 Cumulative

Table 4-17 Emission from the proposed project stack and transportation

S.No	Source	Type of fuel used	Stack Details				Emission (g/s)					
			No. of stack	Height (m)	Temp (0C)	Dia (m)	Exit Velocity (m/s)	PM	SO ₂	NO _x	CO	
1	Ball mill - I (5 TPH)		1	11	80	0.5	15	0.00544	-	-		
2	Ball mill - II (10 TPH)		1	11	80	0.5	15	0.01088	-	-		
3	Ball Mill - III (10 TPH)		1	11	80	0.5	15	0.01088	-	-		
4	DG - 125 kVA	HSD	1	10	195	0.2	9.8	0.001549	0.001443	0.021825	0.004703	
5	DG - 125 kVA	HSD	1	10	195	0.2	9.8	0.001549	0.001443	0.021825	0.004703	
Transportation												
S.No.	Vehicle type	No. of Vehicle per day				PM	SO ₂	NO _x	CO			
1	Bike	30				3.00E-04	-	6.00E-03	3.33E-02			
2	Car	2				2.00E-05	-	5.56E-04	3.29E-03			
3	Bus	1				2.22E-05	-	1.02E-03	8.89E-03			
4	Truck	3				6.67E-05	-	3.07E-03	2.67E-02			
Total (g/s)						3.07E-02	2.89E-03	5.43E-02	8.16E-02			

Note:

1. DG emission calculation based on the capacity.
2. DG height is calculated based on the formula:
Height of building is assumed as 7 m.
i. DG Stack Height (H) = Height of the building (h) + 0.2 SQRT(DG set capacity in KVA).

Source:

1. AP-42: Compilation of Air Emissions Factors.
2. Indian Emission Regulations by the Automotive Research Association of India.

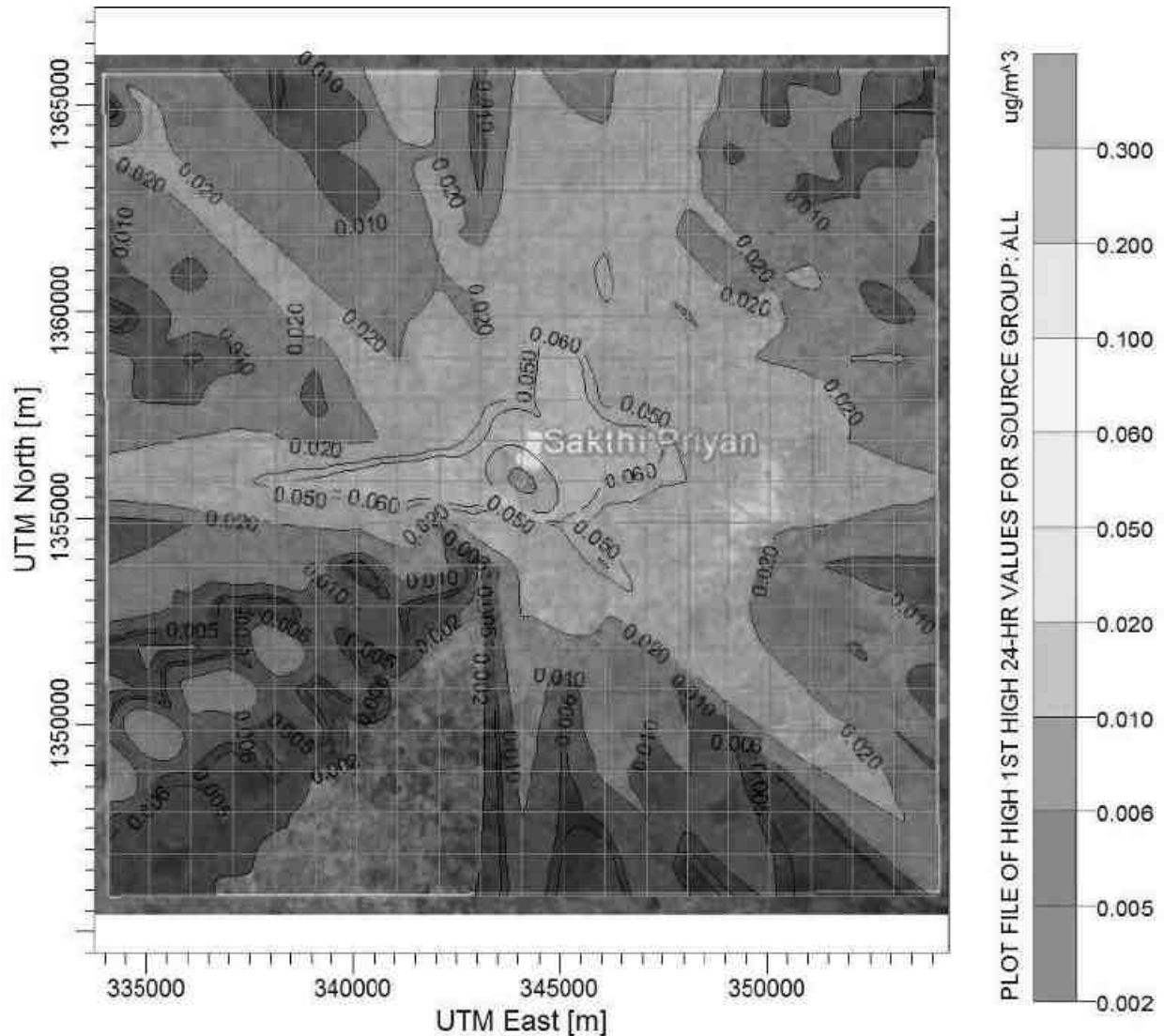


Figure 4-9 Predicted 24-Hrs' GLC's of PM within 10 km Radius of the Study Area

Table 4-18 Estimated Top 10 Highest Concentrations of PM Obtained through Modeling

S. No	UTM coordinates (m)		Conc. ($\mu\text{g}/\text{m}^3$)	Distance from Centre of Project Site (~Km)	Direction from Centre of Project Site
	E	N			
1.	344084	1355873	0.26292	Within site	Within site
2.	342084	1355873	0.10035	2	W
3.	341084	1355873	0.09442	3	W
4.	344084	1356873	0.09273	1	N
5.	343084	1355873	0.08806	1	W
6.	345084	1355873	0.08695	1	E
7.	345084	1357873	0.0792	2.24	NNE
8.	340084	1355873	0.07862	4	W
9.	345084	1358873	0.07757	3.16	NNE
10.	346084	1356873	0.07317	2.24	ENE

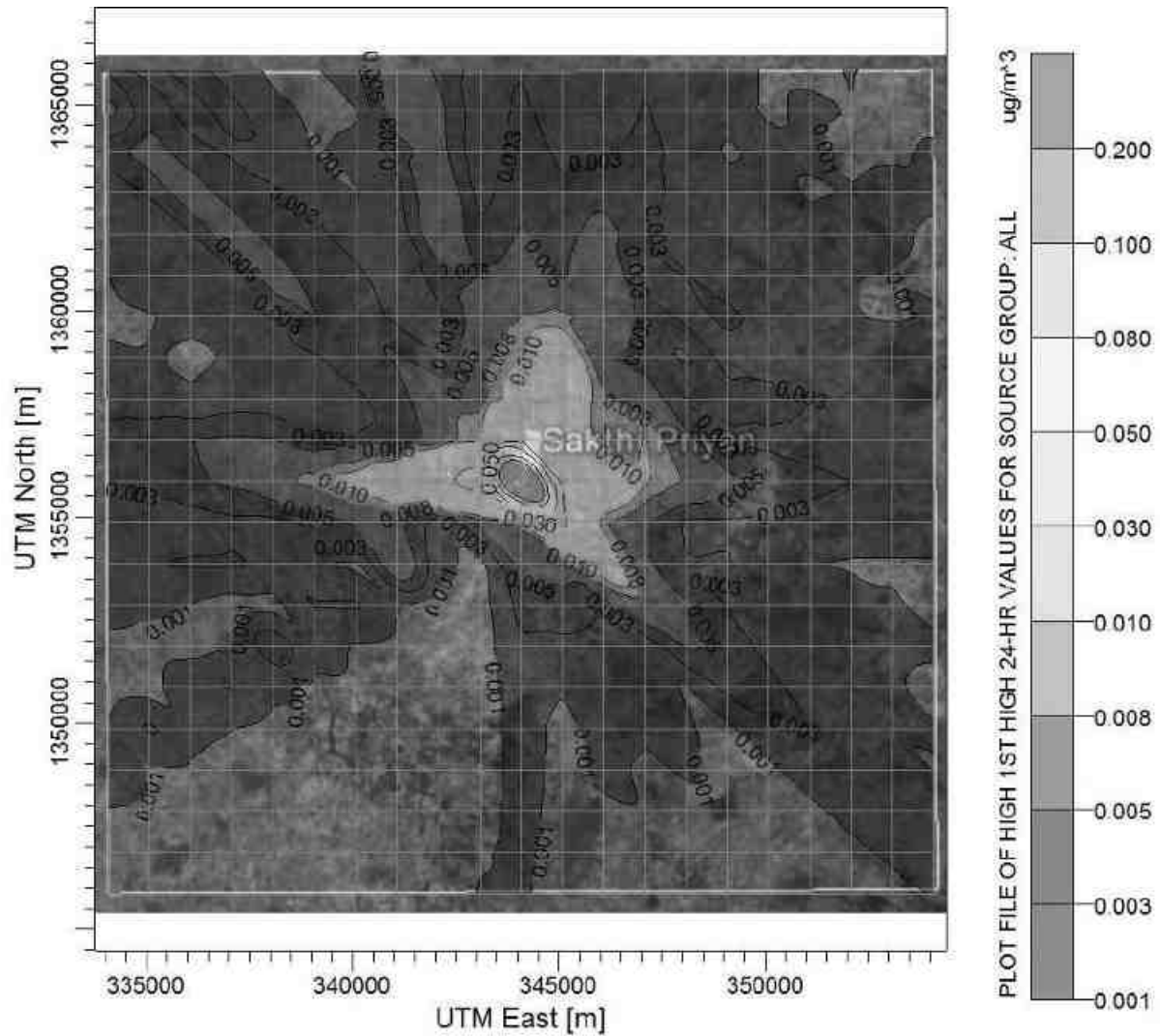


Figure 4-10 Predicted 24-Hrs' GLC's of SO₂ within 10 km Radius of the Study Area
Table 4-19 Estimated Top 10 Highest Concentrations of Sulphur Di Oxide Obtained through Modeling

S. No	UTM coordinates (m)		Conc. (µg/m ³)	Distance from Centre of Project Site (~Km)	Direction from Centre of Project Site
	E	N			
1.	344084	1355873	0.18148	Within site	Within site
2.	343084	1355873	0.04058	1	W
3.	345084	1354873	0.03195	1.41	SE
4.	344084	1356873	0.03008	1	N
5.	345084	1355873	0.02915	1	E
6.	342084	1355873	0.02639	2	W
7.	345084	1356873	0.02225	1.41	NE
8.	346084	1355873	0.01683	2	E
9.	341084	1355873	0.01668	3	W
10.	345084	1358873	0.01563	3.16	NNE

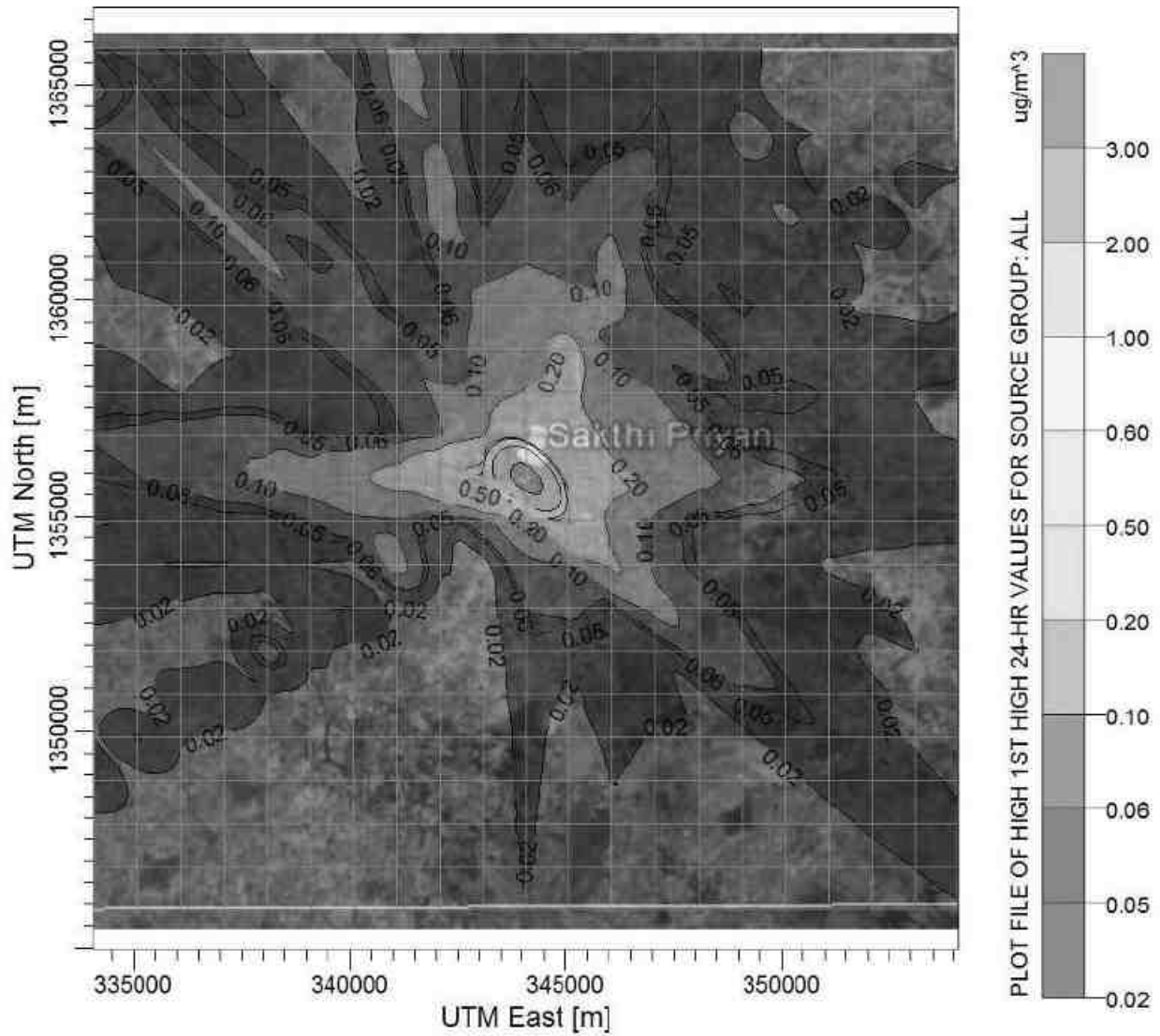


Figure 4-11 Predicted 24-Hrs' GLC's of NO_x within 10 km Radius of the Study Area
Table 4-20 Estimated Top 10 Highest Concentrations of Oxides of Nitrogen Obtained through Modeling

S. No	UTM coordinates (m)		Conc. (µg/m ³)	Distance from Centre of Project Site (~Km)	Direction from Centre of Project Site
	E	N			
1.	344084	1355873	2.92515	Within site	Within site
2.	343084	1355873	0.65592	1	W
3.	345084	1354873	0.50373	1.41	SE
4.	344084	1356873	0.47679	1	N
5.	345084	1355873	0.46805	1	E
6.	342084	1355873	0.41571	2	W
7.	345084	1356873	0.35239	1.41	NE
8.	346084	1355873	0.26513	2	E
9.	341084	1355873	0.26136	3	W
10.	345084	1358873	0.2456	3.16	NNE

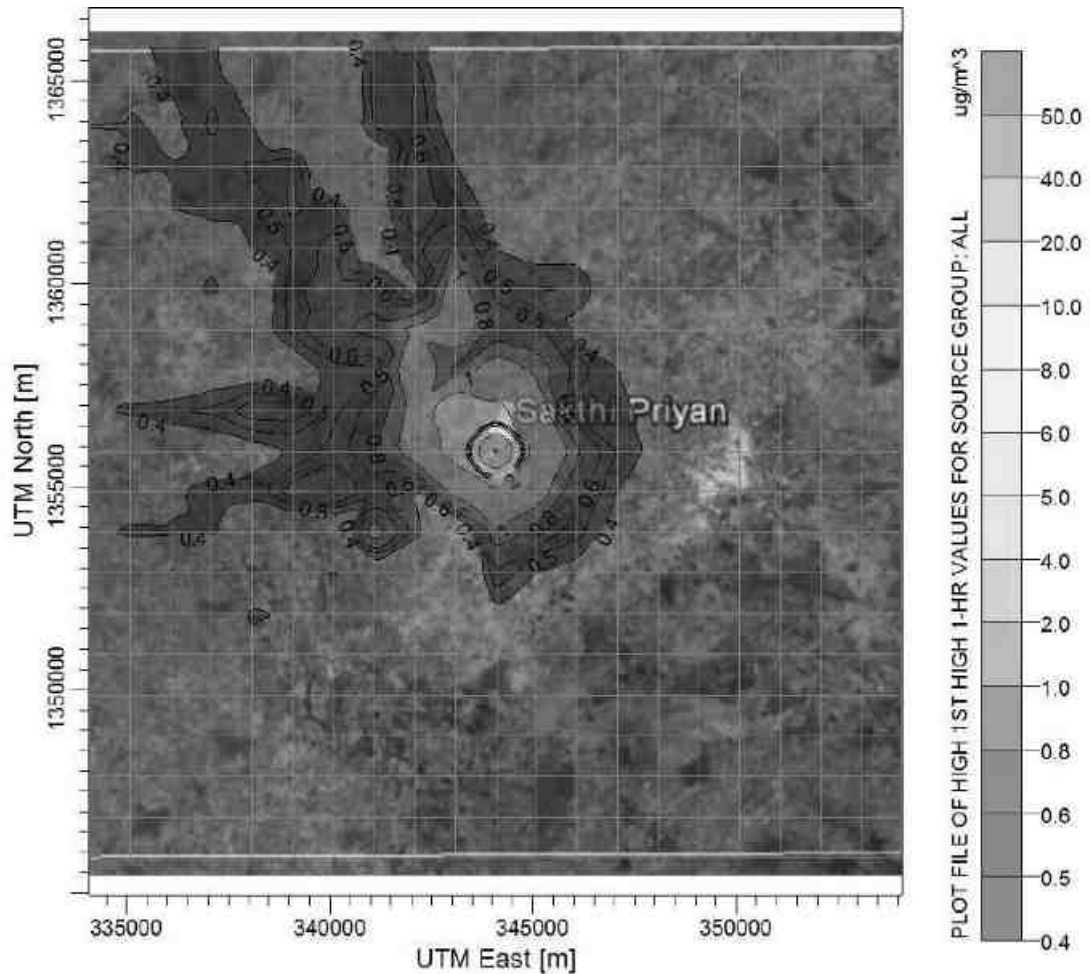


Figure 4-12 Predicted 1-Hrs' GLC's of CO within 10 km Radius of the Study Area

Table 4-21 Estimated Top 10 Highest Concentrations of CO Obtained through Modeling

S. No	UTM coordinates (m)		Conc. ($\mu\text{g}/\text{m}^3$)	Distance from Centre of Project Site (~Km)	Direction from Centre of Project Site
	E	N			
1.	344084	1355873	43.04282	Within site	Within site
2.	343084	1356873	3.5036	1.41	NW
3.	343084	1355873	2.48069	1	W
4.	344084	1356873	2.33495	1	N
5.	344084	1354873	1.73196	1	S
6.	345084	1355873	1.72705	1	E
7.	342084	1357873	1.46568	2.82	NW
8.	343084	1358873	1.35313	3.16	NNW
9.	343084	1359873	1.24824	4.12	NNW
10.	345084	1356873	1.23275	1.41	NE

4.5.1.7.1 Conclusion

Maximum pollutant concentrations of PM, SO₂ and NO_x observed due to proposed for an 24hr-average period have been studied and CO observed due to proposed for an 1hr-average period

have been studied. The total increase in concentrations above baseline status to estimate the percentage increase and summarized in Table 4-11 Total Maximum GLCs from the Stack Emissions **Table 4-22.**

Table 4-22 Total Maximum GLCs from the Cumulative Emissions

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 ($\mu\text{g}/\text{m}^3$)
PM	71.0	0.26	71.26	100
SO ₂	13.7	0.18	13.88	80
NO _x	25.2	2.92	28.12	80
CO	335	43.04	378.04	4000

4.5.1.8 Impact of the transport to the traffic conditions

The proposed plant site involves the transport of raw material and final products near to and from the site. The transportation of raw material / Finished products will involve generation of additional traffic of about 28 trucks per day. **Table 4-23** shows the additional truck traffic for the proposed plant. **Table 4-24** shows the IRC guidelines.

Table 4-23 Additional truck traffic due to proposed project

Sr.No	Material	Quantity in TPD	Total
1	Clinker	200	10
2	Gypsum	25	3
3	Fly ash	175	10
4	GGBS/ Slag	100	5
Total		500	28

Table 4-24 IRC- LOS guidelines

V/C	Level of Service (LOS)	Performance
0.0- 0.2	A	Excellent
0.2-0.4	B	Very Good
0.4-0.6	C	Good/Average/ Fair
0.6-0.8	D	Poor
0.8-1.0	E	Very poor
1.0 & above	F	Worst

V = Volume in PCUs/hr & C = Capacity in PCUs/hrcapacity as per IRC: 106-1990 Guidelines

From the traffic count studies, the present traffic level on existing NH-77 Gingee– Tindivanam is found to be 356 PCUs. Thus, the cumulative traffic load during operational phase would be

$356+3.5 = 359.5$ PCUs. The traffic plot during and after proposed project is shown in **Table 4-25**. With the present level of traffic and the increase in existing traffic due to the proposed project, adequacy of road/ highway during operational phase has been estimated by comparison with the recommendations stipulated by Indian Road Congress (IRC).

Table 4-25 Traffic scenario during and after proposed project

Road	V	C	V/C Ratio	LOS
NH-77 Gingee – Tindivanam Road	359.5	1500	0.23	B

From the results, its envisaged that there will not be a remarkable change in transportation and traffic plot during the construction and operation stage of the proposed project.

4.5.1.9 Vehicular management plan

Raw materials such as Clinker, Gypsum and other raw materials (GGBFS, Flyash) would be transported from the source of 19-20 tons capacity closed trucks to the plant. A Transport management plan will be implemented to assess the following objectives in order to reduce or minimize the environmental impacts on the environment.

- During the truck checklists, the competent personnel would be appointed for the time of loading of trucks;
- Vehicular action would be prohibited during the daylight hours to minimize the impact on the surrounding environments;
- Speed of vehicles will be reduced during the transport and handling of material;
- on-loading /off-loading area will be paved to reduce the dust emission;
- At the time of vehicular movements, the unnecessary plying, empty trips are ignored;
- Emission testing will be carry out periodically for the vehicular maintenances.

4.5.2 IMPACT ON WATER

As the cement grinding unit will be operated on the dry process, so water is not required for grinding process. However, the domestic wastewater from the proposed cement grinding plant is presented below in Table 4-26.

Table 4-26 Wastewater generation from the proposed plant

Sr.No	Particulars	Wastewater Generation (KLD)	Disposal
1	Domestic	1.14	Septic Tank & Soak Pit

	Total	1.14
--	--------------	-------------

The domestic wastewater from the proposed plant in three phases shall be treated with septic tank and soak pit.

4.5.3 IMPACT ON NOISE LEVELS

The main noise generating stationary sources from the proposed project will be ball mills, blowers, compressor, DG Sets, vehicular movement. The noise dispersion from the plant units has been computed based on the mathematical model. The major noise generating sources from the plant are identified and listed in Table 4-27. These are considered as input to the noise model.

Table 4-27 Anticipated noise emission sources

S. No	Source	Noise Levels
1	Ball Mill	85 - 90
2	Blowers	80 – 85
3	Compressor	80 – 85
4	DG Sets (3 nos) 1x125 KVA	60 – 70
5	Vehicular movement (truck)	65 – 75

4.5.3.1 Presentation of Results

The incremental noise levels are computed at proposed plant site at 100 m X 100 m grid intervals over an area of 10 km x 10 km study area. The predicted results of incremental noise levels at each grid points are used to draw noise contours. The predicted noise contours around expected sources are shown in Figure-4.4. The predicted noise levels at the boundary due to various plant activities will be ranging in between 42 to 52 dB (A). It is seen from the simulation results that the incremental noise levels will be well within the CPCB standards.

4.5.3.2 Impact on Work Zone

Ball mills are the noise generating equipment in the proposed plant. However, impacts on the working personnel are not expected to be significant on account of the high level of automation of the plant, which means that workers will be exposed for short duration only.

The noise generation during operational phase would be at source itself through different measures such as inspection, operation and maintenance at regular intervals. The noise control measures as described in EMP will be fully followed. The occupational noise exposure to the workers in the form of 8 hourly time weighted average will be maintained well within the

prescribed OSHA standards [<90 dB (A)]. Hence, the impact on occupational health of workers would be insignificant.

4.5.3.3 Impact on Community

As per the location of proposed plant, the minimum distance maintained between proposed major noise sources and the outer periphery of the project site will be more than 500 m. The cumulative incremental impact of all noise sources at boundary will range in between 42 to 52 dB (A).

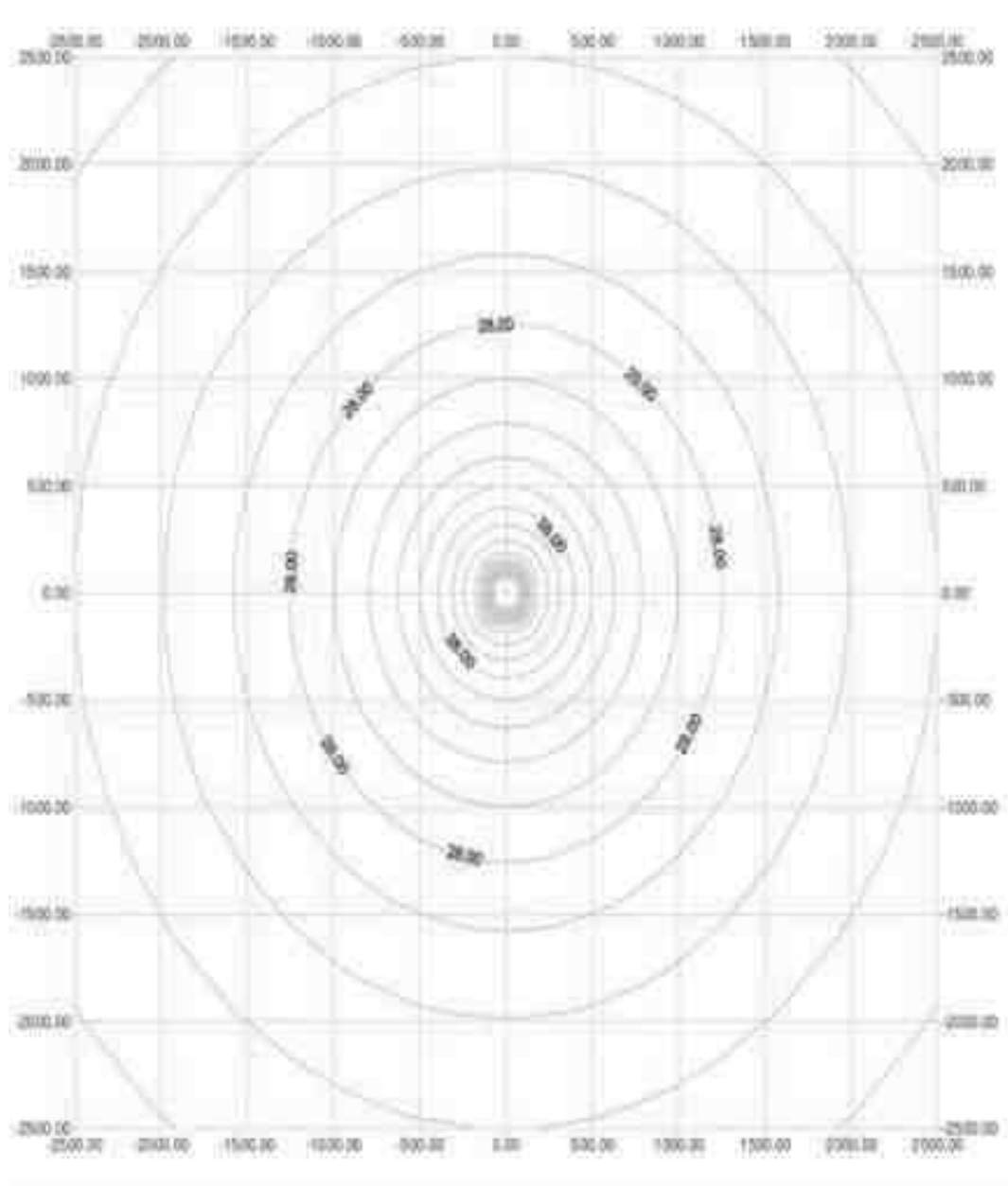


Figure 4-13 Noise contour of the proposed project

4.5.4 IMPACT ON ECOLOGY

The baseline flora and fauna has been presented in chapter –3. Accordingly, there is no wildlife sanctuaries in the study area.

Impact on Terrestrial Ecology

The impact on terrestrial Ecology is due to emission of dust which will be collected in the bag filters. As the pollution loads coming out of the stack are negligible, there is no major impact on flora in and around the project area. Similarly, as per the forest department, no endangered or rare species of flora and fauna are reported in the study area. The impact on the terrestrial ecology will be due to the emission of pollutants like PM, NOx and SO2. However, the incremental concentrations of these pollutants are very less and the impacts on the terrestrial ecology will be insignificant. Development of a thick green belt will reduce the pollution loads in the surroundings area and contain the negative impacts on forests and terrestrial ecology.

Impact on Aquatic Ecology

There is no discharge of industrial effluent in water bodies. The domestic waste water will be treated using septic system. Hence there will not be any impact on aquatic ecosystem in the region.

4.5.5 PREDICTION OF IMPACT ON SOCIO-ECONOMICS

This project will create many job opportunities for the local people. The employment of people will be both on permanent as well as on contract basis. The employment will be categorized into different skilled laborers, semi- skilled and unskilled workers. This plant will also have job offers for managers, supervisors, technicians, operators, helpers etc.

4.5.6 PREDICTION OF IMPACT ON HUMAN HEALTH

The impact from the air emissions is not expected to be significant since the stack design and the atmospheric conditions are such that the ambient air quality at present as well as in future after the proposed facility comes up well within the prescribed ambient air quality limits sets forth by CPCB. The proponents of this facility propose to adopt effective control systems wherever necessary.

4.6 INDIRECT IMPACTS

4.6.1 IMPACTS ON PUBLIC HEALTH AND SAFETY

During the process operation, the control of process emission can have the significant impact on public safety and health. Overall, the adverse impacts on the ambient air, water and soil quality anticipated are low. Due to the potential safety and management system located inside the plant premises, the impact on the public safety system will be low consequently the impacts on public health from the proposed plant work activities will be negligible.

4.6.2 IMPACTS ON CULTURAL RESOURCES

Within the study area, there is no historical monuments or ancient temples.

4.6.3 IMPACTS ON ECOLOGY AND BIODIVERSITY

The plant has been set up in barren land so therefore no cutting of trees or destruction of forest land activities take place. Therefore, there is no significant impact on the ecology and biodiversity.

4.7 MITIGATION MEASURES DURING THE CONSTRUCTION PHASE

The construction phase requires site preparation, transportation of construction materials and equipments and construction of the infrastructure. During this phase, workers would be sourced from nearby areas so there would not be any impact of the project to them.

4.7.1 AIR ENVIRONMENT

The main pollutants from the construction phase would be particulate matter (PM). There are no major levelling operations required. Hence no excavation of the area except for the purpose of foundation is envisaged. However, during dry weather condition, dust generated from excavation and transportation activities will be carried controlled by sprinkling. However, these are expected to insignificant since these emission sources will be confined to the area and time. It should be ensured that the gasoline and diesel powdered construction vehicles are properly maintained to minimize smoke in the exhaust emissions.

4.7.2 NOISE ENVIRONMENT

Generation of noise during construction phase is due to the operation of heavy equipment's and increased frequency of vehicular traffic in the area. Vibrations levels will be increase due to these activities. However, these impacts are short term and temporary in nature and generated

noise will reside for a short period of time. The noise effect on the nearest inhabitants during the construction activity will be negligible due to the distance of the nearest village. However, it's advisable that onsite workers using the high noise equipment's adapt noise protection devices like ear muffs. Noise prone activity has to be restricted to the extent possible during night to reduce the impact on the environment.

4.7.3 WATER ENVIRONMENT

The water environment is susceptible to change due to the construction activity because of the sewage from the sanitary facilities from the construction workers. Mobile toilets would be provided to minimize the impact on water. The vehicle maintenance area should be located in order to prevent the contamination of surface and ground water sources by accidentally spillage of oil.

4.7.4 SANITATION

The construction site should be provided with sufficient and suitable toilet facilities for workers to meet the proper standards of hygiene. These facilities should preferably be connected to a septic tank and maintained to ensure minimum environment impact.

4.7.5 LAND ENVIRONMENT

As soon as construction over, the surplus earth has to be utilized to fill up the low-lying areas, the rubbish is to be created and all unbuilt surface reinstated. The site is devoid of trees. Thus, it does not involve any cutting of trees. Appropriate vegetation will be planted during the construction phase and all areas will be landscaped.

4.7.6 SOCIO-ECONOMIC DEMOGRAPHY

Normally the construction activities will benefit the local peoples in many numbers of ways such as supply of construction laborer's like skilled, semi-skilled and unskilled, tertiary sector employment and provision of goods and services for daily needs including the transport.

4.7.7 STORAGE OF HAZARDOUS MATERIAL

The hazardous material anticipated to be used at the site during the construction include petrol, diesel and gas will be procured from nearby locality.

4.8 MITIGATION MEASURES DURING THE OPERATIONAL PHASE

4.8.1 AIR ENVIRONMENT

The grinding unit operations involve grinding clinker in the ball mills, storage of cement in the silos and packing and dispatching of the cement in PP bag/Paper Bag. The grinding unit consists of 14 individual stacks in which 3 stacks are attached to the hoppers then 3 stack are attached to the ball mill, 3 stack are attached to the transfer points, 3 stacks are attached in packing unit and 2 stacks are attached to the DG set. The proposed cement grinding plant with all these stacks will produces particulate matter.

Air Pollution control Schemes

Adequate and effective control equipment's will be installed in the proposed plant to keep the dust emission at a minimum level. In the proposed plant, the air pollution control schemes and techniques will be made to minimize the emission from process and to keep the ambient air quality within NAAQ Standards. The air pollution sources and control measures are presented in **Table 4-28**.

Table 4-28 Anticipated Air emission sources

S.No	Sources	Control measures
1	Ball Mill (3 Nos.)	Bag Filter with stack of adequate height
2	Hopper (3 set.)	Bag Filter with stack of adequate height
3	Transfer points (3 Nos.)	Bag Filter with stack of adequate height
4	Packaging plant (3 Nos.)	Bag Filter with stack of adequate height
5	DG Sets (2 x 125 KVA)	Acoustic enclosures with stack of adequate height

4.8.2 NOISE ENVIRONMENT

There is stationary as well as moving noise generating sources in the proposed cement grinding unit. These noise sources are generating noise continuously as well as intermittently.

Noise attenuation measures

The greenbelt should be developed around the perimeter of the plant will attenuate the noise emitted by the various sources in the unit. Under the greenbelt health check-up scheme as per the factory Act, the workers will however be checked up for any noise induced Hearing Loss (NIHL) by the competent ENT doctors. Other than the regular maintenance of the various equipment's, ear plugs are recommended for the personnel close to the noise generating units. Apart from this, the following steps are recommended for reduction in noise levels;

- Frequent lubrication of pumps would be undertaken.

- Providing the noise proof cabins to the operators where remote control for operating noise generating equipment is feasible.

4.8.3 WATER ENVIRONMENT

The main water requirement will be for the sanitary facilities. This requirement will be met from the open well in the plant premises. The domestic sewage of 1.14 KLD will be disposed to septic tank through soak pit.

4.8.4 SOLID WASTE MANAGEMENT

All the dust collected in air pollution control equipment's is automatically recycled into the process. Hazardous waste such as used oil will be reused in the girth and pinion of the ball mill. Biodegradable waste will be used as a manure for greenbelt and non biodegradable waste will be disposed to authorized vendors.

4.9 GREENBELT DEVELOPMENT PLAN

The greenbelt area will be developed in an area of 0.78 ha (1.95 acres) which is 42.0 % total area. The study area is semi-arid. And the climate in the zone is basically semi-arid tropical. All the plants naturally occurring in this area are suitable for water conservation as well as protecting them from dust and other air pollutants. Hence, naturally they have the capacity to withstand minor impacts likely to arise out of the proposed project activities. Hence, a green belt has a good role in keeping the environment safer in the midst of various project activities that may alter natural environmental settings.

4.9.1 ABOUT GREENBELT

Green belt can be said as plantation of trees for reducing the pollution as they absorb both gaseous and particulate pollutant, thus sustainably managing them in the atmosphere. Green plants form a surface that is capable of absorbing air pollutants and forming sinks for pollutants, further that it improves the aesthetic value of local environment, if planned along with architectural concepts also. Green belts, thus become, planned open spaces safeguarded from developmental activities such as construction of buildings, factories, and/or any other infrastructural activities; these areas are exclusively used only for growing vegetation cover in its natural way. Green belts in and around urban and industrial areas are important for maintaining ecological health of a region.

The MoEF & CC (Handbook of Environmental Procedures and Guidelines, 1994) has issued certain siting criteria for establishment of industries considering a balanced approach between economic, social and environmental factors into consideration. The factors related to green belt are:

- ✓ The green belt shall be ½ km wide around the battery limit of the industry, for industry having odor problem it shall be one km wide.
- ✓ The green belt between two adjoining large-scale industries shall be one km.
- ✓ No prime agricultural land shall be converted into industrial site.
- ✓ No forest land shall be converted into non-forest activity for the sustenance of the industry (FCA, 1980).
- ✓ Land acquired shall be sufficiently large to provide space for appropriate treatment of wastewater, the treated wastewater left after maximum possible reuse and recycle should be used to raise green belt and to create water body for aesthetics, recreation and if possible for aquaculture.

It will be necessary to improve the forest density with a good mixture of plant varieties. In addition to the protection efforts of enrichment planting, say planting of trees when needed or wanted; ANR (Assisted Natural Regeneration) plantation also need to be promoted. For the purpose, it may be required to undertake planting of selected varieties of plants, with 2-year-old seedlings in 0.5 m³pits, filled with suitable soil, bio-fertilizers and bio-pesticides. Instead of using purchased seedlings, an in-house nursery should be developed within the lease area for ensuring better quality seedlings, required species mix, prevention of damage due to long distance & prolonged time for transportation besides economy and survival efficiency.

4.9.1.1 Green Belt Area

Greenbelt development shall be taken up in 0.6 ha (1.48 acre) along with the implementation of project. Total green belt & plantation area will be minimum 33 % of the project area. The density of trees will be about 1500 trees per hectare (or, say 600 trees per acre). It will be developed around the periphery of the project in three tiers.

Changes in greenbelt area are likely to happen so as to be in tune with the conditions that may have in the Environmental Clearance applied for. Saplings of plants belonging to umbrella species that are having big canopy shall be planted. Intermittently, Shrubs and herbs shall also be planted, so that a three-tier greenbelt is fully developed and made to sustain appropriately. It is proposed to undertake the greenbelt plantations in stage wise. Tree species and intermittently

herbs and shrubs suited to the climatic conditions of the region in tune with the CPCB guidelines will be done. Further, arrangements shall be made to ensure a minimum of 90 % survival. In tune with the suggested guidelines proposed by the Central pollution Control Board (CPCB), further considering the suitability as per the prevailing agro-climatic conditions of the project site, appropriate plant species shall be considered for development of greenbelt in this project.

4.9.1.2 Ensuring minimum 90% survival:

In order to ensure a minimum of 90 % survival, the following steps measures are proposed for implementation.

- a. Tree guards shall be provided to all seedlings.
- b. 2-year-old healthy saplings shall be planted in 0.5 m³ pits and for big trees it shall be 1m x 1m x 1m.
- c. Regular watering shall be done.
- d. Before planting, pits shall be filled with suitable soil, bio-fertilizers and bio-pesticides.
- e. Seeds of small herbaceous plants to grow beneath the trees so as to maintain soil moisture shall be sown intermittently.
- f. A plant nursery shall be established and maintained for the purpose.
- g. Caretaker will be appointed to take care of the survival efficiency with all essential equipment.
- h. Organic composts shall be applied at regular intervals.

4.9.1.3 Criteria on selection of species for green belt

As far as sustainable development is concerned, it becomes necessary to establish greenbelts in areas of major developmental activities in order to attenuate the negative impacts. It may be necessary to have greenbelts in available places around the project (source-oriented plantation) as well as around habitats (receptor-oriented plantation).

It usually emerges with a major aim in the selection of plant species for greenbelt that they are to function as scavengers to air pollutants and also act as barrier for noise traverse. In the meantime, it is also of utmost importance to bear- in-mind the limitations or stresses these seedlings are likely to face; one, the pollutants and second is the climatic and soil conditions they are put to grow. The saplings are to be cared for the first three years, regularly watering it, supplementing nutrients and by providing protection. That means the trees bushes etc. selected for greenbelt have to survive in areas under human control, they have to overcome the limitations imposed by soil conditions, climate, drainage etc. On the other hand, the survival

efficiency of plant species selected for greenbelt development may decline, if the agro-climatic conditions and suitability of plant species are not considered. Therefore, while making choices for greenbelt plantations, due weightage should be given to the agro-climatic conditions prevailing in the proposed area. If it is done so, the saplings will grow as natural vegetation provided sufficient watering and protection are ensured.

For efficacy in removal of pollutants, the saplings should be allowed to grow under such conditions as: (i) absence of water stress in order to ensure appropriate stomatal openings and for proper development of epidermal structures, (ii) adequate nutritional supply to maintain health and vigour of growth; and (iii) well exposure to light & breeze in order to have adequate interaction with atmospheric gases and sunlight. Keeping all these in mind, species were selected for greenbelt. Characters considered in selection of species, including shapes of crowns, for effective assimilation of pollutant gases as well as removal of suspended particulate matters are as described below:

For pollutant emissions management:

- ❖ Tolerance towards concerned pollutants, at concentrations, that are not too high to be instantaneously lethal
- ❖ Longer duration of foliage
- ❖ Free exposure of foliage, by way of having,
 - Sufficiently adequate crown height
 - Openness of foliage in canopy
 - Long and broad laminar surface bearing big leaves
 - Large number of stomatal apertures
 - Well exposed stomata in level with the general epidermal surface.

For Suspended particulate matter management:

- ❖ Crown and its height & spread
- ❖ Leaves having firm petiole support
- ❖ Availability of abundant bark and foliage surfaces, by way of having:
 - Considerably high level of bark roughness
 - Petioles with epidermal outgrowths
 - Abundance of axillary hairs
 - Laminar surfaces bearing hairs or scales
 - Protected stomata (by wax, hairs, arches/rings etc.)

Plantation along roadsides:

- ❖ Should be absorbers of gases as well as particulates including lead contents of particulates
- ❖ High levels of lead sorption as exhibited by ornamentals cultivated in traffic islands
- ❖ Choice of plants for avenue (roadside and traffic island) plantation is not only for containment of pollution but also to form a screen between traffic and roadside residences
- ❖ Choice of plants shall invariably include shrubs of height 1 to 1.5 m and trees of 3 to 5 m height.
- ❖ Intermixing of trees and shrubs are to be considered such that the foliage area density in vertical is almost uniform
- ❖ Since safety of traffic is a major consideration, shrubs in traffic islands and along road-dividers will have to be short enough to be below the eye-level of motorists.

4.9.1.4 Plant species proposed for green belt

As discussed above, and in tune with the guidelines proposed by the CPCB, further considering the suitability as per the prevailing agro-climatic conditions of the project site, the following 164 plant species are considered to be appropriate for development of greenbelt in this project provided plantations shall be made subject to availability.

Table 4-29 Plant species proposed for green belt

S No	Scientific name	Common Name	Family	FS	GR	S/T	R	E/D
1	<i>Abutilon indicum</i>	Country mallow/ Nakochona	Malvaceae	Most of the year	Fast growing	Shrub	Through seeds	D
2	<i>Acacia auriculoformis</i>	Ear leaf acacia	Mimosaceae	Jun- Jan	Fast growing	Tree	Through seeds	E
3	<i>Acacia catechu</i>	The Cutch tree	Mimosaceae	May- Aug	Fast growing	Shrub	Through seeds	E
4	<i>Acacia ferruginea</i>	Rusty acacia/ Safed khair	Mimosaceae	Jan- Feb	Fast growing	Tree	Through seeds	E
5	<i>Acacia leucophloea</i>	Safed babool	Mimosaceae	Jan-Feb	Fast growing	Tree	Through seeds	D
6	<i>Acacia mearnsii</i>	Black wattle/ Chavukku	Mimosaceae	--	Fast growing	tree	Seed/ Root suckers	E
7	<i>Acacia mellifera</i>	Black thorn	Mimosaceae	Twice/yr	Fast growing	Tree	By seeds	D
8	<i>Acacia nilotica</i>	Indian gum/ Baubra	Mimosaceae	Aug-Jan	Fast growing	Tree	Through seeds	E
9	<i>Acacia pennata</i>	Biswal/ Kumaon	Mimosaceae	Jun-Aug	Fast growing	Tree	Through seeds	E
10	<i>Acacia</i>	White thorn/	Mimosaceae	Mat-Jun	Fast	Tree	Through	SD

S No	Scientific name	Common Name	Family	FS	GR	S/T	R	E/D
	<i>polyacantha</i>	Whit catechu/ Kaggali/ Kaachu		Oct-Nov	growing		seeds	
11	<i>Acacia Senegal</i>	Kumttha	Mimosaceae	Aug-Sep Nov- Mar	Fast growing	Tree	Through seeds	D
12	<i>Acacia sinuata</i>	Shikakai/ Seege kaayi	Mimosaceae	--	Fast growing	Tree	Through seeds	E
13	<i>Acacia tortilis</i>	Umbrella thorn	Mimosaceae		Fast growing	Tree	Through seeds	E
14	<i>Achras sapota</i>	Sapota/ Chikku	Sapotaceae	Sep-Dec	Slow growing stages	Tree	Grafting	E
15	<i>Actinodaphne angustifolia</i>	Bagnola	Lauraceae	May- Jun, Nov	Slow growing	Tree	Through seeds	E
16	<i>Adenanthera pavonina</i>	Red wood/ Girid	Mimoseae	Mar- Aug	Fast growing	Tree	Through seeds	D
17	<i>Adina cordifolia</i>	Haldu	Rubiaceae	Jun-Sep	Slow growing	Tree	Through seeds	D
18	<i>Aegle marmelos</i>	Beal/ Belo	Rutaceae	May-Jul	Slow growing	Tree	Through seeds/ root cuttings	E
19	<i>Ailanthus excelsa</i>	Tree of heaven/ Mahala	Simaroubacea e	Feb-Mar	Fast growing	Tree	Seed/ shoot/ root cuttings	
20	<i>Albizia amara</i>	Krishan Siris/ Lalleli	Mimoseae	Apr-Jun	Fast growing	Tree	Seeds/ root suckers	D
21	<i>Albizia procera</i>	White siris	Mimosaceae	Jun-Sep	Fast growing	Tree	Through seeds	D
22	<i>Alstonia scholaris</i>	Saittankajatt	Apocyanaceae	Dec-Mar	Fast growing	Tree	Through seeds	E
23	<i>Anona squamosa</i>	Seetaphal	Annonaceae	Mar-Sep	Fast growing	Small tree	Seeds/ grafting/ budding	E
24	<i>Anona reticulata</i>	Luvuni/ Raamaphala	Annonaceae	Jun	Fast growing	Tree	Through seeds	E
25	<i>Anogeissus latifolia</i>	Dhaura/ Dohu	Combretaceae	May-Jul	Slow growing	Tree	Seed/ root suckers	E
26	<i>Anthocephalus chinensis</i>	Sans	Rubiaceae	Nov-Feb	Fast growing	Tree	Through seeds	D
27	<i>Aphanamixis polystachya</i>	Rohituka tree/ Harin	Meliaceae	Jul	Slow growing	Tree	Through seeds	E
28	<i>Artocarpus heterophyllus</i>	Jackfruit tree	Urticaceae	Nov-Jan	Slow growing	Tree	Through seeds	E
29	<i>Artocarpus lacucha</i>	Monkey jack/ Dahua	Urticaceae	Mar-Apr	Fast growing	Tree	Through seeds	D

S No	Scientific name	Common Name	Family	FS	GR	S/T	R	E/D
30	<i>Azadirachta indica</i>	Neem tree	Meliaceae	Jan-Mar Aug-Sep	quick growth after 1 st season	Tree	Through seeds	E
31	<i>Belanites roxburghii</i>	Date/ Ingudihala	Balanitaceae	Apr-Jun	Fast growing	Tree	Through seeds	E
32	<i>Bambusa arundinacea</i>	Thorny bamboo/ Bendo	Poaceae	--	Fast growing	Shrub	By cuttings	D
33	<i>Bambusa vulgaris</i>	golden bamboo/ Sundragai	Poaceae	—	Fast growing	Shrub	By cuttings	D
34	<i>Barringtonia acutangula</i>	Indian oak/ Hinjolo	Barringtoniaceae	Mar-May Sep-Oct	Fast growing	Tree	Through seeds	E
35	<i>Barringtonia racemosa</i>	Freshwater mangrove	Barringtoniaceae	Round the year	Fast growing	Tree	Through seeds	E
36	<i>Bauhinia acuminata</i>	Kanchan	Caesalpiniaceae	Jun	Fast growing	Shrub	Through seeds	D
37	<i>Bauhinia purpuria</i>	Khairwal	Caesalpiniaceae	Sep-Nov	Fast growing	Tree	Through seeds	D
38	<i>Bauhinia racemosa</i>	Astha/ Omborodo	Caesalpiniaceae	Mar-Jun	Fast growing	Small tree	Through seeds	D
39	<i>Bauhinia semla</i>	Semla	Caesalpiniaceae	Sep-Nov	Fast growing	Tree	Through seeds	D
40	<i>Bauhinia variegata</i>	Kachnar	Caesalpiniaceae	Nov	Fast growing	Tree	Through seeds	D
41	<i>Bischofia javanica</i>	Paniala/ Dingiri	Bischofiaceae	Apr-Sep	Fast growing	Tree	Seed/ cuttings	SD
42	<i>Bridelia squamosa</i>	Khaja	Euphorbiaceae	May-Oct	Fast growing	Tree	Seeds/ root suckers	D
43	<i>Broussonatia papyrifera</i>	Paper mulberrys/ Junglytaat	Moraceae	Aug-Nov	Fast growing	Tree	Seeds/ cuttings/ air-layering	D
44	<i>Buchanania lanzan</i>	Almondette tree/ Charu	Anacardiaceae	Jan-Mar	Fast growing	Tree	Seed/ root suckers	E
45	<i>Butea monosperma</i>	Khakharo	Fabaceae	Jan-Apr	Slow Growing	Tree	By seeds	D
46	<i>Caesalpinia pulcherrima</i>	Peacock flower/ Kenjige / Ratnagandhi	Caesalpiniaceae	Round the year	Fast growing	Shrub	Seed/ Cuttings	E
47	<i>Callistemon citrinus</i>	Bottle brush	Myrtaceae	Round the year	Slow growing	Small tree	Seed/ Cuttings	E
48	<i>Calophyllum inophyllum</i>	Paanang	Clusiaceae	Dec-Jan	Slow growing	Tree	Through seeds	E
49	<i>Calotropis gigantea</i>	Gigantic Swallow wart	Asclepiadaceae	Feb-Jul	Fast growing	Shrub	Seeds/ Cuttings	E
50	<i>Calotropis</i>	Akada/Orkho	Asclepiadaceae	Dec	Fast	Shrub	Seeds/	E

S No	Scientific name	Common Name	Family	FS	GR	S/T	R	E/D
	<i>procera</i>				growing	b	Cuttings	
51	<i>Carissa spinarum</i>	Karaunda/ Anka	Apocyanaceae	Mar-May	Fast growing	Shrub	Seeds/ root suckers	E
52	<i>Cassia fistula</i>	Golden showers/ Sunari	Caesalpiniaceae	Mar-May	Fast growing	Tree	Seeds/ suckers	D
53	<i>Cassia javanica</i>	Apple blossom cassia	Caesalpiniaceae	May-Jun	Fast growing	Tree	Through seeds	D
54	<i>Cassia pumila</i>	Yellow cassia	Caesalpiniaceae	--	Fast growing	Tree	Through seeds	E
55	<i>Cassia renigera</i>	Pink cassia	Caesalpiniaceae	May-Jun	Fast growing	Tree	Through seeds	D
56	<i>Cassia siamea</i>	Iron wood tree	Caesalpiniaceae	Aug-May	Fast growing	Tree	Through seeds	E
57	<i>Casuarina equisetifolia</i>	Jangli saru/ whistling pine	Casuarinaceae	Feb-Apr; Sep-Oct	FG	T	By seeds	E
58	<i>Ceiba pentandra</i>	Kapok	Bambacaceae	Mar-Jul	Fast growing	Tree	Through seeds	D
59	<i>Celtis australis</i>	Cachar/ Banridu	Ulmaceae	--	Fast growing	Tree	By seeds	D
60	<i>Citrus aurantium</i>	Limu/ Niba	Rutaceae	Sep-Nov	Fast growing	Tree	Cutting/ grafting	E
61	<i>Citrus limon</i>	Bara nimbu	Rutaceae	Nov-Jan	Slow growing	Shrub	Cutting/ grafting	E
62	<i>Clerodendrum inerme</i>	Vanjai/ Kundali	Verbenaceae	Nov- Jan	Fast growing	shrub	Seeds/ Cuttings	E
63	<i>Clerodendrum infortunatum</i>	Bhant	Verbenaceae	Oct-Jan	Fast growing	Shrub	Seeds/ Cuttings	E
64	<i>Cocos nucifera</i>	Coconut tree	Arecaceae	Round the year	Slow growing	Tree	Through seeds	E
65	<i>Cordia dichotoma</i>	Lasora/ Indian cherry	Boraginaceae	Mar-Apr	Quick after 1 st year	Tree	Seeds/ Cuttings	E
66	<i>Dalbergia latifolia</i>	Shisham	Fabaceae	Aug-Sep	Fast growing	T	Seed/Ste m/ root cuttings	SD
67	<i>Dalbergia sisoo</i>	Shisham	Fabaceae	Mar-Apr-Jun	Quick after 1 st year	Tree	Seed, root/stem cuttings	E
68	<i>Delonix regia</i>	Gulmohur	Caesalpiniaceae	Apr-Jun	Fast growing	Tree	Seeds/ Cuttings	D
69	<i>Dendrocalamus strictus</i>	Solid bamboo/ Saliabanso	Poaceae	--	Fast growing	Shrub	Seed/ stem/ rhizome cutting/ layering	D
70	<i>Derris indica</i>	Pongam/ Karanjo	Fabaceae	Apr-Jun	Fast growing	Tree	Through seeds	E
71	<i>Diospyros melanoxylon</i>	Ebony/ Kendu	Ebenaceae	Feb-Apr	Slow growing	Tree	Seeds/ root	D

S No	Scientific name	Common Name	Family	FS	GR	S/T	R	E/D
							suckers	
72	<i>Dryptes roxburghii</i>	Putronjiva	Euphorbiaceae	Mar-May	Slow growing	Tree	Through seeds	E
73	<i>Duranta repens</i>	Sky flower	Verbenaceae	Round the year	Fast growing	Shrub	Through seeds	E
74	<i>Emblica officinalis</i>	Amla	Euphorbiaceae	Jun-Jul Feb Mar-May	Fast growing	Tree	Seed/cutting/ budding/ inarching	D
75	<i>Embryopteris peregrina</i>	Gaab	Ebenaceae	Mar-May	Fast growing	Tree	Through seeds	D
76	<i>Erythrina variegata</i>	Indian coral tree	Fabaceae	Feb-May	Fast growing	Tree	Seeds/ Stem Cuttings	D
77	<i>Eucalyptus citriodora</i>	Lemon scented gum	Myrtaceae	Feb-Apr, Oct-Dec	Fast growing	Tree	Through seeds	E
78	<i>Eucalyptus hybrid</i>	Mysore gum	Myrtaceae	Feb-Apr Oct-Dec	Fast growing	Tree	Through seeds	E
79	<i>Ficus benghalensis</i>	Banyan tree	Moraceae	Apr-Jun	Fast growing	Tree	Seeds/ Cuttings	E
80	<i>Ficus benamina</i>	Weeping fig/ Java atthi	Moraceae	Sep-Nov	Fast growing	Tree	Seeds/ Cuttings	E
81	<i>Ficus elastica</i>	Rubber tree/ Seemeala	Moraceae	--	Fast growing	Tree	By cuttings	E
82	<i>Ficus gibbosa</i>	Korotosani	Moraceae	Apr-May	Fast growing	Tree	Seeds/ Cuttings	E
83	<i>Ficus glomerata</i>	Dimra	Moraceae	Aug-Oct, Dec-Feb	Fast growing	Tree	Seeds/ Cuttings	D
84	<i>Ficus hispida</i>	Hairy fig/ Kaadatthi	Moraceae	Apr-Jul	Fast growing	Tree	Seeds/ Cuttings	E
85	<i>Ficus religiosa</i>	Peepal tree	Moraceae	Jan-May	Slow in earlier stages, later fast growth	Tree	Seeds/ Cuttings	E
86	<i>Ficus virens</i>	Pipli	Moraceae	Jan-May	Slow then fast	Tree	seeds/ cutting	E
87	<i>Garcinia indica</i>	Kokum	Clusiaceae	Nov-Feb	Slow then fast	Tree	Through seeds	E
88	<i>Garcinia talbotii</i>	Limboti	Clusiaceae	Nov	Slow growing	Tree	Through seeds	E
89	<i>Gardenia jasminoides</i>	Gandhraj/ Suvasane malle	Rubiaceae	Apr-Aug/ Sept	Fast growing	Shrub	Seeds/ Cuttings	E
90	<i>Gardenia resinifera</i>	Cambi resin tree/ Dekamali/ Bikki gida	Rubiaceae	Mar-Jun	Fast growing	Tree	Seeds/ Cuttings	D
91	<i>Gliricidia sepium</i>	Mother of cocoa/ Mexican	Fabaceae	Jan-Mar	Fast growing	Tree	Seeds/ Cuttings	D

S No	Scientific name	Common Name	Family	FS	GR	S/T	R	E/D
		lilac/Gobbarad a mara						
92	<i>Grevillia robusta</i>	Silky oak/ Savukkumara m	Proteaceae	Feb-Apr	Fast growing	Tree	Through seeds	E
93	<i>Grewia subinequalis</i>	Phalsa/ Pharasakoli	Tiliaceae	Apr-Jun	Fast growing	Tree	Through seeds	E
94	<i>Guazma ulmifolia</i>	Bastar cedar/ Rudrakshi/Bh adrakshi	Sterculiaceae	Mar- Aug	Fast growing	Tree	Through seeds	E
95	<i>Hamelia patens</i>	Fire bush/ Scarlet bush	Rubiaceae	Oct-Jan	Fast growing	Shru b	Seeds/ Cuttings	E
96	<i>Heterophragma roxburghii</i>	Waras/ Bechadimara/ Kaligottumara / Adavinugge	Bignoniaceae	Feb-Apr	Fast growing	Tree	Through seeds	E
97	<i>Hibiscus rosa-sinensis</i>	Jasum/ Chinese hibiscus	Malvaceae	Round the year	Fast growing	Shru b	Cutting/ grafting	E
98	<i>Holoptelia integrifolia</i>	Indian Elm/ Dauranja	Ulmaceae	Feb-Apr	Fast growing	Tree	Seeds/ stem cuttings	D
99	<i>Ixora arborea</i>	Torchwood tree/ Jilpai/ Koda gandhai/ Goravi/ Goraje	Rubiaceae	Round the year	Fast growing	Tree	By cuttings	E
100	<i>Ixora coccinea</i>	Rangan	Rubiaceae	Round the yrae	Fast growing	Tree	Cutting	E
101	<i>Ixora rosea</i>	Chethi	Rubiaceae	Round the year	Fast growing	Tree	By Cuttings	E
102	<i>Ixora undulata</i>	Palukajooi/ Wavy leaf ixora	Rubiaceae	Mar-Apr	Fast growing	Tree	Cutting	E
103	<i>Juniperus communis</i>	Common juniper/ Aaraar/	Cupressaceae	Mar- Apr	Fast growing	Shru b	Through seeds	E
104	<i>Kigelia Africana</i>	Sausage tree	Bignoniaceae	Mar-Jun	Fast growing	Smal l tree	Through seeds	E
105	<i>Lagerstroemia parviflora</i>	Small flowered crepe myrtle/ Dhaura/Chana ngi/ Ventaku/ Bhutara	Lythraceae	Jun	Fast growing	Tall Tree	Through seeds	D
106	<i>Lagerstroemia speciosa</i>	Patali/ Queen crepemyrtle	Lythraceae	Apr-Jun	Fast growing	Tree	Through seeds	E
107	<i>Lantana camara</i>	Wild sage	Verbenaceae	Round the year	Fast growing	Shru b	Seeds/ Cuttings	E
108	<i>Lawsonia inermis</i>	Henna/ Benjat	Lythraceae	Apr-Jul	Fast growing	Shru b	Seeds/ Cuttings	E
109	<i>Madhuca</i>	Mahwa/	Sapotaceae	Feb-Apr	Fast	Tree	Through	D

S No	Scientific name	Common Name	Family	FS	GR	S/T	R	E/D
	<i>longifolia</i>	Mahula			growing		seeds	
110	<i>Mallotus philippensis</i>	Kaamala tree	Euphorbiaceae	Nov-Jan	Slow growing	Tree	Through seeds	E
111	<i>Mammea suriga</i>	Surungi/ Naaga kesar/	Calophyllaceae	Feb-Mar	Fast growing	Tree	Through	E
112	<i>Mangifera indica</i>	Mango tree/ Am/ Amri	Anacardiaceae	South: Jan-Mar North: Feb-Apr	Quick growing after 1 st year	Tree	Seed/ trans-planting/ grafting/ budding/ air-layering/ root-cutting/ marcottin g	E
113	<i>Melaleuca leucadendra</i>	Cajuput tree	Myrtaceae	Sep-Nov	Fast growing	Tree	Seeds/ cutting	E
114	<i>Millingtonia hortensis</i>	Indian cork tree	Bignoniaceae	Oct-Dec	Fast growing	Tree	Seeds/ Cuttings	E
115	<i>Mimusops elengi</i>	Spanish cherry	Sapotaceae	Jan-Mar	Fast growing	Tree	Through seeds	E
116	<i>Mimusops hexandra</i>	Ceylon iron wood	Sapotaceae	Sep-Nov	Fast growing	Tree	By cuttings	E
117	<i>Moringa oleifera</i>	Drumstick tree	Moringaceae	Jan-Apr	Fast growing	Tree	Seeds/ Cuttings	D
118	<i>Morus alba</i>	White mulberry	Moraceae	Feb-Jun	Fast growing	Tree	Seeds/ grafting/ budding/ cutting/	E
119	<i>Murraya paniculata</i>	Marchula	Rutaceae	Jun-Oct	Fast growing	Shrub	Seeds/ Cuttings	E
120	<i>Nerium indicum</i>	Pink oleander	Apocyanaceae	Round the year	Fast growing	Shrub	Cutting	E
121	<i>Nyctanthus arbor-tristis</i>	Harsinghar	Oleaceae	Round the year	Fast growing	Shrub	Seeds/ Cuttings	D
122	<i>Ouginia oojenensis</i>	Sandon/ Banjan	Fabaceae	Feb-Mar	Fast growing	Tree	Seeds/ Cuttings	D
123	<i>Peltophorum pterocarpum</i>	Copper pod tree	Caesalpiniaceae	May-Sep	Fast growing	Tree	Through seeds	E
124	<i>Phoenix sylvestris</i>	Wild date palm	Arecaceae	Jan-Feb	Slow growing	Tree	Through seeds	E
125	<i>Phyllanthus acidus</i>	Harfarauri	Euphorbiaceae	Feb-May	Fast growing	Tree	Seeds/ Cuttings/ Buddings	D
126	<i>Pithecellobium duclae</i>	Vilayat imili	Mimosaceae	Jan-Feb	Fast growing	Tree	Seeds/ branch cuttings	E
127	<i>Poinciana pulcherrima</i>	Guletura	Caesalpiniaceae	Oct-Jan	Fast growing	Shrub	By cuttings	E
128	<i>Polyalthia longifolia</i>	Devdaru	Annonaceae	Apr-Jun	Fast growing	Tree	Through seeds	E

S No	Scientific name	Common Name	Family	FS	GR	S/T	R	E/D
							(Fresh)	
129	<i>Populus nigra</i>	Black poplar/ Lombardy	Salicaceae	--	Fast growing	Tree	Seeds/ Stem/ Root cuttings/ Root suckers	D
130	<i>Prosopis cineraria</i>	Shami/ Khejri	Mimosaceae	Dec-Apr	Fast growing	Tree	By Seeds/ root suckers	E
131	<i>Prosopis tamarugo</i>	Vilayati babul	Mimosaceae	Dec-Apr	Fast growing	Tree	Seeds/ Root suckers	E
132	<i>Psidium guajava</i>	Amrud	Myrtaceae	--	Fast growing	Tree	Seeds/ Cutting/ grafting/ budding	E
133	<i>Pterygota alata</i>	Buddha coconut	Sterculiaceae	Mar-Apr	Fast growing	Tree	By Seeds/ Cuttings	SD
134	<i>Ricinus communis</i>	Castor/ Erandi	Euphorbiaceae	Sep-Oct	Fast growing	Shrub	Through seeds	E
135	<i>Salix tetrasperma</i>	Indian willow/ Baisi	Salicaceae	--	Fast growing	Tree	By cuttings	D
136	<i>Samanea saman</i>	Rain tree	Mimosaceae	Mar-Jun	Fast growing	Tree	By Seeds/ Cuttings	E
137	<i>Sapindus emarginatus</i>	Soapnut	Sapindaceae	Oct-Dec	Fast growing	Tree	Through seeds	E
138	<i>Sapium sebiferum</i>	Makhan tree/ Chinese tallow tree	Euphorbiaceae	Jun-Aug	Fast growing	Tree	Through seeds	D
139	<i>Saraca asoka</i>	Ashok	Caesalpiniaceae	Dec-May	Fast growing	Tree	Through seeds	E
140	<i>Sesbania grandiflora</i>	Swamp pea/ Ogasti	Fabaceae	Sep-Dec	Fast growing	Tree	Through seeds	E
141	<i>Sesbania sesban</i>	Common sesban	Fabaceae	Aug-Dec	Fast growing	Shrub	Through seeds	E
142	<i>Sesbania speciosa (Senna alata)</i>	Candle bush / Seemaigathi	Caesalpiniaceae	Sep-Dec	Fast growing	Shrub	Through seeds	E
143	<i>Soymida febrifuga</i>	Indian redwood/ Sahan	Meliaceae	Mar	Fast growing	Tree	Through seeds	D
144	<i>Spathodea campanulate</i>	Tulip tree	Bignoniaceae	Nov-Jan	Fast growing	Tree	By seeds/ Cuttings	E
145	<i>Spondias pinnata</i>	Wild mango	Anacardiaceae	Feb-Apr	Fast growing after 1 year	Tree	Through seeds	D
146	<i>Sterculia foetida</i>	Juglibadam	Sterculiaceae	Mar-May	Fast growing	Tree	Through seeds	D
147	<i>Sterculia guttata</i>	Spotted sterculia	Sterculiaceae	Jan-Feb	Fast growing	Tree	Through seeds	D

S No	Scientific name	Common Name	Family	FS	GR	S/T	R	E/D
148	<i>Strychnos nux-vomica</i>	Jahar/ Bishamushti	Loganiaceae	Mar-Apr	Fast growing	Tree	Through seeds	D
149	<i>Syncarpia glomulifera</i>	Turpentine tree	Myrtaceae	--	fast growing	Tree	Through seeds	E
150	<i>Syzygium cumini</i>	Jamun/ Jamo	Myrtaceae	Mar-May	Fast growing	Tree	Seeds/ Cutting/ grafting/ budding	E
151	<i>Tabernaemanta na divaricata</i>	Crepe jasmine/ Chandni/ Tagar/ Tagari/ Nandi battalu/ nanjubattalu/ Nandyaavarta/ Tagara	Apocyanaceae	Round the year	Fast growing	Shrub	By cuttings	E
152	<i>Tamarindus indica</i>	Tamarind/ Tentuli	Caesalpiniaceae	Apr-Oct	Fast growing (Early)	Tree	Through seeds	E
153	<i>Tecoma stans</i>	Yellow bells/ Piliya/ Koranechellar	Bignoniaceae	Feb-Apr	Fast growing	Shrub	By seeds/ Cuttings	E
154	<i>Terminalia alata</i>	Laurel/ Sahaju	Combretaceae	May-Jul	Fast growing	Tree	Seeds/ Cuttings	D
155	<i>Terminalia arjuna</i>	Arjhan/ Arjuno	Combretaceae	Apr-Jul	Fast growing	Tree	Seeds/ Cuttings/ air-layering	D
156	<i>Terminalia bellerica</i>	Bahera/ Bharo	Combretaceae	Apr-May	Fast growing	Tree	Seeds/ Cuttings	D
157	<i>Terminalia catappa</i>	Deshi badam	Combretaceae	Oct – Nov	Fast growing	Tree	By seeds	D
158	<i>Terminalia chebula</i>	Harra/ Hirda	Combretaceae	Mar-Oct	Fast growing	Tree	By seeds	D
159	<i>Thevetia peruviana</i>	Yellow oleoner/ Konyorphul	Apocyanaceae	Round the year	Fast growing	Shrub	Seeds/ Cuttings	E
160	<i>Trema orientalis</i>	Charcoal tree/ Kharkas	Ulmaceae	Round the year	Fast growing	Tree	Seeds/ stumps	E
161	<i>Zizyphus mauritiana</i>	Indian jujube/ Bodori	Rhamnaceae	Apr-Oct	Fast growing (Early)	Tree	Through seeds	E
162	<i>Zizyphus enoplia</i>	Jackal jujube/ Kantokalli	Rhamnaceae	Apr-Jun	Fast growing	Straggler shrub	Through seeds	E
163	<i>Zizyphus rugosa</i>	Wild jujube	Rhamnaceae	Dec-Feb	Fast growing	Straggler shrub	Through seeds	E
164	<i>Zizyphus xylopyra</i>	Kat-ber/ Goteoboro	Rhamnaceae	Apr-Jun	Fast growing	Straggler	Through seeds	E

S No	Scientific name	Common Name	Family	FS	GR	S/T	R	E/D
						shrub		

CN: Common Name; FS: flowering Season; GR: Growth Rate; R: Regeneration; S: Shrub; SS: Straggler shrub; T: Tree; E/D: Evergreen/ Deciduous; SD-Semi-deciduous; South: South India; North: North India

4.9.1.5 Budget- Recurring and non-recurring costs for greenbelt

Separate allocations are proposed for ensuring greenbelt development and its effective management. The allocations shall be made as recurring and non-recurring costs as per the EMP suggested. It is expected that, with the adoption of the above-mentioned mitigation measures, the impact due to the proposed project activity over flora & fauna of the study area shall be minimal on the ecosystems. Progressive plantation over a period of time shall create conditions favorable for fauna also.

4.10 SOCIO ECONOMIC IMPACT ASSESSMENT

Social Impact Assessment (SIA) is an instrument used to analyze social issues and solicit stakeholder views for the design of projects. SIA helps in making the project responsive to social development concerns, including options that enhance benefits for poor and vulnerable people while mitigating risk and adverse impacts on such segments of population. It analyzes distributional impacts of intended project benefits on different stakeholder groups, and identifies differences in assets and opportunities to access the project benefits. The scope and depth of SIA is determined by the complexity and importance of issues studied, considering the skills and resources available. SIA should include studies related to involuntary resettlement, compulsory land acquisition, impact of imported workforces, job losses among local people, damage to sites of cultural, historic or scientific interest, impact on minority or vulnerable groups, child or bonded labor, use of armed security guards. However, SIA may primarily include the following:

A. SOCIAL ASPECTS

SIA provides baseline information for designing social development strategy. The analysis may lead to determining the key social and Institutional aspects that are likely to be affected the project activities; identify the key stakeholder groups in this context and determine how relationships between stakeholder groups will affect or be affected by the project; and identify expected social development outcomes and actions proposed to achieve those outcomes.

B. AGRICULTURE IMPACT

The agricultural activities are seen in the areas where there is sufficient soil cover. The buffer zone will remain undisturbed and no adverse impact is envisaged

4.10.1 STRATEGY TO ACHIEVE SOCIAL DEVELOPMENT OUTCOMES

Identify the likely social development outcomes of the project and propose a social development strategy, including recommendations for institutional arrangements to achieve them, based on the findings of the social assessment. The social development strategy could include measures that:

- ❖ Strengthen social inclusion by ensuring inclusion of both poor and excluded groups as well as then intended beneficiaries in the benefit stream, offer access to opportunities created by the project.
- ❖ Empower stakeholders through their participation in design and implementation of the project, their access to information, and their increased voice and accountability (i.e. a participation framework); and
- ❖ Enhance security by minimizing and managing likely social risks and increasing the resilience of intended beneficiaries and affected persons to socioeconomic shocks.

4.10.2 BUDGETARY PROVISION FOR ENVIRONMENT MANAGEMENT PLAN (EMP)

In order to comply with the environmental protection measures as suggested in the above sections, the project management has made budgetary provision for environmental protection and safety measures. The capital cost of the project is about Rs. 5 Crores. It is proposed to invest about Rs.40 Lakh on pollution control, green belt development, rainwater harvesting, environmental monitoring systems and others. The annual expenditure to be incurred on plantation, maintenance, monitoring and analysis of ambient air and occupational health etc. as shown in Table below:

Table 4-30 EMP budgetary provision

Sr. No.	Description of Item	Capital Cost (Rs. in Lakhs)	Recurring Cost (Rs. in Lakhs)
1	Air Pollution control measures	24	1
2	Environmental monitoring & reporting	4	3
3	Greenbelt development	3	1.5
4	OHS measures	1	1
5	Fire protection & prevention measures	4	1.5

6	Rainwater Harvesting	2	1
7	Solid & Hazardous Waste Management	0.5	0.5
8	Septic Tank & Soak pit	1.5	0.5
Total		40	10

4.10.3 ACTION PLAN FOR ENVIRONMENTAL MEASURES

The Environmental measures suggested above will be implemented so as to reduce the impact on environment during the operations of the proposed project. In order to facilitate easy implementation, mitigation measures are phased as per the priority of implementation. The action plan for the Environmental measures is given below:

Sr.No.	Recommendations	Time Requirement
1.	Air Pollution Control Measures	Before commissioning of respective units
2.	Water Pollution Control Measures	Before commissioning of the plant
3.	Noise Control Measures	Along with the commissioning of the plant
4.	Green Belt Development	Stage-wise implementation

CHAPTER 5 ANALYSIS OF ALTERNATIVES

5 ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

5.1 ANALYSIS OF ALTERNATE SITE

The present chapter provides the selection specifications of the proposed site location are involved.

5.1.1 SITE SELECTION CRITERIA

SPC has proposed to set up a Standalone cement grinding Plant at S.F.No:30/2, 30/3 & 30/4, Dheevanur Village, Tindivanam (Tk), Villuppuram District, Tamil Nadu. The land for proposed project site has been selected based on the following examinations:

Availability of land

- The required land area 1.877 ha (4.64 acres) is available.
- The selected land is categorized as non-planning area by DTCP.
- The land is flat barren land with slight undulations and less vegetation cover.
- The land area doesn't have any habitation, so there is no resettlement and rehabilitation issues.

Connectivity

- The State Highway – 5 (Vanthavasi to Mayilam Road) is located at the distance of 6.8 km from the plant site in East direction.
- The National Highway-77(Gingee to Tindivanam road) is located at the distance of 1.2 km from the plant site in south direction.
- Thindivanam railway station is located at a distance of 9.9 km in South East direction.
- The proposed project site has good connectivity to existing cement hubs and raw material supplier locations of Tamil Nadu.

Environment Setting

- Less proximity to densely populated area.
- There is no protected forests, national parks, wild life sanctuaries, ecological sensitive zones in the area
- No migratory routes for birds are observed.
- There is no historical/ Archaeological places nearby.
- There is no defense installation and hills/ valleys located within 10 Km.
- No settlement and rehabilitation involved.

Justification for the project site:

1. The land area is already under the ownership of the proponent which is sufficient to carry out the proposed activities;
2. The site has nearby connectivity to raw material suppliers and distributors of finished products;
3. Availability of water and power at nearby distances;
4. Manpower availability from nearby areas;
5. Absence of forest land and perennial water bodies in the site;
6. Absence of declared biodiversity parks/ sanctuaries within the surroundings of site;
7. National Highway is nearby to the plant site, for the smooth movement of raw materials, finished products;
8. The plant site comes under Seismic zone-III as per seismic zone mapping of India which is moderate intensity zone;
9. The area is safe from site flooding possibilities;
10. Absence of areas of archaeological and historical importance within 10 km radius and
11. No resettlement and rehabilitation issues.

5.2 ANALYSIS OF ALTERNATE TECHNOLOGY

5.2.1 BALL MILL/ GRINDING MILL

There are two technologies available for grinding of cement. The technology of cement grinding is basically dependent on the type of mill adopted for the purpose. The two technologies are:

1. Horizontal Ball mill
2. Vertical Roller Mill

The proposed cement grinding unit will adopt the horizontal ball mill technology. The horizontal ball mill technology is used due to below mentioned reasons:

- The cost of installation is low
- Cost of production is low
- It is suitable for materials of all degree of hardness
- The grinding medium is cheap
- Suitable for both batch and continuous operations.

CHAPTER 6 ENVIRONMENTAL MONITORING PROGRAM

6 ENVIRONMENTAL MONITORING PROGRAM

6.1 INTRODUCTION

This chapter presents the details of environmental monitoring, schedule, institutional

arrangements for pollution control, cost for environmental protection measures and details of greenbelt development for the proposed project.

6.2 ENVIRONMENTAL MONITORING

Regular monitoring of the various environmental parameters is necessary to evaluate the effectiveness of the management programme so that the necessary corrective measures can be taken in case there are some drawbacks in the proposed programme. Since environmental quality parameters at work zone and surrounding area are important for maintaining sound operating practices of the project in conformity with environmental regulations, the post project monitoring work forms part of Environmental Monitoring Program. Environmental Monitoring Program will be implemented once the project activity commences.

Environmental Monitoring Program includes:

- 1) Environmental surveillance
- 2) Analysis and interpretation of data
- 3) Preparation of reports to support environmental management system and
- 4) Organizational set up responsible for the implementation of the programme.

Environmental Monitoring will be taken up for various environmental components as per conditions stipulated in Environmental Clearance Letter issued by SEIAA, Tamil Nadu. and Consent to Operate issued by the Tamil Nadu State Pollution Control Board. Compliance of same will be submitted to respective authorities on regular basis.

The main objectives of environmental monitoring are:

- To assess the change in the environmental conditions;
- To monitor the effective implementation of mitigation measures;
- To facilitate compliance with applicable acts, regulations and guidelines;
- To recognize that social responsibility and environmental management are among the highest corporate priorities;
- To assign clear accountability and responsibility for environmental protection and social responsibility to management and employees;
- To facilitate environmental and social planning throughout the project life cycle;
- To provide a process for achieving targeted performance levels;
- To provide appropriate and sufficient resources, including training, to achieve targeted performance levels on an on-going basis; and
- Evaluate environmental performance and social responsibility for proposed cement plant after establishment of M/s Sakthipriyan Cements.

- The attributes, which merit regular monitoring, are specified underneath:
- Air quality;
- Water and wastewater quality;
- Noise levels;
- Soil quality; and
- Ecological preservation and plantation.

The post project monitoring to be carried out at the industry level is discussed below:

6.3 MONITORING PROCEDURE

Regular monitoring of important and crucial environmental parameters is of immense importance to assess the status of environment during plants operation. With the knowledge of baseline conditions, the monitoring programme can serve as an indicator for any deterioration in environmental conditions due to operation of the plants and suitable mitigatory steps could be taken in time to safeguard the environment. Monitoring is as important as that of control of pollution since the efficiency of control measures can only be determined by monitoring. The following routine monitoring programme would therefore be implemented.

Table 6-1 Environmental Monitoring Programme

S.No.	Components	Locations	Parameters	Frequency
1	Stacks attached to hopper (3 Nos.), ball mills (3 Nos.), Transfer points (3 Nos.), packaging plant (3 Nos.), DG Set 125 KVA (2 nos.)	Bag Filters	SPM, SO ₂ , NO ₂ , Temperature, flow etc.,	Monthly
2	Ambient Air	2 within the premise • Upwind direction:1 • Downwind direction:1	PM ₁₀ , PM _{2.5} , SO ₂ , NO _x	Monthly
3	Water Quality	1 location within plant site	Parameters specified under IS:10500-2001 Specifications for Drinking Water	Monthly
4	Work Place Air Quality	3-5 within plant area	PM ₁₀ , PM _{2.5} /as specified under previous CTO	Quarterly
5	Noise	All prominent locations within the premises	Noise levels	Quarterly
6	Soil	1 within premises	As per norms	Once in a year
7	Occupational	Periodical check-	Vision, Audiometry,	Age <30 yrs: once

	Health	up	Spirometry, Urine, RBS, Liver function tests (LFT), Complete blood count, Anemia, etc.	in 5 years; 31-40 yrs, once in 4 years; 41-50 yrs: once in 2 years; above >50 yrs, once in a year
		Post-employment check-up	Vision, Audiometry, Spirometry, Chest Skiagram, Urine, Complete blood count, etc.	Once at the time of relieving
8	Safety	Whole unit	Safety Audit	Yearly
9	Greenbelt development	Within the premises and in plant vicinity	Plant growth and survival rate	Periodic

6.4 REPORTING PROCEDURE

For effective implementation of the monitoring program, it is also necessary to have a permanent organizational set-up and reporting procedure. To comply with the same, the unit has setup a permanent environmental management cell (EMC) for the effective implementation and monitoring of environmental management system as mentioned in figure below.

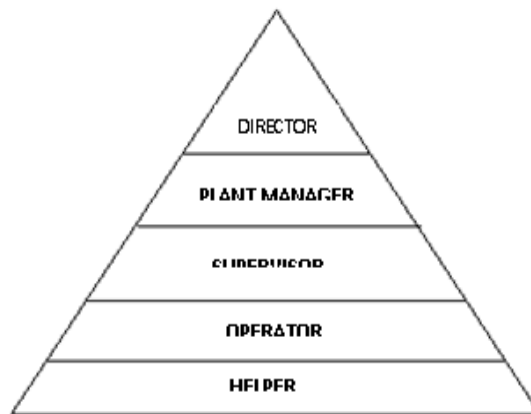


Figure 6-1 Environmental Management Cell

The Plant Manager is and will be responsible for overall environmental management. Activities to be performed by the EMC are presented below

Table 6-2 Responsibilities of EMC

S.No.	Designation	Responsibilities
1	Director	<ul style="list-style-type: none"> • Framing & approval of environmental policy • Overall inspection and giving directions to subordinate staff

2	Plant Manager	<ul style="list-style-type: none"> • Overall responsible for environmental management • Regularly coordinate with the Director and take feedback regarding all the activities performed under EMC • Awareness and management of any issue/accidents/incident at the unit, any noncompliance/ violation of environmental norms • Legal compliances of TNPCB & other Authorities, Execute and follow-up for routine monitoring, cleaning and maintenance work of environmental Management systems. • Regularly coordinate with Supervisor and take feedback regarding all the activities performed under EMC
3	Supervisor	<ul style="list-style-type: none"> • Reporting the Manger about all the activities performed under EMC. • Observe regulatory discipline and working strength of operators. • Supervise implementation of activities under EMC • Reporting of any issue/accidents/incident at the unit, any noncompliance/ violation of environmental norms
4	Operators	<ul style="list-style-type: none"> • Run Environmental Management System (EMS) regularly and efficiently as per the SOP and instruction of Supervisor • Routine cleaning & maintenance of Environmental Management System (EMS), maintain good housekeeping, observe regularity, discipline, working strength of helpers
5	Helpers	<p>Help operators and follow their instructions to operate Environmental Management System (EMS).</p>

6.5 MONITORING SCHEDULE DURING CONSTRUCTION PHASE

M/s. Sakthipriyan Cements proposed to set up a standalone cement grinding unit to manufacture Pozzolanic Portland Cement (PPC), Ordinary Portland Cement (OPC), Portland Slag Cement (PSC) with production capacity of 500 TPD at S.F.No:30/2,30/3&30/4 , Dheevanur Village, Tindivanam (Tk), Villuppuram District, Tamil Nadu. The proposed project will be implemented in three phases viz. First phase- 100 TPD, Second Phase - 300 TPD (Upon completion), Third Phase - 500 TPD (Upon completion). Total production capacity is 500 TPD. The estimated cost for the proposed project is Rs. 5.0 crores. The construction activities require mobilization of construction material and machinery/equipments due to which generation of only fugitive emission will take place. Therefore, monitoring will not be required by large for the same. However, regular monitoring takes place within the unit in compliance with the conditions

of previous environmental clearance as well as Consent to Operate. All the emissions from the unit are well within the permissible limits.

6.6 MONITORING SCHEDULE DURING OPERATIONAL PHASE

During operational stage, mainly particulate matter is emitted in cement grinding operations. Following attributes which merit regular monitoring based on the environmental setting and nature of project activities are listed below:

- Source emissions and ambient air quality;
- Water and wastewater quality (water quality & sewage quality etc);
- Soil quality;
- Noise levels (equipment and machinery noise levels, occupational exposures and ambient noise levels);

The following routine monitoring programme as detailed in as under will be implemented at site. Besides to this monitoring, the compliances to all environmental clearance conditions and regular permits from TNPCB/MoEF will be monitored and reported periodically.

Table 6-3 Environmental Monitoring During Operational Phase

S. No.	Potential Impact	Action to be Followed	Parameters for Monitoring	Frequency of Monitoring	Location
1	Ambient Air Emissions	Ambient air quality within the premises of the proposed unit and nearby habitations to be monitored.	PM ₁₀ , PM _{2.5} , SO ₂ , NO _x CO	As per CPCB/SPCB requirement or on quarterly whichever is earlier	At two four locations inside project premises
		Exhaust from vehicles to be minimized by use of fuel-efficient vehicles and well-maintained vehicles having PUC certificate.	<ul style="list-style-type: none"> • Vehicle logs to be maintained • CO and HC 	As per PUC requirements	All vehicles calling factory to comply
		Vehicle trips to be minimized to the extent possible	Vehicle logs	-	-
2	Stack monitoring	Stack sampling Ball mills: 3Nos Transfer Point: 3 Nos Packaging Section: 3 Nos DG stack: 2Nos.	PM emission from ball mill & packer stack DG: PM, NO _x , HC, CO	quarterly	Ball mills Transfer Point Packaging Sections DG stack.
3	Noise	Noise generated from various plant	Spot Noise Level	Periodic during operation phase as	Noise measurement at

S. No.	Potential Impact	Action to be Followed	Parameters for Monitoring	Frequency of Monitoring	Location
		operations, to be optimized and monitored	recording; Leq(night), Leq(day), Leq(dn)	per consent order of TNPCB/Conditions of EC	ball mill and at two locations within premises
4	Wastewater Discharge	No untreated discharge to be made to surface water, groundwater or soil. No discharge hoses in vicinity of watercourses.	-	-	-
		Take care in disposal of wastewater generated such that soil and groundwater resources are protected	Treated in septic tank and sent to dispersion trench followed by soak pit	Periodic during operation phase	-
		Compliance of treated sewage to standards	Comprehensive as per GSR 422(E)	Once in a season	One location (Treated sewage)
5	Drainage and runoff management	Ensure drainage system and specific design measures are working effectively. Design to incorporate existing drainage pattern and avoid disturbing the same.	Visual inspection of drainage and records thereof	Periodic during operation phase	-
6	Water Quality and Water Levels	Monitoring used water quality & groundwater quality and levels	Comprehensive monitoring as per IS 10500 Groundwater level (bgl in mt.)	Periodic during operation phase	Three locations surrounding project site
7	Energy Usage	Energy usage for air-conditioning and other activities to be minimized. Conduct annual energy audit for the buildings	Energy audit report	Annual audits and periodic checks during operational phase	-
8	Emergency preparedness,	Fire protection and safety	Mock drill records, on site	Periodic during operation phase	-

S. No.	Potential Impact	Action to be Followed	Parameters for Monitoring	Frequency of Monitoring	Location
	such as fire fighting	measures to take care of fire and explosion hazards, to be assessed and steps taken for their prevention.	emergency plan, evacuation plan		
9	Maintenance of flora and fauna	Vegetation, greenbelt / green cover development. No forest area in 10 km zone.	No. of plants, species	Periodic during operation phase	-
10	Solid and Hazardous Waste Management	Spent oil and STP sludge collection, storage as per norms, followed by off-site recycling	Records of solid waste generation and disposal	Periodic during operation phase	-
11	Soil quality	Maintenance of good soil quality	Physico-chemical parameters and metals.	Periodical monitoring	Plantation areas
12	Health	Employees and migrant labour health check ups	All relevant parameters including HIV	Regular check ups	-

6.7 MONITORING METHODS

6.7.1 AIR QUALITY MONITORING

I. Workspace Monitoring

The concentration of air borne pollutants in the workspace/work zone environment will be monitored periodically. If concentrations higher than threshold limit values are observed, the source of fugitive emissions will be identified and suitable measures as detailed in EMP will be initiated. Records of emission monitoring shall be maintained.

II. Ambient Air Quality Monitoring

The ground level concentrations of PM₁₀, PM_{2.5}, SO₂, NO_x, CO in the ambient air will be monitored as per plan proposed. Any abnormal rise will be investigated to identify the causes and if found inside the cement unit premises appropriate action will be initiated. Records of AAQ monitoring shall be maintained.

6.7.2 WATER AND WASTEWATER QUALITY MONITORING

Records of water withdrawn will be maintained. Any leakages or excessive consumption will be identified and rectified. Third party watches quality monitoring will be carried out covering the scope prescribed in the consent order.

I. Monitoring of Wastewater Streams

The unit will have only domestic waste water which will be handled through septic tank followed by dispersion trench.

II. Monitoring of Groundwater

The monitoring of groundwater is the most important tool to validate safety of public health. It is suggested to collect water samples and analyse from surrounding bore wells as per the conditions imposed in EC. Records of analysis will be maintained.

6.7.3 NOISE LEVELS

Noise levels will be monitored in the plant area. The frequency will be once in a month in the work zone. Similarly, ambient noise levels near habitations will also be monitored once in six months or as per conditions imposed in EC. Outside agency will be contracted for monitoring noise as per CPCB norms.

6.7.4 REPORTING SCHEDULES OF THE MONITORING DATA

It is proposed that voluntary reporting of environmental performance with reference to the EMP should be undertaken. The environmental monitoring contracted laboratory will co-ordinate all monitoring programmes at site and data thus generated will be regularly furnished by project proponent to the TNPCB. The Environmental Audit reports will be prepared for the entire year of operations and will be regularly submitted to regulatory authorities.

6.8 BUDGET FOR IMPLEMENTATION OF ENVIRONMENTAL MONITORING

M/s. Sakthipriyan Cements will incur the following expenditure to implement the Environmental Monitoring for the proposed grinding unit:

Table 6-4 Budgetary provisions for environmental monitoring (Recurring)

S. No.	Environmental Component	No. of samples	Sample cost	Total cost (Annual)
1	Ambient air Quality	4	6500	26000
2	Stack Monitoring	24	4000	96000
3	Ground water Sampling	6	6000	36000

4	Noise levels Monitoring	6	2000	12000
5	Soil quality Test	6	5000	30000
6	Employee health check-up	30	3500	105000
Total				305000

CHAPTER – 7

ADDITIONAL STUDIES

7 ADDITIONAL STUDIES

7.1 INTRODUCTION

In this chapter following topics are discussed:

- Public Consultation
- Risk Assessment & Disaster Management Plan

7.2 RISK ASSESSMENT, HAZARD ANALYSIS & DMP

7.2.1 INTRODUCTION

Risk assessment forms an integral part of any plan. Risk assessment is not only a legal necessity but also a social requirement. Risk analysis consists of two parts viz. Risk identification and risk assessment. Risk identification can be as simple as asking “what if” questions at design review stage itself. Other method in use is preparing a checklist of the normal hazards associated with a particular situation or a piece of equipment. Risk assessment techniques are:

- Hazard and Operability Study (HAZOP)
- Safety Studies
- Safety Indices

Risk is associated with disaster and a disaster is the product of a hazard such as earthquake, flood or windstorm, coinciding with a vulnerable situation.

There are four basic types of hazardous events, which put societies at risk:

- Those based on nature Earthquakes, droughts, floods, avalanches etc.
- Those based on violence War, armed conflict, physical assault etc.
- Those based on deterioration Declining health, education and other social services, environmental degradation etc.
- Those based on failings of industrialized society Technical failures, factory explosions, fires, gas leakages, transport collisions.

On the basis of the field studies and analysis, the following major emergencies are identified associated with the proposed project:

Table 7-1 Types of risks & levels

Emergencies	Type of Risk	Project Execution Stage	Risk Level
Accidents	Human Related	Construction as well as operation	Moderate
Fire	Human Related	Operation	Low
Cyclone	Natural	Construction as well as operation	Low

Tsunami	Natural	Construction as well as operation	Low
Earthquake	Natural	Construction as well as operation	Low

Hazard analysis involves the identification and quantification of the various hazards (unsafe conditions) that will establish for the proposed plant. On the other hand, risk analysis deals with the recognition and computation of risks to which the equipment in the plant and personnel are prone to.

It involves the identification and assessment of risks the neighboring populations are exposed as a result of hazards or unsafe operations. This requires a thorough knowledge of failure probability, credible accident scenario, vulnerability of population etc. Much of this information is difficult to get or generate. Consequently, the risk analysis is often confined to maximum credible accident studies.

7.2.2 APPROACH TO THE STUDY

Risk involves the occurrence or potential occurrence of some accidents consisting of an event or sequence of events. The risk assessment study covers the following:

- Identification of potential hazard areas;
- Identification of representative failure cases;
- Visualization of the resulting scenarios in terms of electrical shock and hazards, fire (thermal radiation) and possibility of explosion etc.;
- Assess the overall damage potential of the identified hazardous events.
- Furnish specific recommendations on the minimization of the worst accident possibilities; and
- Preparation of broad Disaster Management Plan (DMP), On-site and Off-site Emergency Plan, which includes Occupational and Health Safety Plan.

7.3 HAZARD IDENTIFICATION

M/s Sakthipriyan Cement is planning establish cement grinding facilities and not be using any chemicals, liquid fuel, gases for plant operations, HSD will be used for DG set (emergency power backup only). Thus, the risk related to manufacturing process is almost negligible.

7.3.1 MAJOR HAZARDS

The entire probable potential hazard is classified under different heads.

- Fire hazards

- Toxic gas release hazards
- Explosion hazards
- Corrosion hazards

7.3.1.1 Fire Hazards

Since the Stone Age term “fire” is associated with fear. It is very dangerous if occurs in uncontrolled manner. It should be clearly understood that when a liquid is used having flash point below the normal ambient temperature, it could, in suitable circumstances, liberate a sufficient quantity of vapour to give rise to flammable mixtures with air.

7.3.1.2 Exposure Limits

The exposure limits for Portland cement, gypsum, crystalline silica and calcium carbonate are as given in the following table.

Table 7-2 Exposure limits

Sr. No.	CHEMICALS	ACGIH TLV-TWA (mg/m ³)
1	Portland Cement	10 mg total dust/m ³
2	Calcium Sulfate dehydrate (gypsum)	10 mg total dust/m ³
3	Crystalline Silica	0.05 mg respirable quartz/m ³
4	Calcium carbonate	10 mg total dust/m ³

Management

By establishing a heightened awareness of the safety impacts of technology, personnel and the management, the system provides a dynamic environment for continual improvement. Following Management System will be adopted by the company to prevent any process hazard:

- Skill Supervisor
 - Process Safety Information
 - Operating Procedure manual developed
 - Fire proof electricity fitting
 - Earthing Bonding
 - Transportation of raw materials safely
 - Process automation with safety lock wherever possible
- Nevertheless, the following steps are implemented.
- Setting-up of a system to inform employees, public and authorities in case of any undue accident or happening.
 - Arrange for medical aid centers being informed immediately in case of such an event.

- Provide training to specific company personnel in first aid as well as preliminary rescue operations.
- Nominate a person to inform and help relatives in case of such a happening and to ensure that authorities' information is handed over to the media.
- Organization of an investigative team to study the accident and to record the same to avoid repetition of such an accident in future.
- Carry out rehearsals so that personnel are acquainted with their responsibilities and steps that they have to follow.

7.3.2 MAXIMUM CREDIBLE ACCIDENT SCENARIO ANALYSIS

Physical hazards Injuries during project operation are typically related to slips, trips, and falls; contact with falling / moving objects; and lifting / over-exertion. Other injuries may occur due to contact with, or capture in operating machinery. Activities related to maintenance of equipment, including cement mills, mill separators, fans, and belt conveyors, represent a significant source of exposure to physical hazards. Such hazards may include the following:

- Falling / impact with objects
- Transportation.

A. Loading/Unloading operation/ Storage

- Approach of heavy good vehicles for unloading material
- Work inside hopper/Silo for unblocking of mouth
- Excessive dust during loading/unloading operation
- Airborne dust
- Conveyor moving parts
- Cleaning of overflows
- Unauthorized passages, travelling over transportation system
- Motor overloading
- Unclean platforms causing staggering and falls.

B. Cement mills (Grinding unit)

- Failure of rotating parts of machinery
- Falling of personal from height
- Fall of material from height in case where protection ducting is blocked
- Hurling of mill(shell) parts
- Exposure to Noise

- Exposure to dust
- Work Atmosphere without sufficient ventilation
- Hurling of dust or coming into contact with hot material
- Manual handling of loads
- Hit by compressed air or other hydraulic fluids
- Getting hit crushed or trapped by machinery.

C. Silo cleaning operation

- Work in confined spaces
- Falling of material
- Falling of personal from working platform
- Exposure to dust
- Use of lifting equipment
- Use of hand-held work equipment during cleaning.

7.3.3 ELECTRICAL HAZARD DUE TO DUST

Electrical equipment such as motors, circuit breakers, transformers, and switchgear can produce sparks and ignite dust clouds and hybrid dust/air mixtures in the vicinity. Reference is taken from CCPS Guidelines for safe handling of Bulk solids.

- Ingress of dust into enclosures with subsequent ignition causes smouldering or burning (fires)
- Dust that enters an enclosure will settle out as layers on internal surfaces and become heated
- Electrically conductive dusts cause short-circuiting when deposited on exposed electrical components and circuits
- Abrasive and/or corrosive dusts damages components of electrical equipment
- Electric shock.

7.3.4 FLOOD, EARTHQUAKE AND OTHER NATURAL CALAMITIES

- In case of a land slide, earthquake or any other natural calamity, the Emergency
- Controller will immediately inform the Vice President/Sr Management who will contact the Local Municipal Administration and police for remedial actions.
- The staff on duty or other personnel as given under plant personnel emergency notification list will be called for alertness.
- Emergency vehicles will be kept ready.

- Medical staff at the Medical Centre will be alerted.
- Fire & Safety staff will be alerted.
- All shift supervisors of the site will be alerted.

7.3.5 RIOT OR CIVIL DISTURBANCES PROCEDURE OR BOMB THREAT OR TERRORIST ATTACK

If there are persons, on or near company property with the suspected intent of causing damage to the property, injury to the plant personnel, disruption of normal operations, etc. The information will be given to Head (P&A) / Head (Security) and the following steps will be taken:

- Security shift supervisor will be instructed to give the related details and the police services will be informed, if required.
- The staff on duty or other personnel as given under plant personnel emergency notification list will be called for alertness.
- Security shift supervisor will instruct to the security to close and lock all the site entry gates.
- It will be ensured that no unauthorized person is allowed access to the site without positive identification by the gate security staff & as per instructions given by Head (P&A) / Head (Security).
- Emergency vehicles will be kept ready.
- Medical staff at the Medical Centre will be alerted.
- Fire & Safety staff will be alerted.
- All shift supervisors of the site will be alerted.

Mitigation Measures

Following management measures will implemented and will be continued after proposed project also to prevent the physical hazards in the plant:

- Work Permit system to ensure proper management control on the hazardous work activities like Maintenance Work required energy isolation, Work in Confined Space, Lifting & supporting loads, Work at Height and Earth Excavation.
- Any person working on equipment with moving parts is personally ensured that the equipment is de-energized, isolated and locked/tagged out.
- Any person working from a position with the potential risk for a fall from height has to use all protection.
- Any person doing flame welding, cutting or brazing in the proximity of any flammable material has to use standard hot work equipments.
- Prescribed PPE are provided to all workers exposed to open processes or systems.

- In case of any accident, immediate & proper medical cares are being provided at the plant site and nearby hospital and nursing home.
- To minimize traffic hazard, unidirectional vehicular movement will be implemented for the proposed project.

7.3.6 DISASTER MANAGEMENT PLAN

7.3.6.1 Disasters

A disaster is a catastrophic situation in which suddenly, people are plunged into helplessness and suffering and as a result, need protection, clothing, shelter, medical and social care and other necessities of life.

Disasters can be divided into two main groups. In the first, are disasters resulting from natural phenomena like earthquakes, volcanic eruptions, storm surges, cyclones, tropical storms, floods, avalanches, landslides, forest fires. The second group includes disastrous events occasioned by man, or by man's impact upon the environment. Examples are armed conflict, industrial accidents, radiation accidents, factory fires, explosions and escape of toxic gases or chemical substances, river pollution, mining/ subsidence/fire etc or other structural collapses, air, sea, rail and road transport accidents which can reach catastrophic dimensions.

There can be no set criteria for assessing the gravity of a disaster since this depends to a large extent on the physical, economic and social environment in which it occurs. What would be consider a major disaster in a developing country, ill equipped to cope with the problems involved, and may not mean more than a temporary emergency elsewhere. However, all disasters bring in their wake similar consequences that call for immediate action, whether at the local, national or international level, for the rescue and relief of the victims. This includes the search for the dead and injured, first aid and social care, removal of the debris, the provision of temporary shelter for the homeless, food, clothing and medical supplies, and the rapid re-establishment of essential services.

7.3.6.2 Objectives of Disaster Management Plan [DMP]

The Disaster Management Plan is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities. For effective implementation of the Disaster Management Plan, it should be widely circulated, properly understood and personnel trained through rehearsals/drills.

The Disaster Management Plan should reflect the probable consequential severity of the undesired event due to deteriorating conditions or through 'Knock on' effects. Further the management should be able to demonstrate that their assessment of the consequences uses good supporting evidence

and is based on currently available and reliable information, incident data from internal and external sources and if necessary the reports of outside agencies.

To tackle the consequences of a major emergency inside the plant or in the immediate vicinity of the plant, a Disaster Management Plan has to be formulated and this planned emergency document is called "Disaster Management Plan".

The Industrial Disaster Management Plan is to make use of the combined resources of the plant and the outside services to achieve the following:

- Effect the rescue and medical treatment of casualties;
- Safeguard other people likely to be affected
- Minimize damage to property and the environment;
- Initially contain and ultimately bring the incident under control;
- Identify any dead;
- Provide for the needs of relatives;
- Provide information to the authentic regulatory authorities;
- Preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of the Emergency.

In effect, it is to optimize operational efficiency to rescue, rehabilitate and render all required help and to restore normalcy.

7.3.6.3 Emergencies

I. General, Industrial, Emergencies

The emergencies that could be envisaged in the plant and fuel storage are as follows:

- Slow isolated fires;
- Fast spreading fires;
- Structural failures;
- Contamination of food/water; and
- Sabotage/Social disorder.

II. Specific Emergencies Anticipated

- Electrical short circuits/ fire, explosion
- Mechanical equipment failure causing harm to workmen

Fire and Explosion

Fire consequences can be disastrous, since they involve huge quantities of fuel either stored or in dynamic inventory in pipe lines or in nearby areas. Preliminary hazard analysis has provided a basis for consequence estimation. Estimation can be made by using various pool fire, tank fire

consequence calculations. In the factory premises storage of fuel (HSD) will not be more than two barrels of 200 liters each. Thus, adequate A,B &C classed firefighting arrangements are provided. Electrical short circuit and related fires also require similar A, B &C class fire fighting equipments in place. It is strongly recommended that all conditions indicated in fire NOC and EC shall be followed. During the study of Risk Assessment, the nature of damages is worked out and probability of occurrence of such hazards is also drawn up.

7.3.7 EMERGENCY ORGANIZATION

In order to maintain emergency response capability, certain facilities must be kept in a state of readiness, and sufficient supplies and equipment must be available. Typical examples are:

- Emergency Operation Centers
- Communication equipment
- Alarm systems
- Personal Protection Equipment
- Fire fighting facilities, equipment and supplies
- Spill and vapour release control equipment and supplies
- Medical facilities, equipment and supplies
- Monitoring systems
- Transportation systems
- Security and access control equipment

It is the responsibility of the Plant Manager to ensure that appropriate equipment and materials are available to respond to emergencies occurring inside the premises.

7.3.8 EXPOSURE CONTROLS AND PERSONAL PROTECTION

- **Exposure Controls**
 - Control of dust through implementation of good housekeeping and maintenance;
 - The bag filters will be installed to control dust emission.
 - Use of PPE, as appropriate (e.g. masks and respirators)
 - Use of mobile vacuum cleaning systems to prevent dust buildup on paved areas;

7.3.9 PERSONAL PROTECTIVE EQUIPMENT

For the safety of the workers, personal protective equipments like hand gloves, helmets, safety shoes, goggles, aprons etc. & Ear protecting devices like earplugs/earmuffs will be provided. Nose mask will be provided at all the places, where there is possibility of dust generation.

I. Respiratory Protection:

When the dust level is beyond exposure limits or when dust causes irritation or discomfort use Respirator.

II. Clothing

Wear impervious abrasion and alkali resistant gloves, boots, long sleeved shirt, long pants or other protective clothing to prevent skin contact.

III. Eye Protection

Wear Safety goggles to avoid dust contact with the eyes. Contact lenses should not be worn when handling the materials.

IV. First Aid

Following first aid measures shall be taken.

- **Eye Contact:**

Rinse eyes thoroughly with water for at least 15 minutes, including under lids, to remove all particles. Seek medical attention for abrasions and burns.

- **Skin Contact:**

Wash with cool water and a pH neutral soap or a milk skin detergent. Seek medical attention for rash, burns, irritation and dermatitis.

- **Inhalation:**

Move person to fresh air. Seek medical attention for discomfort or if coughing or other symptoms.

- **Ingestion:**

Do not induce vomiting. If conscious, have person drink plenty of water. Seek medical attention.

7.3.10 OTHER SAFETY MEASURES

- Safety training to the workers will be given.
- PPE will be provided to the workers.
- The maintenance and cleaning of bag filters will be carried out regularly.
- The dust removal efficiency of bag filters will be check regularly.

- Work place environment monitoring will be carried out regularly and records will be maintained. The monitoring of cement dust and silica in the work place will be carried out.
- Good housekeeping will be implemented in the plant and also inside the factory area.
- First aid box will be provided.
- The industry will provide emergency lights inside the plant premises.
- Ventilation matching the requirement of each shed/enclosure will be provided to reduce fugitive dust concentration levels below exposure limits.
- Fire extinguishers for A, B & C category will be provided for fire fighting.
- In case any emergency, arrangement of ambulance van will be done.
- Two main gates will be provided for entry and exit of the workers.

7.3.11 ONSITE EMERGENCY PLAN & PREPAREDNESS

Emergency Control Centre

The center will be equipped with the following facilities:

- Telephone line connecting the center to all areas of the Plant specially those prone to emergency as well as to outside for obtaining emergency services.
- Dedicated Emergency Telephones with Incoming call facility only
- A site map showing details like location of fire-fighting equipments and hydrants, location of emergency exits etc.
- Aerial view of the Plant location with respect to other important areas in the vicinity of the site.
- List of all possible emergency services providers with their contact numbers & address.
- Internal telephone directory of the Plant including contact numbers of residences of senior personnel.
- Note pads, pen, pencil & other stationary for recording any details at the time of incident
- List of Disaster team members and First Aiders.
- Stock of safety equipments like gloves mask etc.
- List of contacts of external emergency services.

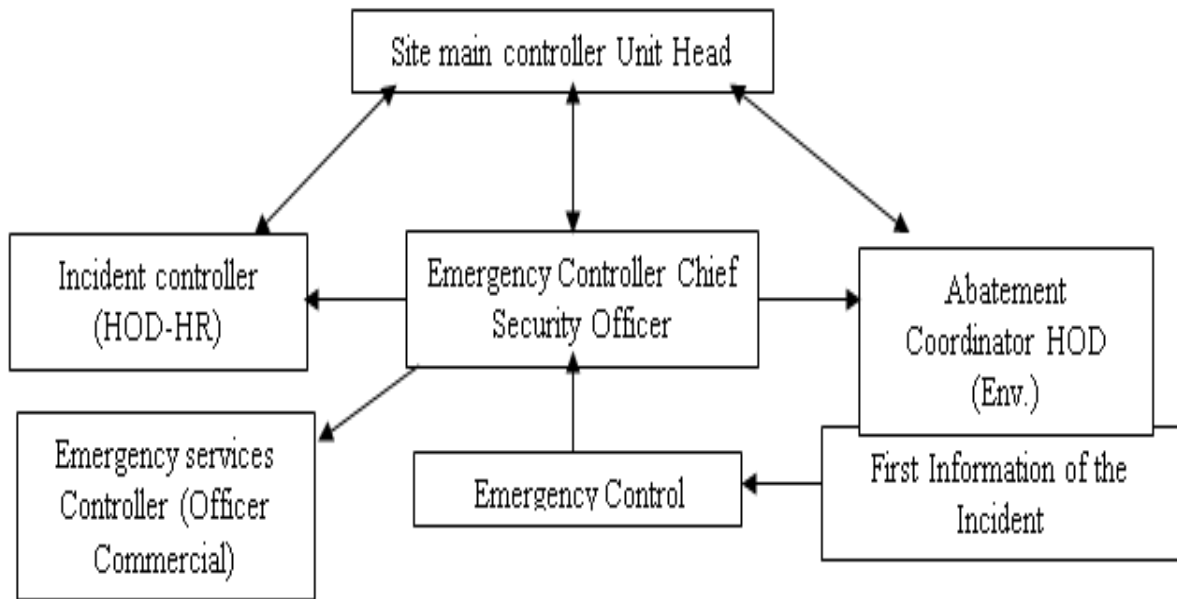


Figure 7-1 Emergency Response Team

7.3.12 COMMUNICATION WITH EXTERNAL EMERGENCY SERVICES

A regular liaison with external emergency is maintained by the Incident Controller (HOD-HR). He shall obtain the required assistance from these agencies in case of any emergency while operating as an Incident Controller (HOD-HR) at the Emergency Control Centre.

7.3.13 EMERGENCY PREVENTION SYSTEM

A) Fire prevention system an automatic sprinkler system will install in the selective section, which will capable of quenching the fire, and operates the water sprinkler system automatically. Apart from above, adequate numbers of firefighting equipment will be installing to the different locations of the mill. While installing these equipment's, care has been taken to match the type of equipment with the type of fire likelihood in the relevant area for e.g.:

B) Personnel Protective Equipment

Safety Equipment's for handling of fire, like Stairs, Helmets, Torch, Hand Gloves etc. will be provided in sufficient stock at security gates. Apart from this, the various protective equipment for handling hazardous substances, like gloves, masks, etc. will be provided at the places of storage & use of such substances.

PPE are used mainly:

- To protect personnel from a hazard while performing rescue/accident control operations,

- To do maintenance and repair work under hazardous conditions, and For escape purposes.

The following type of PPE will be provided to the employees during plant Construction/Operation:

1. Hand Gloves Leather
2. Hand Gloves Cotton
3. Hand Gloves Asbestos
4. Hand Gloves Rubber
5. Grinding goggles
6. Ear Plugs 3M
7. Ear Muffs
8. Safety Harness
9. Dust Mask 3M
10. FPR Face Shields
11. Wind Socks
12. Fluorescent vests
13. Helmets

7.4 OCCUPATIONAL HEALTH AND SAFETY

Health hazards associated with the occupation are called occupational hazards. In Cement grinding factory the major sources of emission are:

1. Raw material handling silos, conveyors, open storages: Suspended Particulate Matter.
2. Cement Grinding Unit: Total Dust or Suspended Particulate Matter.
3. Packing plant

Some of the preventive safety measures to minimize the risk of accident with respect to Technical Safety, Organizational Safety and Personal Safety are listed below:

- The factory will take all reasonably practicable measures to minimize the risk of such accident in compliance with the legal obligation under the relevant safety norms.
- All building plans and installations are as per relevant acts and duly approved by competent government authorities.
- Process and Equipment will be designed by qualified and experienced professionals and fabricated to applicable national / international codes with stage wise inspection and certification of compliance to relevant BSI/ASTM/IS codes etc, as per norms.

- Safety features such as fire extinguisher and suitable Personal Protective Equipment (PPE) shall be provided. Regular operations and testing of fire extinguishers shall be carried out.
- Periodic inspection and testing of pressure vessels, equipment, machineries and material handling systems with certification will be carried out through approved agencies or experts as per norms.
- Training of workers and Staff for fire fighting, work permit system, first aid, safe handling of materials and integrating safety, in all activities.
- Accident / Incident reporting system and information of employees about the same for better awareness.
- Suitable notices / boards displayed at several locations indicating appropriate hazards warning as well as DOs and DON'T for ensuring operational and personal Safety for information of workers / staff and visitors.

7.4.1 NOISE EXPOSURE

Sources:

Grinding mills, Compressors, Fans, Blowers, Material handlers.

Effects:

Hearing impairment, Hypertension, Ischemic heart disease, Annoyance, Sleep disturbance

Noise attenuation and control techniques:

A good noise control and safety against excessive noise exposure program consists of the following components:

- Noise measurement and analysis;
- Engineering control of noise sources where feasible;
- Following OHSAS recommendations and personal protection where noise control is not feasible;
- Employee training and education for usage of PPE and avoiding excessive exposure to high noise levels/pressure.
- Record keeping

Control Measures:

- Introducing good acoustic design.
- Adopting proper scheduling of construction activities.
- Scheduling noisy activities during the day time periods.
- Operating well-maintained mechanical equipment on-site.

- Ensuring that equipment that may be intermittent in use should be shut down between work periods or should be throttled down to a minimum.
- Installing rubber coating in dumpers/ hoppers and entry chutes- avoiding metal to metal friction.
- Using personnel protection gear such as earplugs, muffs, etc.
- Developing a greenbelt around the factory premises.
- Controlling air-flow generated noise by adopting adequate sizing of inlet/outlet ducts.
- Installing noise barriers around air blowers, pumps, and generators to reduce noise impacts at nearby receptors.
- Devising and implementing a rigorous inspection and maintenance program applicable to equipment on-site.

To create safety awareness safety films shall be shown to workers and leaflets shall be distributed. Some precautions and remedial measures are adopted to prevent fires are:

- Compartmentation of cable galleries, use of proper sealing techniques of cable passages and crevices in all directions would help in localizing and identifying the area of occurrence of fire as well as ensure effective automatic and manual fire fighting operations;
- Spread of fire in horizontal direction would be checked by providing fire stops for cable shafts;
- Reliable and dependable type of fire detection system with proper zoning and interlocks for alarms are effective protection methods for conveyor belts;
- Housekeeping of high standard helps in eliminating the causes of fire and regular fire watching system strengthens fire prevention and fire fighting; and
- Proper fire watching by all concerned would be ensured.

7.4.2 HEAT STRESS

High temperature and humidity; direct sun or heat; limited air movement; physical exertion; poor physical condition; some medicines; inadequate tolerance for hot workplaces; and insufficient water intake may also lead to heat stress.

Table 7-3 Primary signs, symptoms & medical treatment

S. NO.	DEFINITION	PRIMARY SIGNS AND SYMPTOMS	PRECAUTIONARY GUIDELINES
1.	Heat Stroke - Most serious heat related disorder when	Confusion; irrational behavior; loss of	Move worker to a shady, cool area and the remove outer

S. NO.	DEFINITION	PRIMARY SIGNS AND SYMPTOMS	PRECAUTIONARY GUIDELINES
	the body's temperature regulation fails and body temperature rises to critical levels, It's a medical emergency and may result in death.	consciousness; convulsions; a lack of sweating (usually); hot, dry skin; and an abnormally high body temperature.	clothing; Provide the worker fluids (preferably water); circulate air to improve evaporative cooling.
2.	Heat Exhaustion - Partly due to exhaustion; it is a result of the combination of excessive heat and dehydration.	Headache, nausea, dizziness, weakness, thirst, and giddiness; Fainting or heat collapse.	Remove from the hot environment and give fluid replacement. Compulsive adequate rest, and when possible, ice packs should be applied.
3.	Heat Cramps - Caused by performing hard physical labor in a hot environment.	Electrolyte imbalances caused by sweating and are normally caused by the lack of water replenishment.	Workers in hot environments should drink water every 15 to 20 minutes and also drink carbohydrate-electrolyte replacement liquids.
4.	Heat Rashes - the skin is persistently wetted by unevaporated sweat.	A red cluster of pimples or small blisters mainly in neck and upper chest, in the groin, under the breasts, and in elbow creases.	Provide a cooler, less humid environment, powder may be used to increase comfort, avoid using ointments or creams.

7.4.3 SAFETY MEASURES

Safety of both men and materials during construction and operation phases is of concern. A comprehensive safety plan has been prepared and implemented in the plant. The preparedness of an industry for the occurrence of possible disasters is known as emergency plan. The disaster in the plant is possible due to collapse of structures and fire/explosion etc.

Keeping in view the safety requirement during construction, operation and maintenance phases, and the plant would formulate safety policy with the following guidelines principles:

- To allocate sufficient resources to maintain safe and healthy conditions of work;
- To take steps to ensure that all known safety factors are considered in the design, construction, operation and maintenance of plants, machinery and equipment;
- To ensure that adequate safety instructions are given to all employees;

- To provide wherever necessary protective equipment, safety appliances and clothing and to ensure their proper use;
- To inform employees about materials, equipment or processes used in their work which are known to be potentially hazardous to health or safety;
- To keep all operations and methods of work under regular review for making necessary changes from the point of view of safety in the light of experience and upto date knowledge;
- To provide appropriate facilities for first aid and prompt treatment of injuries and illness at work;
- To provide appropriate instruction, training, retraining and supervision to employees in health and safety, first aid and to ensure that adequate publicity is given to these matters;
- To ensure proper implementation of fire prevention methods and an appropriate fire fighting service together with training facilities for personnel involved in this service;
- To organize collection, analysis and presentation of data on accident, sickness and incident involving people injury or injury to health with a view to taking corrective, remedial and preventive action;
- To promote consultation in health and safety matters to ensure effective participation by all employees;
- To publish/notify regulations, instructions and notices in the common language of employees;
- To prepare separate safety guidelines for each type of occupation/processes involved in a plant;
- To ensure safety inspection by a competent person at suitable intervals of all buildings, equipments, work places and operations.

General Safety

- Good housekeeping, disposal methods will be followed to control the fugitive emissions.
- In order to prevent the work men from facing the musculo-skeletal disorders, backache, pain in minor and major joints etc, manual carrying of weights to the shop floor from the ground floor will be avoided totally. Safe carrying weights (up to 15 kgs) only allowed carrying by work men. Stair cases with suitable gradient will be constructed in the work sheds. Material handling trolleys will be provided to carry/handle the solid materials from one place to other.

- Employees will be educated, trained and, informed about the chemicals and their properties by displaying the material safety data sheets (MSDS) in the processing areas.
- Awareness about potential hazards, work hazards, fire hazards, and health hazards associated with the raw materials which are being used by the industry will be developed among the employees.
- Shielding guards will be provided to all belt pulleys, couplings and all moving parts of the machinery.
- All electrical cables and electrical equipment will be properly grounded and earthed.
- Poster display regarding safety, health and environmental protection will be arranged in the plant to make awareness of safety and health.
- All responsible employees will be educated and trained to handle the firefighting equipment.
- NO SMOKING policy will be strictly implemented in the entire plant area.
- Emergency exits will be provided at the selected places.
- One shower type eye wash will be provided in the plant area.
- Fire extinguisher will be provided where ever is needed.
- All flammable chemicals and solvents will be kept away from ignition sources and heat.
- Storage of chemicals will be as per their compatibility.
- Proper exhaust ventilation will be provided to the process area to maintain the airborne concentrations and solvents below their TLV values.

7.4.4 SAFETY ORGANIZATION

Construction Phase

A qualified and experienced safety officer shall be appointed or contracted to supervise safety. The responsibilities of the safety officer include identification of the hazardous conditions and unsafe acts of workers and advice on corrective actions, conduct safety audit, organize training programs and provide professional expert advice on various issues related to occupational safety and health. He is also responsible to ensure compliance of Safety Rules/ Statutory Provisions. In addition to employment of safety officer, every contractor, who employs more than 10 workers, shall also employ one safety officer to ensure safety of the worker.

Operation and Maintenance Phase

When the construction is completed the posting of safety officers shall be in accordance with the requirement of Factories Act and their duties and responsibilities shall be as defined there off.

7.5 PUBLIC HEARING

As per the issued ToR, Draft EIA is prepared and submitted to Regional Office, SPCB, Tamil Nadu for conducting the public hearing. After conduction of PH, the issues raised during public hearing meeting will be addressed with the action plan in the Final EIA report and eventually submitted to SEIAA, Tamil Nadu for obtaining Environmental Clearance.

CHAPTER 8 PROJECT BENEFITS

8 PROJECT BENEFITS

8.1 PROJECT BENEFITS

The proposed standalone cement grinding plant will result in improvement of infrastructure as well as overall socio-economic development in the area. The people residing in the nearby areas will be benefited directly and or indirectly due to the proposed project. It is anticipated that the proposed grinding plant will provide benefits for the locals in two phases i.e. during construction phase as well as during operational stage of the grinding plant.

8.1.1 CONSTRUCTION PHASE

During construction phase, the proposed project will benefit the region in the following manner:

8.1.1.1 Employment Generation

The proposed project will generate employment opportunities to the local population during the construction phase. This will last for approximately month. Unskilled/semiskilled labor for the plant would be drawn locally or from nearby places. The employment of local personnel in skilled and executive staff category would depend upon availability and suitability of individual. In addition to the direct employment in the construction of grinding plant, an indirect employment will generate in truck transports operation, repair garages, other ancillary plants, markets /shops etc.

8.1.1.2 Community Services

M/s. Sakthipriyan cements will employ local people to the extent possible. In addition, SPC will develop necessary infrastructure like water supply, sewerage, medical facility, etc. for catering to the needs of the project personnel and their families, which will be also beneficial to the locals residing in the area.

8.1.1.3 Transportation

During the construction of grinding plant, movement of material of great magnitude other construction material and construction machinery would involve. The material to be transported includes earthwork, concrete, steel and other material. Transport of construction materials to the project site will result in increased traffic in the area, which will certainly put additional load on the existing road infrastructure.

8.1.1.4 Demography and Socio – economics

As the labors/workmen are generally unskilled the locals would get opportunities for employment during construction activities. In addition to the opportunities of getting employment as construction laborers, the local population would also have employment opportunities in related service activities like petty Commercial establishments, small contracts /sub–contracts and supply of construction material for building and ancillary infrastructure.

8.1.2 OPERATIONAL PHASE

8.1.2.1 Population

During the operational phase, about 30 people will be employed. Considering a family size of 4 persons, there is a likelihood of increase to about 30 persons and 20 persons as indirect. Considering that most of the skilled personnel proposed to be employed for the proposed project would be from outside the study area and unskilled/ semiskilled personnel will be from within the study area. The proposed project would add to the population in the study area, which would result in better scope for indirect employment.

8.1.2.2 Education

Unskilled people and limited skilled people (depending on availability) will be hired from local population. So, especially skilled people expected to come to the study area from outside are expected to be educated. In addition, some secondary developments like opening of new schools may take place in view of the increased family population due to the proposed employment.

8.1.2.3 Employment

The manpower requirement for the operational phase of the proposed plant will be about 50 people (Direct-30 & Indirect-20). All attempts will be made to employ locally available skilled personnel from the study area. In case of non-availability of skilled persons, people will be hired from outside the study area. Requirement of un-skilled / semi-skilled people will be mostly met from the local population.

8.1.3 IMPROVEMENTS IN THE PHYSICAL INFRASTRUCTURE

The project is a proposed standalone cement grinding unit, there is no significant physical infrastructure at the proposed plant immediate neighborhood. However, after the establishment, the management has tries to develop a significant greenbelt around the project premises also.

Due to which the areas of nearby vicinity of the project has seen a positive change. The development of physical infrastructure will include:

- Improvement in street lightings around plant site
- Development and maintenance of approach roads leading to streamlined transportation and proper connectivity

8.2 CORPORATE SOCIAL RESPONSIBILITY

8.2.1 CSR ACTIVITIES

CSR activities aid to fulfil the basic requirements of the people in the location and the economic progress action plan needs to be taken care. The basic requirements of the society need will be reinforced by the extending the health care, educational facility improvement, providing drinking water to the locality villages affected, planning or strengthening of existing roads in the area.

The preference will be given to the local people for the proposed plant manpower employment. The proposed project will give the opportunities to the peoples for their growth of the socio-economic status of the region. The issues which will be raised during public consultation will be addressed in the form of action plan with physical targets as per the OM issued by the MoEF&CC dated 30.09.2020 and its amendments.

8.2.2 CORPORATE ENVIRONMENT RESPONSIBILITY (CER)

As per OM.F.No.22-65/2017-IA.III Dated: 1st May 2018, 2.0% of the total project cost (INR 5 crore) ie. 10 Lakhs, will be used for CER activities. The issues which will be raised during public consultation will be addressed in the form of action plan. SPC plans to engage in various CER activities, such as providing potable water facilities to a nearby school and improving infrastructure at the government school in Dheevanur village. A portion of the project budget will be allocated to these CER activities, which are expected to be completed within three years from the commencement of the establishment activity. The action plan for the proposed CER projects is detailed below:

Table 8-1 Corporate Environment Responsibility Action Plan

Sr. No	Activity	Capital Cost (Lakhs)	2024-2025	2025-2026	2026-2027
1	Potable water supply facility for nearby Govt. School	4	2	1	1
2	Infrastructure facilities	4	2	1	1

Sr. No	Activity	Capital Cost (Lakhs)	2024-2025	2025-2026	2026-2027
	such as sanitary, library, sports amenities and smart classroom to Govt.Schools				
3	Scholarship to economically weaker section students	1	0.5	0.25	0.25
4	Health Camps in nearby villages	1	0.5	0.25	0.25
		10	5	2.5	2.5

8.3 OTHER TANGIBLE BENEFITS

Participation of the local people at the inception level will make sure the company's commitment towards the improvement of the local people. The proponent will bring in more professional attitude among the employees especially the local people. Proper training will be given to the people of the primary and secondary employment area regarding their respective work.

CHAPTER-9 ENVIRONMENTAL COST & BENEFIT ASSESSMENT

9 ENVIRONMENTAL COST BENEFITS ANALYSIS

9.1 ENVIRONMENTAL COST BENEFITS ANALYSIS

As per EIA Notification dated 14th Sept., 2006, as amended from time to time; the Chapter on “Environmental Cost Benefit Analysis” is applicable only, if the same is recommended at the Scoping stage.

As per the ToR points issued by SEIAA, Tamil Nadu vide Letter No. SEIAA-TN/F.No.9460/3(b)/ToR-1300/2022 Dated: 01st November, 2022 for the proposed project, the Environmental Cost Benefit Analysis is not applicable.

CHAPTER-10

ENVIRONMENTAL MANAGEMENT PLAN

10 ENVIRONMENTAL MANAGEMENT PLAN

10.1 INTRODUCTION

The environment management plan is devised to describe the site-specific arrangements done to mitigate the negative impacts arising from various project activities of the plant. EMP also ensures that the project implementation is carried out to monitor improvements made. Also, the plan outlines the roles and responsibilities of the key personnel who are charged with the responsibility to manage the proposed plant. An EMP reduces adverse environmental impacts during its life cycle. The plan will outline the short- and long-term strategies for managing a range of environmental issues that are prepared following rules and complying with guidelines of the MoEF&CC and the State Pollution Control Board.

10.1.1 OBJECTIVES OF ENVIRONMENTAL MANAGEMENT PLAN

The EMP provides a way to deal with probable adverse impacts and to implement better practices for all the project activities.

The main objectives in formulating the Environmental Management Plan are:

- To encourage, support and conduct development work for the purpose of achieving environmental standards and to improve methods of environmental management.
- To promote further plantation of indigenous species of plants in the core and buffer zone of the plant.
- To ensure working conditions, devoid of air & noise pollution in order to promote employees health and production of unit simultaneously.
- Perspective budgeting and allocation of funds for environmental management expenditure.
- Continuous development and search for innovative technologies for assurance of better management of environment problems.
- Motivate to adopt cleaner production technology.
- To comply Corporate Responsibility for Environmental Protection (CREP).

Environment Management System Design

The unit will ensure the following activities

a. Commitment & Policy

The project management will strive to provide and implement the environmental management plan that incorporates all issues related to describing quality of air, soil water, ecology and biodiversity, waste management, safety of workmen etc.

b. Planning

This includes identification of environmental impacts, compliance to legal requirements and setting environmental objectives. The various potential impacts are discussed under **chapter-4** of the EIA Report.

c. Implementation:

This comprises of resources available to the proponents, accountability of contractors, training of operational staff associated with environmental control facilities and documentation of measures to be taken.

d. Measurement & Evaluation

This includes monitoring, corrective actions, and record keeping. Evaluation of EMP achievements will lead to continual improvement.

10.2 ENVIRONMENTAL MANAGEMENT PLAN

10.2.1 AIR QUALITY

The main pollutant emitted from the cement grinding plant is particulate matter. The probable sources of dust emission are as follows:

Raw material unloading area

- Storage silos
- Ball mill
- Packing machines

To control the emission from process areas bag house/ bag filters will be for the proposed plant. The bag filters are provided suitable places where the sources of pollution is occurs such as grinding unit, hopper loading and unloading areas. The stack is proposed to provide suitable height as per CPCB guidelines. The below mentioned measures are taken/will be taken to mitigate negative impact of operations phase of the project on the surrounding air environment:

- Bag filters have been provided at all the transfer points to control and capture dust emission
- Stack of adequate height has been provided at ball mills and other emission areas with the statutory requirement.
- Adequate stack monitoring facility (SMF) containing sampling port-hole, platform, access ladder etc.

- Spare parts in adequate numbers have been kept at all times to ensure uninterrupted operations and compliance to emission norms.
- All the vehicles are checked for PUC certificate timely.
- Idle running of vehicles is minimized during material loading/unloading operations.

10.2.1.1 Environmental Action Plan to control fugitive emission

Table 10-1 Fugitive emission control action plan

Plant areas	Action plan
Material unloading Section	Provision of enclosure of suitable height towards unloading side Bag filter will be provided to effectively capture dust emission.
Transfer points	Enclosed transfer points Doors of this section are kept close during operations Bag filters at all transfer points
Raw material and cement storage area	Covered storage area Cement stored in silo with bag filters
Packing section	Bag filter at packing machine Adequate ventilation has been provided in packing hall to provide dust free work environment. Spilled cement from the packing machine is/will be collected properly and sent for recycling. Arrangement for vacuum sweeping will also be provided.
Plant roads	All internal roads will be provided as concrete and it will be maintaining proper channel. Repairing work is done constantly whenever and wherever required Water sprinkling will be done regularly along the road to control fugitive emissions; Speed limit inside the plant premises will be fixed to prevent dust emissions.

10.2.2 WATER QUALITY

The unit is based on zero effluent discharge. The sewage of quantity 1.14 KLD will be generated from domestic usage which shall be treated septic tank and soak pit. No effluent will be generated in the proposed activities.

10.2.2.1 Hydrogeology

The fresh water is being sourced from private water supply for both construction and operation phase. There will be no abstraction of ground water.

10.2.2.2 Rain Water Harvesting

Keeping in mind the importance of water, rainwater is conserved water by harvesting by which the sub-soil water condition/ moisture content is maintained/ improved to a great extent. Rainwater harvesting (RWH) system comprises components of various stages- transporting rainwater through pipes, filtration and storage in tanks for reuse. The catchments of a water harvesting system are the surface which directly receives the rainfall and provide water to the rainwater harvesting system. The rainwater run-off from all the un-paved areas shall be routed to natural flows.

The first flush will be checked from entering collection system, using diversion valves to ensure that runoff from the first spell of rain is flushed out and does not enter the system. This needs to be done since the first spell of rain carries a relatively larger amount of pollutants from the air and catchments surface. Rainwater from paved and roof areas, landscaped, paved area and rest of the area within project premises will be harvested to well.

The stored water will be majorly used for the greenbelt development. After the implementation of the project, no fresh water will be used for greenbelt development. Suitable rainwater harvesting structures will be construct before the operation of plant at construction phase itself.

10.2.3 ECOLOGY AND BIODIVERSITY

There is no major eco-sensitive area near the project site. Therefore, it could be stated that the project and its associated activities are very less likely to impact the nearby ecology and biodiversity adversely if all the protective measures suggested in chapter IV such as provision of adequate APCDs and stack etc. strict implementation of EMP/mitigation measures are required to ensure that the biodiversity of the study area should not be impacted negatively.

List of the Rare or endemic or endangered or threatened and Schedule I species found in the study area is given in Chapter -3. None of the plant species is listed under the threatened Taxa by the Botanical Survey of India (BSI). There are seven species belonging Sch-I, to 2 species of Sch-II (Indian grey mongoose and Indian fox/ Bengal fox House) and rest of species belongs Sch-III, Sch-IV and Sch-V of Wildlife Protection Act, 1972. Budget of Rs.2.5 lakhs/annum has

been allotted for the wildlife conservation plan and submitted to the Chief Wildlife Warden for authentication, However Schedule II and III and other schedule IV birds are protected by the Indian Wildlife (Protection) Act, 1972. Since that species are found both in the core area and the buffer zone, both the project proponent and the State Forest and wildlife department are responsible for their conservation.

10.2.4 GREEN BELT DEVELOPMENT PLAN

Green belt design and development has been attributed a great importance and has become an essential element of planning policy. The main objective of greenbelt is to provide a barrier/buffer between the sources of pollution and the surrounding areas. The greenbelt helps to capture the fugitive emission and attenuate the noise apart from improving the aesthetics of the region. Total species of 1184 trees will be planted in 42% of the total area.

10.2.4.1 Objective

The main objective of the green belt is to provide a barrier between the plant and the surrounding areas. The green belt helps to capture the fugitive emissions and to attenuate the noise generated in the plant apart from improving the aesthetics of the plant site. In order to control the industrial pollutants, dense tree plantations are necessary.

As the sedimentation pattern of the pollutants, ambient and ground level concentration of pollutants are usually determined by the direction and speed of prevailing wind and vertical and horizontal thermal gradients prevailing in the area, the belt of plantations will be designed accordingly. The width of the tree belt depends on the gaseous emissions, availability of land and site characteristics etc. Geometry of planting of tree is more important in order to have effective wind break by the plantation. For an effective green belt, a mixture of tree species is necessary and some shrubs and grasses will be inter-cropped. As far as possible, there will be no gaps in the green belt. Where opening is imperative, alignments to roads will be such that open gaps are prevented to overcome funneling action of wind.

The inter-spaces will be planted with grasses, bushes and hedges. Greenbelt is thus a set of rows of trees planted in such a way that they form an effective barrier between the plant and the surroundings.

10.2.4.2 Plan of Action for greenbelt development

Integrated Soil, water and nutrient conservation with rain water harvesting and afforestation is the chosen strategy. A spacing of 3 m x 3m is chosen for use of tractors for inter-cultivation with

fodder legumes. Priority will be given to retain existing trees. Aided natural regeneration with singling will be the chosen practice. The greenbelt development plan is detailed in **Chapter-4**.

10.2.4.3 Plant Species for Greenbelt

While selecting the plant species for the proposed green belt, the following points will be taken into consideration:

- Should be a fast-growing type;
- Should have a thick canopy cover;
- Should be perennially green;
- Should be preferably of native origin; and
- Should have a large leaf area index.

10.2.4.4 Recommended species in the Greenbelt Area

The list of plants for afforestation and greenbelt are chosen keeping in view of the local agroclimatic conditions; integrated soil, water nutrient and nutrient conservation; fodder for local needs of the Sheppard's who were using the land earlier and the essential needs of the local wildlife. The choosing of the species should be ratified by the Horticulturist of the project site and local forest department. Their planting should be interspersed with each other to create mixed canopy of the plants and the ideal stance for planting all trees is 3 X 3 m.

10.2.5 NOISE

In the process, various sources like Loading & unloading operations, Vehicle movements and DG-sets will produce noise. The predicted noise levels after implementation of proposed project will be in the range of 75 dB (A) to 85 dB (A) near the plant boundary in all the directions. The ambient noise levels in the region at most of the places are within the permissible limits. However, the greenbelt provided will further reduce the noise levels.

The specifications for procuring major noise generating machines/equipment will include built in design requirements to have minimum noise levels meeting Occupational Safety & Health Association (OSHA) requirement. Appropriate noise barriers/shields, silencers etc. should be provided in the equipment, wherever feasible. As far as possible, noise emanating from noisy equipment should be adequately attenuated by enclosure, insulation etc. The recommendations to mitigate higher noise levels are:

- Noise suppression measures such as enclosures, buffers and / or protective measures will be provided, if required (wherever noise level is more than 90 dB (A)).

- Employees will be provided with ear protection measures like earplugs or earmuffs.
- Earplug will be provided to all workers where exposure is 85 dB (A) or more.
- Extensive oiling, lubrication and preventive maintenance will be carried out for the machineries and equipment to reduce noise generation.
- Green Belt Development in the plant boundaries

The following precautionary measures are/will be adopted in the project:

- Care will be taken regarding CPCB noise standards while purchasing the equipments/ machinery for the proposed project.
- Proper and scheduled noise monitoring shall be carried out for both ambient environmental and work zone.
- Noise attenuation devices such as ear mufflers must be provided to the workers in the high noise exposure areas;
- Regular maintenance and greasing of equipments & machineries will further reduce the noise level inside the factory periphery;
- Thick plantation has been/ shall be developed all along the periphery to minimize the noise pollution.

10.2.6 SOLID WASTE

Domestic solid waste of 13.5 kg/day will be collected, segregated. Biodegradable waste will be used as a manure for greenbelt and non biodegradable waste will be disposed to authorized vendors. All the dust collected in air pollution control equipment's is automatically recycled into the process. The solid waste generation details are given bellow:

Sr. No	Particulars	Quantity	Treatment and Disposal
Hazardous waste			
1	Used Oil	0.1 TPA	Given to authorized recyclers
Solid wastes			
2	Total Domestic waste <ul style="list-style-type: none"> • Biodegradable • Non – biodegradable 	13.5 kg/day 8.1 kg/day 5.4 kg/day	Biodegradable waste will be used as a manure for greenbelt and non biodegradable waste will be disposed to authorized vendors

10.3 ENVIRONMENT MANAGEMENT CELL

An Environmental Management Cell with adequate professional expertise and resources has been established to discharge responsibilities related to environmental management including statutory compliance, pollution prevention, environmental monitoring, etc.

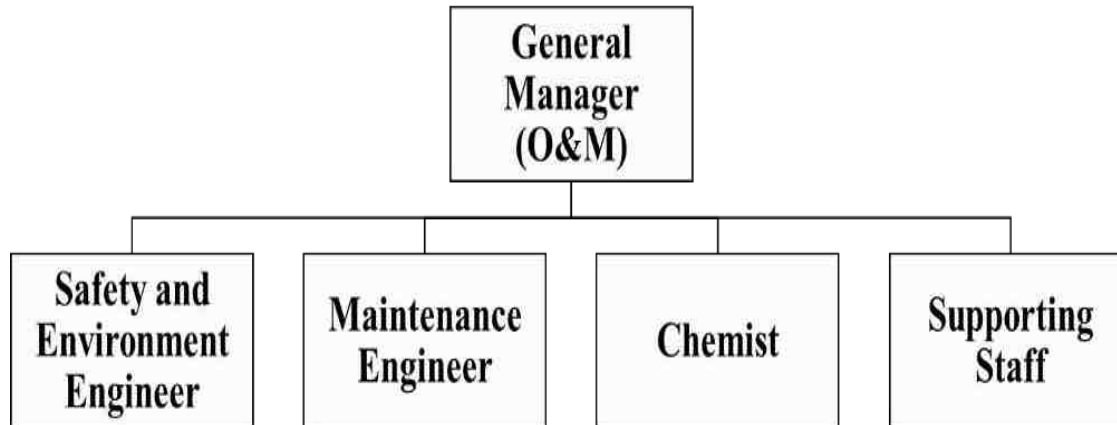


Figure 10-1 Organization Structure

10.4 BUDGETARY PROVISION FOR ENVIRONMENT MANAGEMENT PLAN (EMP)

In order to comply with the environmental protection measures as suggested in the above sections, the project management has made budgetary provision for environmental protection and safety measures. The capital cost of the project is about Rs. 5 Crores. It is proposed to invest about Rs.0.04 Crores on pollution control, green belt development, rainwater harvesting, environmental monitoring systems and others. The annual expenditure to be incurred on plantation, maintenance, monitoring and analysis of ambient air and occupational health etc. as shown in table below:

Table 10-2 EMP budgetary provision

Sr. No.	Description of Item	Capital Cost (Rs. in Lakhs)	Recurring Cost (Rs. in Lakhs)
1	Air Pollution control measures	24	1
2	Environmental monitoring & reporting	4	3
3	Greenbelt development	3	1.5

4	OHS measures	1	1
5	Fire protection & prevention measures	4	1.5
6	Rainwater Harvesting	2	1
7	Solid & Hazardous Waste Management	0.5	0.5
8	Septic Tank & Soak pit	1.5	0.5
Total		40	10

10.5 CORPORATE ENVIRONMENT RMANAGEMENT PLAN (EMP)

As per OM.F.No.22-65/2017-IA.III Dated: 1st May 2018, 2.0% of the total project cost (INR 5 crore) ie. 10 Lakhs, will be used for CER activities. The issues which will be raised during public consultation will be addressed in the form of action plan. SPC plans to engage in various CER activities, such as providing potable water facilities to a nearby school and improving infrastructure at the government school in Dheevanur village. A portion of the project budget will be allocated to these CER activities, which are expected to be completed within three years from the commencement of the establishment activity. The action plan for the proposed CER projects is detailed below

Sr. No	Activity	Capital Cost (Lakhs)	2024-2025	2025-2026	2026-2027
1	Potable water supply facility for nearby Govt. School	4	2	1	1
2	Infrastructure facilities such as sanitary, library, sports amenities and smart classroom to Govt.Schools	4	2	1	1
3	Scholarship to economically weaker section students	1	0.5	0.25	0.25
4	Health Camps in nearby villages	1	0.5	0.25	0.25
		10	5	2.5	2.5

10.5.1 ACTION PLAN FOR ENVIRONMENTAL MEASURES

The Environmental measures suggested above will be implemented so as to reduce the impact on environment during the operations of the proposed project. In order to facilitate easy

implementation, mitigation measures are phased as per the priority of implementation. The action plan for the Environmental measures is given below:

Sr.No.	Recommendations	Time Requirement
1.	Air Pollution Control Measures	Before commissioning of respective units
2.	Water Pollution Control Measures	Before commissioning of the plant
3.	Noise Control Measures	Along with the commissioning of the plant
4.	Green Belt Development	Stage-wise implementation

CHAPTER-11

SUMMARY AND CONCLUSION

11 SUMMARY AND CONCLUSION

11.1 INTRODUCTION

M/s. Sakthipriyan (herein after called as SPC) has proposed to establish a new unit at S.F. No:30/2, 30/3 & 30/4, Dheevanur Village, Thindivanam (Tk), Villuppuram District, Tamil Nadu for Manufacturing Ordinary Portland Cement (OPC), Pozzolanic Portland Cement (PPC) and Portland Slag Cements(PSC). The cost for the proposed standalone grinding unit project is Rs. 5.0 crores, and the capital cost for environmental protection measures are proposed as Rs. 40 Lakhs. The annual recurring cost is Rs. 10.0 lakhs per annum.

Project Scoping Category

As per the EIA Notification-2006 and amendments thereof; the proposed project activity falls under project activity of Schedule 3(b) Cement Plants-Standalone Grinding unit. The proposed industry falls under category 'B1'. Therefore, EC is required from SEIAA prior to setup of manufacturing facility.

The ToR application for prior environmental clearance for the proposed unit was submitted to SEIAA and received ToR vide **Letter No SEIAA-TN/F.No.9460/3(b)/ToR-1300/2022 dated: 01.11.2022.**

Baseline studies for one season (non-monsoon) i.e from **April to June 2023** were conducted by **M/s Vimta Labs Ltd** and potential environmental impacts of the project activities were identified, assessed and documented in this report.

As per the issued ToR, Draft EIA report has been prepared and submitted for Public Hearing (PH). After completion of Public Hearing, the Final EIA report along with action plan for commitment by the proponent will be submitted to TNSEIAA for further appraisal of the project and obtaining Environmental Clearance.

11.2 LOCATION OF THE PROJECT

The Total land area of 1.877 ha (4.64 acres) is under the Ownership of the promoter at S.F.No:30/2,30/3&30/4, Dheevanur Village, Thindivanam Taluk, Viluppuram District, Tamil Nadu at Latitude: 12°15'39.7" N & Longitude 79°34'00.81"E. The project site is close to NH-77 at 1.2 km in South direction & 6.8 km from the SH-5 in East direction. The nearest railway station is Thindivanam at 9.9 km in North direction. The nearest airport is located in

puducherry at a distance of 42.21 km in South East direction from the project site. The details of environmental setting are given in **Table - 11.1**.

Table 11-1 Environmental setting of the plant site (10 km radius)

Sr. No.	Particulars	Details		
		Pts	Latitude	Longitude
18.	Latitude & Longitude	A	12°15'39.7" N	79°33'56.02" E
		B	12°15'42.69" N	79°33'57.99" E
		C	12°15'42.04" N	79°34'00.04" E
		D	12°15'42.93" N	79°34'00.43" E
		E	12°15'42.36" N	79°34'02.23" E
		F	12°15'39.12" N	79°34'00.81" E
19.	Elevation above MSL	78 m		
20.	Land use at the project site	Unclassified land use		
21.	Nearest Habitation	Agoor (1.22 km, NNE) Dhevanur (1.47 km, SSW)		
22.	Nearest Highway	NH 77-Gingee to Thindivanam Road (1.2 km,S) SH 5- Vanthavasi to Mayillam Road (6.8 km, E)		
23.	Nearest Railway station	Thindivanam Station (9.9 km, SE)		
24.	Nearest Air Port	Puducherry Airport (42.21 km, SE) Chennai International Airport (102 km,NE)		
25.	Nearest Sea Port	Cuddalore (64.88 km, SSE)		
26.	Nearest Major Town	Tindivanam (9.9 Km, SE)		
27.	Reserve Forest within 10-km radius	Nil		
28.	Nearest water bodies	Dheevanur Lake (0.96 km, W) Mannampoondi Lake (1.89 km, N) Salai Lake (2.10 km, E) Vilukkam Lake (2.56 km, E) Kollar Lake (3.3 km, E) Venganthur Pond (4.01 km SW) Tributary River (4.31 km,SW) Puliyannur Lake (5.03 km, N) Taniyal Lake (6.44 km, N) Gingee River (6.71 km, SW) Meur Lake (8.17 km, S) Modaiyur Lake(8.7 km, SW) Chitheri (9.03 km, NNW) Thenpasar Lake (9.31 km, SSE) Kodium Lake (9.58 km, NE) Botheri Lake (9.78 km, SE) Vairapuram Big Lake (10 km, NE) Melsevur Lake (10 km, SSW)		
29.	Hills/ Valleys	Nil		

Sr. No.	Particulars	Details
30.	Ecologically sensitive zones like Wild Life Sanctuaries, National Parks and biospheres	None within 10-km radius
31.	Defense Installation / Archaeological	Nil
32.	Historical places	None within 10-km radius
33.	Socio-economic factors	No resettlement and rehabilitation involved
34.	Nearest Hospitals	4. Mannampoondi Hospital- (2.78 km, NNW) 5. Rettanai Government Hospital- (6.89 km,SSW) 6. Government Hospital- Thindivanam, (9.49 km, SE)
18.	Religious places	5. Sri Nerkuthi Vinayagar Temple (1.17 km,SW) 6. Sri Lakshminarasimha Temple (9.29 Km,SE) 7. Masjide Thakva Pallivasal (1.73Km, NNW) 8. St.Joseph's Church (3.16Km,NW)
19.	Nearby Major Industries	5. NCC Agro Industries, (5.47 Km, SW) 6. Stellar Pipes (5.87 km, E) 7. Mint Industries (9.8 Km,SE) 8. Venmaniyathur SIPCOT, (4.5 Km,E)
20.	Fire and rescue service	Tamil Nadu Fire and Rescue service, Tindivanam– (10.83 km, SE)
21.	Seismic Zone	Seismically, this area is categorized under Zone II as per IS: 1893 (Part 1) 2002.

11.3 PROJECT DETAILS

11.3.1 MANUFACTURING DETAILS

The total production capacity is 500 TPD. The production will be carried out in three phases. Each cement will be produced in alternate days. The details of manufacturing capacity of cements products are listed in **Table - 11.2**.

Table 11-2Details of manufacturing capacity

Sr.No	Products	Quantity (TPD)
1	A. PPC (Pozzolana Portland Cement)/ B. OPC (Ordinary Portland Cement)/ C. PSC (Portland Slag Cement)	500
	Phase – I	100
	Phase – II (Upon completion)	300
	Phase – III (Upon completion)	500

Note: A-Clinker: 65-75%, Pozzolanic Material: 15-35% and Gypsum: 3-5%, B-Clinker (90-95%), Gypsum (3-5%), Minor additional constituents (0-5%) and C-Clinker (45-65%), Granulated Blast Furnace Slag (30-50%), Gypsum (3-5%)

11.3.2 LAND REQUIREMENT

1.877 Ha (4.64 acres) of land has been procured for the proposed unit. The site falls in the unclassified land use zone by DTCP. The details of land-use breakup of the proposed plant are given in **Table - 11.3**.

Table 11-3 Details of Land use break-up

Sr. No	Plant Facilities	Area(ha)	Area (acres)	Percentage (%)
1	Plant Facilities Including Admin office etc.,	0.509	1.26	27.15
2	Raw Material Storage Area	0.063	0.15	3.23
3.	Solid waste storage area	0.002	0.007	0.15
4	Greenbelt development	0.789	1.95	42.00
5	Internal Road	0.153	0.373	8.08
6	Open Area	0.361	0.9	19.39
	Total	1.877	4.64	100

Source: SPC

11.3.3 RAW MATERIAL REQUIREMENT

The details of requirement of raw materials, sources and their mode of transportation are given in **Table-11.4**.

Table 11-4 Details of raw materials requirement

Sr. No	Raw Material	Quantity in TPD	Location	Distance	Transportation
1	Clinker	200	Andhra Pradesh	532.3 Km	Closed trucks by road
2	Gypsum	25	Chennai	180 Km	Closed trucks by road
3	Fly ash	175	Chennai	180 Km	Closed trucks by road
4	GGBFS/Slag	100	Thoothuku di	420 Km	Closed trucks by road

Source: SPC

11.3.4 POWER AND FUEL REQUIREMENT

The power requirements for the proposed plant will be 500 KVA. The power requirements will be met from Tamilnadu Generation and Distribution Corporation Limited

(TANGEDCO). Two (2) Nos of Diesel Generator with the capacity of 125 KVA will be used, in cases of the power failure. The fuel required for DG operation will be 40 lit/hr of diesel.

11.3.5 WATER REQUIREMENT

The water requirement for the proposed project will be 8.0 KLD which will be sourced from the Private supplier. Domestic consumption will be 1.35 KLD and for greenbelt activities and dust suppression will be 5.15 KLD and 1.5 KLD respectively. The details of water requirement are presented in **Table - 11.5**.

Table 11-5 Details of water requirement

Sr.No	Particulars	Consumption (KLD)	Source
1	Domestic	1.35	Private Suppliers
2	Greenbelt	5.15	
3	Dust Suppression	1.5	
Total		8.0	

Source: SPC

11.3.6 MANPOWER REQUIREMENT

The Total manpower employed in the proposed unit will be 30 Persons as direct which includes Managers, Supervisors, Technical assistants and Skilled/semiskilled workers etc.,20 persons will be engaged as indirect employees.

11.4 BASELINE ENVIRONMENTAL STATUS

The 10 km radial distance from the existing plant boundary has been considered as study area for Environmental Impact Assessment (EIA) baseline studies. Environmental monitoring for various attributes like meteorology, ambient air quality, surface and ground water quality, soil characteristics, noise levels and flora & fauna have been conducted at specified locations and the secondary data collected from various government and semi-government organizations. Baseline environmental monitoring studies for the various environmental attributes were carried out during **April to June 2023**. The details of the baseline study are presented as follows:

11.4.1 METEOROLOGY

Meteorological data at the site was monitored during **April to June 2023**. It was observed that during study period temperature ranged from 25.8 °C to 33.5°C. During the same period of

observations, the relative humidity recorded was ranged from 63% to 75 %. Predominant wind directions are mostly from the South and South West.

11.4.2 AMBIENT AIR QUALITY

To establish the baseline status of the ambient air quality in the study area, the air quality was monitored at eight (8) locations. The summary of the ambient air quality monitoring results is given in **Table - 11.6**

Table 11-6 Summary of ambient air quality in the study area

Sr. No	Parameters	Concentration (µg/m ³)		NAAQS Limits, 2009 (µg/m ³)
		Minimum	Maximum	
1	Particulate matter PM _{2.5}	11.80 (AAQ-6 & AAQ-8)	24.0 (AAQ-7)	60
2	Particulate matter PM ₁₀	35.60 (AAQ-8)	71.0 (AAQ-7)	100
3	Sulphur dioxide (SO ₂)	5.80 (AAQ-8)	13.70 (AAQ-7)	80
4	Oxides of Nitrogen (NO _x)	9.20 (AAQ-8)	25.20 (AAQ-3 & AAQ-7)	80
5	Carbon monoxide, CO	214 (AAQ-8)	335 (AAQ1)	2000

Note: All the values are in µg/m³
Ozone (O₃), VOC, Ammonia (NH₃), Lead (Pb), Arsenic (As) (ng/m³), Nickel (Ni) (ng/m³), Mercury (Hg), Benzene (C₆H₆ and Benzo (a) Pyrene (BaP) (ng/m³) are below the Detectable Limit

Note: Based on the market demand, the manufacturing of PPC, OPC & PSC will be in a phased manner.

11.4.3 WATER QUALITY

Eight (8) ground water samples and four (4) surface water samples within the study area were considered for assessment. The water samples are compared with the standards of drinking water IS 10500:2012.

Ground water Quality

The results of the ground water samples are compared with the standards for drinking water as per IS: 10500:2012. The analysis results indicate that the pH ranges in between 7.24 to 7.89, which is well within the specified standard of 6.5 to 8.5. The maximum pH of 7.89 was observed at Vempoondi (GW6) and the minimum pH of 7.24 was observed at Vilukkam (GW5). Total hardness was observed to be ranging from 231 to 582 mg/l. The maximum hardness was recorded at Plant site (GW1) and the minimum hardness was recorded at Maniyampattu (GW8). The Total Dissolved Solids (TDS) concentrations were found to be ranging in between 612 to 1389 mg/l. The maximum TDS was recorded at Plant site (GW1)

and the minimum TDS was recorded at Maniyampattu (GW8). Chlorides at all the locations were within the permissible limit, ranging in between 84.3 to 412.5 mg/l. Nitrates were found to be in the range of from 4.50 mg/l to 28.50 mg/l. The heavy metal content is below detectable limits.

Surface water Quality

During the baseline period season, 4 samples were taken for analysis. The analysis results indicate that the pH ranges in between 7.55 to 7.77, which is well within the specified standard of 6.5 to 8.5. The maximum pH of 7.77 was observed at Dheevanur Lake (SW4) and the minimum pH of 7.55 was observed at Vilukkam Lake (SW1). Total hardness was observed to be ranging from 86 to 379 mg/l. The maximum hardness of 379 mg/l was observed at Venganathur pond (SW3) and the minimum hardness of 86 mg/l was observed at Vilukkam Lake (SW1). The Total Dissolved Solids (TDS) concentrations were found to be ranging in between 265 to 647 mg/l. Chlorides were ranging in between 15.0 and 127.5 mg/l. Fluorides are ranging in 0.3 to 1.1 mg/l. Nitrates were found to be in the range of from 4.4 mg/l to 21 mg/l. Dissolved oxygen are ranging in 5.3-5.7 mg/l. Biological oxygen demand was less than 3-mg/l. Chemical oxygen demand are less than 5 mg/l. heavy metal content is below detectable limits.

11.4.4 SOIL CHARACTERISTICS

Six (6) soil samples were collected in and around the plant site to assess the present soil quality of the region. It has been observed that the texture of the soil is mostly “sandy clay soil” in the study area. The common colour of the soil is pale brown. The pH of the soil ranged from 8.0 to 8.89, indicating that the soil is slightly Alkali in nature. The bulk density of soil ranges from 1.16 to 1.38 gm/cc. Available nitrogen was observed to be 82.4 kg/ha to 254.2 kg/ha. Available phosphorous was observed to be 47.40 kg/ha to 74.30 kg/ha in the study area and Potassium was observed as 178.3 kg/ha to 487.0 kg/ha in the study region.

11.4.5 NOISE LEVELS

The noise monitoring has been conducted for determination of ambient noise levels at eight (8) locations in the study area. The daytime (L_{day}) noise levels were found to be in the range of 42.8 dB (A) to 54.3 dB (A). The night time (L_{night}) noise levels were observed to be in the range of 39.0 dB (A) to 50.0 dB (A). Hence, the noise levels were found to be well within the range specified by CPCB norms.

11.4.6 ECOLOGICAL ENVIRONMENT

As per MOEF and Forest Department of Tamilnadu state reveals that there are no Wildlife sanctuaries, National parks/biosphere reserves in 10 km radius from the proposed plant site boundary. As per the records of the Botanical Survey of India there are no plants of conservation importance in the study area. It can be concluded that there is seven species belonging Sch-I, two species of Sch-II (Indian grey mongoose and Indian fox/ Bengal fox House) and rest of species belongs Sch-III, Sch-IV and Sch-V of Wildlife Protection Act, 1972. Budget of Rs.2.5 lakhs/annum has been allotted for the wildlife conservation plan and submitted to the Chief Wildlife Warden for authentication, However Schedule II and III and other schedule IV birds are protected by the Indian Wildlife (Protection) Act, 1972. Since that species are found both in the core area and the buffer zone, both the project proponent and the State Forest and wildlife department are responsible for their conservation.

11.4.7 SOCIO ENVIRONMENT

The study area (10-km radius) has a total population of 1,10,975 persons according to 2011 Census. The male and female constitute 50.1 % and 49.1 % of the total population respectively. As per census, the study area comprises 28% population belonging to Scheduled Castes (SC) and 1.4% belonging to Scheduled Tribes (ST). The literacy rate is found to be 55.40%. As per census 2011 records, the main workers were found to be 51.11% of the total population. The marginal workers and non-workers constituted to 9.44% and 48.89% of the total population.

11.5 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impacts during Operational Phase

11.5.1 IMPACT ON SOIL

The soil quality remains the same as the proposed activity does not involve a change in land use pattern. The probable sources of degradation of soil quality will be due to settling of airborne particles and generation & disposal of hazardous wastes and sludges. The generated hazardous wastes will be disposed to TSDF. The airborne fugitive dust from the plant process such as raw material handling area and vehicular movement will be likely to be deposited on the topsoil in the immediate vicinity of the plant boundary. However, the fugitive emissions are likely to be controlled to a great extent through pollution control measures like water

sprinkling and the greenbelt development. Hence, no impact is envisaged on soil quality of the project site.

11.5.2 IMPACT ON AIR QUALITY

Particulate Matter (PM), Sulphur dioxide (SO₂) and Oxides of Nitrogen (NO_x) will be the major pollutants from the proposed activity. In order to control the emissions of particulates, the pollution control equipments are proposed. Adequate stack height has been provided to disperse gaseous emissions over a wider area. The maximum resultant ground level concentration of PM, SO₂, NO_x and CO are given in **Table - 11.7**

Table 11-7 Total Maximum GLCs from the Cumulative Emissions

Pollutant	Max. Base line Conc. (µg/m ³)	Estimated Incremental Conc. (µg/m ³)	Total Conc. (µg/m ³)	NAAQ standard (µg/m ³)
PM	71.0	0.26	71.26	100
SO ₂	13.7	0.18	13.88	80
NO _x	25.2	2.92	28.12	80
CO	335	43.04	378.04	4000

Gaseous Emission Control Measures:

The gaseous emissions Sox NO_x & CO from the DG sets will be controlled by adequate stack height as per CPCB norms. The impact of fugitive emissions from the proposed activity on air quality of the region is insignificant.

11.5.3 IMPACT ON WATER QUALITY & MANAGEMENT

The entire water demand for the proposed activity will be met from the private tankers. SPC has estimated the water requirement for the proposed project to be 8.0 KLD. To minimize the impacts on groundwater table, SPC has proposed to develop rainwater harvesting structures for the plant use and this reduce the consumption of fresh water. Water will be mainly used at certain stages in the process like greenbelt development, drinking, dust suppression and domestic needs. No effluent generation is envisaged. The domestic wastewater of 1.14 KLD will be disposed into the septic tank followed by soak pit.

11.5.4 IMPACT DUE TO SOLID WASTE GENERATION

In order to avoid problems associated with solid waste disposal, an effective solid waste management system will be followed. Hence, the impact due to solid waste generation during

the plant operation is not envisaged. The sources, quantity of the solid waste generated and waste management measures for proposed activity are presented in **Table - 11.8**

Table 11-8 Details of solid waste generation and management

Sr. No	Particulars	Quantity	Treatment and Disposal
Hazardous waste			
1	Used Oil	0.1 TPA	Used Oil will be given to authorized recyclers.
Solid wastes			
2	Total Domestic waste <ul style="list-style-type: none"> • Biodegradable • Non – biodegradable 	13.5 kg/day 8.1 kg/day 5.4 kg/day	Biodegradable waste will be used as a manure for greenbelt and non biodegradable waste will be disposed to authorized vendors

Source: SPC

11.5.5 IMPACT ON NOISE LEVELS

The major noise generating sources are from the areas of DG-sets, ball mills, loading and unloading operations, vehicle movements. The predicted noise level through mathematic modeling at the boundary due to various plant activities will be ranging in between 65-80 dB (A). It is seen from the modelling results that the incremental noise levels are within the CPCB standards.

Noise Attenuation Measures

The following control measures will be implemented for the proposed project:

- All the design/installation precautions as specified by the manufacturers with respect to noise control will be strictly adhered to;
- High noise generating sources will be insulated adequately by providing suitable enclosures;
- All the necessary noise protective equipment will be supplied to workmen operating near high noise generating sources.
- The air compressor, DG sets, transformer etc. will be provided with acoustic enclosure;
- Other than the regular maintenance of the various equipment, ear plugs/muffs will be recommended for the personnel working close to the noise generating units; and
- Adequate greenbelt development will also be developed in the plant boundary of

the proposed plant.

11.5.6 IMPACT ON ECOLOGY

The proposed industry is not going to discharge any treated or untreated effluents. Hence, it is not going to have any direct or indirect impacts on the Schedule I species that are most likely to occur in the study area of the project site. No direct or indirect damage is expected to the flora and fauna of the Study area. Further, as there are no rare or endangered or endemic or threatened terrestrial animal species within the project area, the project does not pose any direct threat to the flora and fauna of the study area. Further, the greenbelt will be developed in 42.0% of the total project area. Hence, the anticipated environmental impacts on the flora and fauna of the study area are negligible and easily reversible. It will not create any kind of environmental stress to the local flora and fauna.

The incremental concentrations of the air quality modelling show that the resultant levels of PM, SO₂ and NO_x are well within the permissible limits as per National Ambient Air Quality Standards, 2009. The impacts on aquatic ecology due to the proposed activity would be negligible as the treated water will be properly reused and no waste water will be discharged outside the plant premises. The proposed activity does not create any significant impact on aquatic bodies.

11.5.7 IMPACT ON PUBLIC HEALTH

The discharge of waste materials (stack emission and solid wastes) from process operations can have some adverse impact on public safety and health in the surrounding area, if appropriate treatment procedures are not followed. As the plant pollution control equipments will be designed as per the modern available technology for controlling the impacts, no adverse impacts on public health in the area are anticipated.

11.6 ENVIRONMENTAL MANAGEMENT PLAN

Environmental Management Plan during the Construction Phase

11.6.1 SOIL ENVIRONMENT MANAGEMENT

Preparation of site will involve excavations and fillings. The earthen material generated during excavations and site grading periods, will be properly dumped and slope stabilisation will be taken. The topsoil generated during construction will be preserved and reused for plantations. The additional greenbelt area will be delineated before start-up of earthwork and tree plantation will be taken up during construction stage itself.

11.6.2 AIR QUALITY MANAGEMENT

The activities like site development, grading and vehicular traffic contribute to increase in PM and NO_x concentrations. The mitigation measures recommended to minimize the impacts are:

- Water sprinkling in construction area;
- Proper maintenance of vehicles and construction equipment; and
- Tree plantation in the area earmarked for greenbelt development.

11.6.3 WATER QUALITY MANAGEMENT

- The earthwork (cutting and filling) will be avoided during the rainy season and will be completed during the summer season.
- Stone pitching on the slopes and construction of concrete drains for storm water to minimize soil erosion in the area will be undertaken.
- Soil binding and fast-growing vegetation will be grown within the plant premises to arrest the soil erosion.

11.6.4 NOISE LEVEL MANAGEMENT

Operation of construction equipment and vehicular traffic contribute to the increased noise level. Recommended mitigation measures are:

- Enclosures for noise making units like pumps, DG sets, compressors etc.,
- Good maintenance of vehicles and construction equipment;
- Plantation of trees around the plant boundary to attenuate the noise; and
- Provision of earplugs and earmuffs to workers.

11.6.5 ECOLOGICAL MANAGEMENT

Minimum clearing of vegetation will be required. The existing trees will be preserved in the operation phase of the project. Thus, there will not be any ecological impact due to the project activity in its construction stage.

Environment Management Plan during the Operation Phase

During operation phase, the impacts on the various environmental attributes should be mitigated using appropriate pollution control equipment. The Environment Management Plan prepared for the proposed project aims at minimizing the pollution at the source itself.

11.6.6 AIR POLLUTION MANAGEMENT

Fugitive and flue gas emission from plant will contribute to increase in concentrations of PM, SO₂, NO_x and CO. The mitigation measures recommended are as follows:

- Raw material handling sections are major source for fugitive emissions;

- Adopting good housekeeping practice will also help in control of fugitive emission. Maintaining shop floor and roads in good condition minimizes the chances of fugitive emission; and
- The trucks and other vehicles shall be maintained and serviced regularly to reduce air emissions.

11.6.7 WATER POLLUTION MANAGEMENT

The recommended measures to minimise the impacts are as follows;

- Domestic wastewater will be disposed into septic tank followed by soak pit;
- Provision of storm water system to collect and store run-off water during rainy season and utilization of the same in the process to reduce the fresh water requirement; and
- Suitable rainwater harvesting structures to be constructed.

11.6.8 NOISE POLLUTION MANAGEMENT

The major noise generating sources are the DG-sets, grinding unit, loading and unloading operations, and vehicle movements. Some recommendations are;

- Adequate protective measures in the form of ear muffs/ear plugs have been provided to the workers working in high noise areas;
- In addition, reduction in noise levels in the high noise machinery areas could be achieved by adoption of suitable preventive measures such as suitable building layout in which the equipment is to be located; and
- Adequate greenbelt development is also being developed in the plant boundary.

11.6.9 SOLID WASTE MANAGEMENT

All the dust collected in air pollution control equipment's is automatically recycled into the process. Hazardous waste such as used oil will be reused in the girth and pinion of the ball mill. Biodegradable waste will be used as a manure for greenbelt and non biodegradable waste will be disposed to authorized vendors.

11.6.10 ECOLOGICAL MANAGEMENT

Adequate attention will be paid to the plantation of trees, their maintenance and protection. The construction of cement grinding units does not involve any cutting of trees. The greenbelt area will be developed in an area of 0.78 ha (1.95 acres) which is 42 % total area.

11.7 TRAFFIC STUDY

The project site is located at a distance of 1.0 Km from the National highway-77 Gingee – Tindivanam road. The engine driven vehicles were classified into various levels like two wheelers, auto rickshaw, car/utility, buses and trucks. The proposed activity involves the transport of raw material and finished goods near to and from the plant site. The present level of traffic on the existing road found to be 405.6 PCUs/hr. The total traffic generated from the proposed activity will be 429.6 PCUs/hr (405.6+24=429.6). The transportation in the proposed activity not create any significant impacts to the environment.

Table 11-9 Traffic scenario

Road	V	C*	V/C Ratio	LOS
Gingee-Tindivanam road	Existing			
	405.6	1500	0.27	B
	After proposed project			
	429.6	1500	0.2716	B

V= Volume in PCUs/hr & C= Capacity in PCUs/ hr

** Note: Capacity as per IRC Guidelines*

The existing level of service (LOS) of the Gingee-Tindivanam is ‘B’ which is Very Good. After considering the transportation of trucks due to the proposed project activity, meagre impact was envisaged. The level of service predicted to be ‘B’ (Very Good) even after the proposed project.

There will be a movement of trucks in the plant premise for the transportation of raw material and products but the proposed activity involves only a small increase in truck numbers which may never cause a significant impact. The vehicular movements can discharge SO₂, NO_x, CO and particulate emissions due to combustion engines. The emission from the vehicular movements can be controlled by good management practices of the vehicles.

- Vehicles used for transportation will be equipped with novel engine for reducing emissions.
- Low sulphur-High Speed Diesel will be used for fuelling vehicles.
- Periodical maintenance of vehicles with emission testing will be carried out.

11.8 ENVIRONMENTAL MONITORING PROGRAM

The environmental monitoring program is important in terms of evaluating the performance of pollution control equipment installed in the plant. The sampling and analysis of the environmental attributes will be as per the guidelines of CPCB/TNPCB. The frequency of air, noise, surface water and ground water sampling and location of sampling will be as per the directives of Tamil Nadu Pollution Control Board.

11.8.1 BUDGETARY ALLOCATION FOR ENVIRONMENTAL PROTECTION

The management is quite conscious of its responsibility for maintaining clean and a healthy environment and it will adopt a comprehensive Environmental Management Plan (EMP) which will cover several environmental protection measures, not only for abatement of environmental pollution resulting from the project, but also for the improvement in the ambient environment. The overall investment in the proposed project is 500.00 Lakh. About Rs. 40.0 lakh as capital cost and Rs. 10.0 Lakh as recurring cost will be proposed for the environment protection program.

Table 11-10 Cost provision for environmental measures

Sr. No.	Description of Item	Capital Cost (Rs. in Lakhs)	Recurring Cost (Rs. in Lakhs)
1	Air Pollution control measures	24	1
2	Environmental monitoring & reporting	4	3
3	Greenbelt development	3	1.5
4	OHS measures	1	1
5	Fire protection & prevention measures	4	1.5
6	Rainwater Harvesting	2	1
7	Solid & Hazardous Waste Management	0.5	0.5
8	Septic Tank & Soak pit	1.5	0.5
Total		40	10

11.9 DISASTER MANAGEMENT PLAN

To tackle the consequences of a major emergency inside the plant premises or its immediate vicinity, a Disaster Management Plan has been formulated. The objective of the Disaster

Management Plan is to make use of the combined resources of the commercial cement plant and the outside services, to achieve the following:

- Effect the rescue and medical treatment of casualties;
- Safeguard other people;
- Minimize damage to property and the environment;
- Initially contain and ultimately bring the incident under control;
- Identify any dead;
- Provide for the needs of relatives;
- Provide authoritative information to the media;
- Secure the safe rehabilitation of affected area; and
- Preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of the Emergency.

11.10 OCCUPATIONAL HEALTH & SAFETY MEASURES

Large projects where multifarious activities are involved during construction, testing, commissioning, operation and maintenance, the men, materials and machines are the basic inputs. Along with the benefits, the industrialization generally brings several problems like occupational health and safety. The industrial planner therefore has to take steps to minimize the impacts and to ensure appropriate occupational health and safety in the commercial cement plant.

The following measures are proposed:

- Conducting awareness programs at regular intervals to the employees;
- Providing safety kits and prevention kits; and
- Provision of first aid kit at the plant site to handle emergency situations that may arise.
- An amount of Rs. 1.0 lakhs will be allocated annually for the safety and health of the workers.

11.11 CORPORATE SOCIAL AND ENVIRONMENTAL RESPONSIBILITY

As per OM.F.No.22-65/2017-IA.III Dated: 1st May 2018, 2.0% of the total project cost (INR 5 crore) ie. 10 Lakhs, will be used for CER activities. The issues which will be raised during public consultation will be addressed in the form of action plan. SPC plans to engage in various CER activities, such as providing potable water facilities to a nearby school and improving infrastructure at the government school in Dheevanur village. A portion of the

project budget will be allocated to these CER activities, which are expected to be completed within three years from the commencement of the establishment activity.

11.12 PROJECT BENEFITS

The basic requirement of the community needs will be strengthened by extending health care, educational facilities to the community, providing drinking water to the villages and taking part in various health care activities.

Implementation of the project will result in the following benefits

- Temporary employment for people from the neighboring villages during construction phase;
- 30 persons will be employed as direct and 20 persons will be employed as indirect.
- providing drinking water facility and revamping of bore wells facilities in the nearby villages;
- State will get revenue from payment towards taxes and water cess etc.,
- Reduces the demand and supply gap of cement products.

11.13 CONCLUSION

The proposed cement plant will have some marginal impacts on the local environment. However, the project also offers significant benefits, such as meeting future cement demand, providing employment opportunities for local residents, and improving transportation facilities. These advantages will ultimately enhance the living standards of the local communities.

CHAPTER – XII DISCLOSURE OF CONSULTANT ENGAGED

12 DISCLOSURE OF CONSULTANT ENGAGED

In order to assess the potential environmental impacts due to the “**Proposed standalone Cement Grinding Unit of 500 TPD in a Phased manner**” at Survey No.30/2, 30/3, 30/4, Dheevanur village, Tindivanam Taluk, Villupuram District and Tamil Nadu State. **M/s. Sakthipriyan Cements** has engaged M/s. Hubert Enviro Care Systems (P) Limited, Chennai to undertake EIA study. The nature of consultancy service rendered covers terrestrial environmental assessment.

12.1 BRIEF RESUME AND NATURE OF HUBERT ENVIRO CARE SYSTEMS PVT. LTD.

HECS is a total Environmental management company which provides Environmental consultancy services, Analytical testing services, turnkey solutions and Operation-Maintenance services for water and wastewater facilities.

The company provides solutions to several industries like Refineries, Thermal Power Plant, Pharma, R&D Facilities, Electroplating and Manufacturing, IT Parks, Residential Complexes, Mines, Dairies, Food Processing, Textile mills, Breweries, etc.

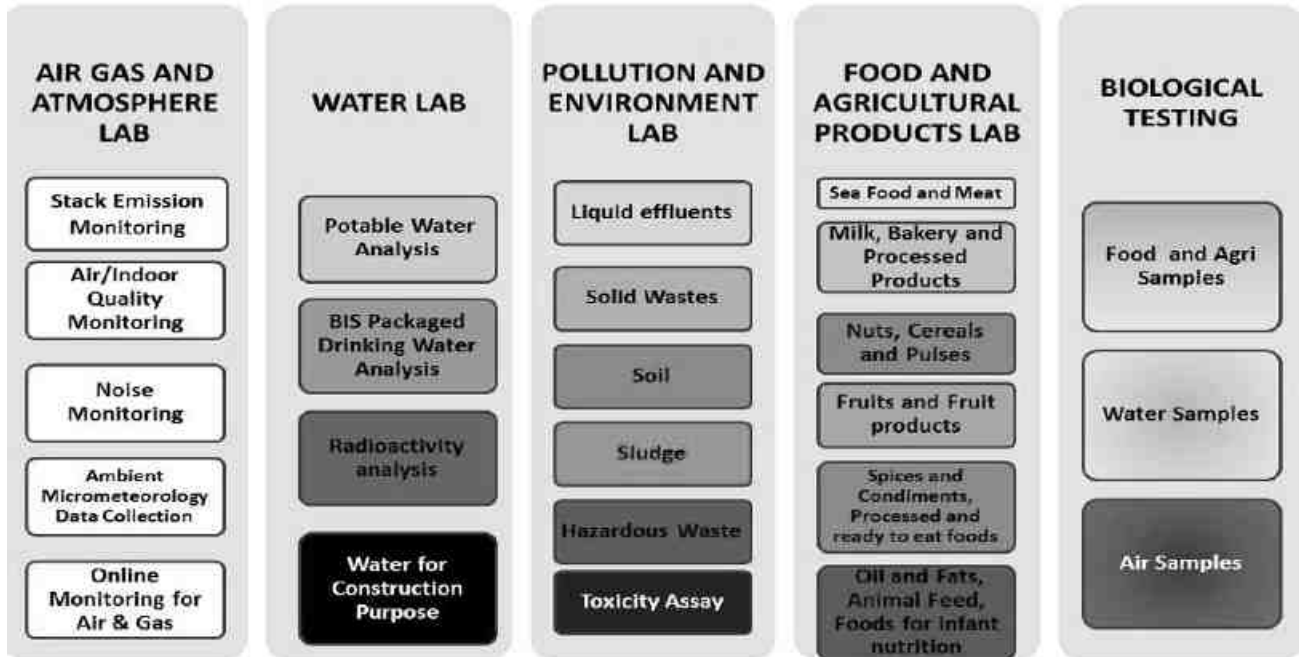
The company is specialized in executing projects right from concept development, supply, commissioning and operation on turnkey basis. HECS has successfully executed more than 300 environmental engineering projects for various industrial sectors both in India and overseas

Consultancy Profile:

- ✚ HECS is accredited by QCI-NABET
- ✚ An approved consultant for carryout EIA studies across India
- ✚ India’s leading multidisciplinary Environmental Consultancy organization
- ✚ HECS- Consultancy division comprises of technical skilled and competent Team of 40 people. The team consists of Three Doctorates & about thirty postgraduates
- ✚ HECS has industry specific prominent expert to provide solutions & recommendations
- ✚ Serving client more than 25 years & pan India presence in the following sectors:
 - Environmental Clearance
 - Coastal Regulation Zone
 - Risk Assessment, DMP, HAZOP studies
 - Feasibility/ treatability studies
 - Due diligence studies
 - Ground water Clearance

- DISH, PESO and other statutory approvals
- Consent to Establish, Consent to Operate
- Hazardous waste, bio- medical waste authorization
- Other environmental approvals

✚ Has an in-house laboratory wherein the following activities are being carried out:



12.2 QCI – NABET ACCREDITATION

CONSULTANCY	HUBERT ENVIRO CARE SYSTEMS (P) LTD., CHENNAI
NABET CERTIFICATE NO	NABET/ EIA/ 24-27/ RA0335 VALID UP TO 31/03/2027
MOEF REG. LAB	LB/99/7/2021-INST LAB-HO-CPCB-HO/PVT/8984 DATED 29.01.2024



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NABET

National Accreditation Board for Education and Training

Certificate of Accreditation

Hubert Enviro Care Systems, Chennai

A-21, III Phase, Thiru VI Ka Industrial Estate- 600032

The organization is accredited as **Category-A** under the **QCI-NABET Scheme for Accreditation of EIA Consultant Organization, Version 3: for preparing EIA/EMP reports in the following Sectors-**

S.No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1.	Mining of minerals including opencast / underground mining	1	1 (a) (i)	A
2.	Offshore and onshore oil and gas exploration, development & production	2	1 (b)	A
3.	River Valley projects	3	1 (c)	A
4.	Thermal power plants	4	1 (d)	A
5.	Mineral beneficiation	7	2 (b)	A
6.	Metallurgical industries (ferrous & non-ferrous)	8	3 (a)	A
7.	Cement plants	9	3 (b)	A
8.	Petroleum refining industry	10	4 (a)	A
9.	Pesticides industry and pesticide specific intermediates (excluding formulations)	17	5 (b)	A
10.	Petro-chemical complexes	18	5 (c)	A
11.	Petrochemical based processing	20	5 (e)	A
12.	Synthetic organic chemicals industry	21	5 (f)	A
13.	Industrial estates/ parks/ complexes/areas, export processing Zones (EPZs), Special Economic Zones (SEZs), Biotech Parks, Leather Complexes	31	7 (c)	A
14.	Bio-medical waste treatment facilities	32A	7 (d a)	B
15.	Ports, harbours, break waters and dredging	33	7 (e)	A
16.	Highways	34	7 (f)	B
17.	Common Effluent Treatment Plants (CETPs)	36	7 (h)	B
18.	Common Municipal Solid Waste Management Facility (CMSWMF)	37	7 (i)	B
19.	Building and construction projects	38	8 (a)	B
20.	Townships and Area development projects	39	8 (b)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RAAC minutes dated May 31, 2024, posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no QCI/NABET/ENV/ACO/24/3292 dated June 25, 2024. The accreditation needs to be renewed before the expiry date by Hubert Enviro Care Systems, Chennai following due process of assessment.

Issue Date
June 25, 2024



Valid up to
March 31, 2027



Mr. Ajay Kumar Jha
(Sr. Director, NABET)

Certificate No.
NABET/EIA/24-27/RA 0335



Prof (Dr) Varinder S Kanwar
(CEO- NABET)

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.

ANNEXURE

for

**Proposed Standalone Cement Grinding Unit of 500 TPD in a
Phased manner**

at

SF. No. : 30/2, 30/3, 30/4

Village: Dheevanur,

Taluk: Thindivanam,

District: Villupuram,

State: Tamil Nadu.

By



M/s. Sakthipriyan Cements

**Project termed under Schedule 3(b), Category B1 as per EIA Notification
2006 and its subsequent amendments**

ToR Issued on F.No.9460/3(b)/ToR – 1300/2022 dated:01.11.2022

Baseline Monitoring Period – April to June 2023

EIA Consultant



M/s. HUBERT ENVIRO CARE SYSTEMS (P) LTD

Baseline Monitoring Laboratory



M/s. Vimta Labs Ltd

August 2024

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Annexure – I

Land Document

288/2021

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17.2.2021

K. ராஜசேகர்
K. செந்திரவேலு
புஷ்பேசரி

M. சரசா
தா.சி. அலண்டியாக்கம்
No 2493-B1 2008
தமிழ்நாடு

கிரையப்பத்திரம்

கிரையம் ரூபாய்.15,54,400/-

மார்க்கட் மதிப்பு ரூபாய்.15,54,400/-

நிகழும் 2021 ஆம் ஆண்டு பிப்ரவரி மாதம் 18-ம் பதினெட்டாம் நாள், பாண்டிச்சேரி-605001, வாணரப்பேட்டை, சித்திவிநாயகர்வீதி, கதவுஎண்.1 என்ற முகவரியில் வசிக்கும் கல்யாணசுந்தரம் அவர்களின் குமாரர் க.ராஜசேகர் ஆதாரஎண்.6965 1685 9230, செல்நெ.7373053003, PAN NO.APTPR4603F-(1), புதுச்சேரி - 605004, முதலியார்பேட்டை, நைனாரம், அண்டபம், திவான்சுந்தரம்

எழுதிவாங்குபவர்கள்

K. Rajalakshmi

எழுதிக்கொடுப்பவர்கள்

P. Anand

செவியலட்சுமி

V. Annapoornam

சந்திரவேலு

S. Senthil

சுமதி

S. Megala

சுமதி

P. Saranya

சுமதி

சுமதி

சுமதி

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சுமதி

சுமதி

2021 ம் ஆண்டு 288 ம்
59
1 வது தரம்

பதிவு

भारतीय गैर न्यायिक INDIA NON JUDICIAL

भारत

रु. 25000

पच्चीस हजार रुपये

Rs. 25000

TWENTY FIVE THOUSAND RUPEES

INDIA

தமிழ்நாடு தமிழ்நாடு TAMILNADU

1744
17.2.2008

K. ராஜசேகர்
K. செந்தில்குமார்
யசுச்சேரி

M. Sarada D 596327

M. 81371
மு.நா.நி. அவரைப்பாக்கம்
L.No 2493-B1-2008
தமிழ்நாடு

2

முதலியார்நகர், பகவத்சிங் தெரு, கதவுஎண்.78 என்ற முகவரியில் வசிக்கும் கல்யாணசுந்தரம் அவர்களின் குமாரர் க.செந்தில்குமார் ஆதார்எண்.3645 2347 7992, PAN NO.CSZPS6402D-(2) ஆகிய உங்கள் இருவருக்கும்.

சென்னை-600001, மண்ணடி, சென்னை பொது தபால்நிலையம், பவளக்காரத்தெரு,

கதவுஎண்.95 என்ற முகவரியில் வசிக்கும் காலஞ்சென்ற கன்னியான் அவர்களின் குமாரர்

எழுதிவாங்குபவர்கள் : K. Rajesh k. Senthil

எழுதிக்கொடுப்பவர்கள் : P. Anand
10வது தெரு

சென்னை
சென்னை
சென்னை

சென்னை
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சென்னை



தமிழ்நாடு தமிழ்நாடு TAMILNADU

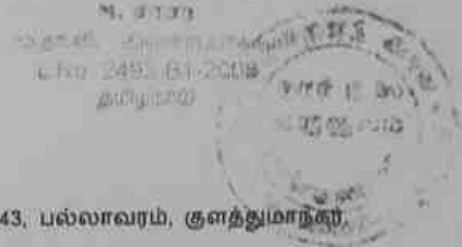
M. Sarasa D 596303

1765

17.2.2021

K. ராஜேசன்
K. செந்தில்குமார்
யுசுசுசுசு

3



க.வெங்கடேஷ் ஆதார்எண்.8191 9149 8763-(1), காஞ்சிபுரம்-600043, பல்லாவரம், குளத்துமாநூர், வேம்புலியம்மன்கோவில் ஏழாவது தெரு, கதவுஎண்.17 என்ற முகவரியில் வசிக்கும் காலகுசென்ற கன்னியான் அவர்களின் குமாரத்தியும், ஜெயபால் அவர்களின் மனைவியுமான ஜெ.ஜெயலட்சுமி ஆதார்எண்.8365 8717 7685-(2), பாண்டிச்சேரி-605005, பூமியான்பேட்டை, உழந்தை

எழுதிவாங்குபவர்கள் : J. Rishal K. Sarasa

எழுதிகொடுப்பவர்கள் :

சுந்திரா

சுந்திரா

சுந்திரா

சுந்திரா

சுந்திரா

சுந்திரா

சுந்திரா

P. Sarasa

V. Annaswami

சுந்திரா

S. Megala

P. Sarasa

சுந்திரா

சுந்திரா

சுந்திரா

சுந்திரா

K. Peja

புத்தகம் 2021ம் வருடத்திற்கு 288 ம்
விலகம் 59 புள்ளிக்கொடுக்கப்பட்டுள்ளது
3 வது நாள்



भारतीय गैर न्यायिक INDIA NON JUDICIAL

रु.
25000
पच्चीस हजार रुपये



Rs.
25000
TWENTY FIVE THOUSAND RUPEES

தமிழ்நாடு தமில்நாடு TAMILNADU

131E
9.2.2021.

K. ராஜேசகர்
K. செந்தில் குமார்
யசச்சேரி

M. Sarasa

D 596302

சென்னை மாவட்டம்
L No 2493-B1-2008
தமிழ்நாடு



ஏறிபாதை, கதவுஎண்.11 என்ற முகவரியில் வசிக்கும் காலஞ்சென்ற கன்னியாள் அவர்களின் குமாரத்தியும், பழனி அவர்களின் மனைவியுமான ப.சந்திரா ஆதார்எண்.3429 9958 34353-(3), விழுப்புரம் மாவட்டம், திண்டிவனம் வட்டம், தீவனூர் கிராமம், ஈ.பி எதிரில், கதவுஎண்.168 என்ற முகவரியில் வசிக்கும் காலஞ்சென்ற கன்னியாள் (எ) கண்ணாயிரம் அவர்களின் மனைவி

எழுதிவாங்குபவர்கள்

J. Rindal K. Sarasa

எழுதிகொடுப்பவர்கள் :

சென்னை மாவட்டம்
சுந்திரா

P. Annasawari
S. சந்திரா
S. mekala

சுந்திரா
சென்னை மாவட்டம்

சென்னை மாவட்டம்
சென்னை மாவட்டம்

P. Renuka

சென்னை மாவட்டம்
சென்னை மாவட்டம்

சென்னை மாவட்டம்

சென்னை மாவட்டம்

சென்னை மாவட்டம்

சென்னை மாவட்டம்
சென்னை மாவட்டம்
4 வது தளம்





தமிழ்நாடு தமிழ்நாடு TAMILNADU

mi
17.2.2021

K. ராஜேசகர்
K. செந்தில்குமார்
யசுச்சேரி
5

M. Sarasa
M. சாரா
முதலிய. அலுவலர்பயா.
LN No 2493-B1-2009
கடற்காடி

S 952063



க.முனியம்மாள் ஆதார்எண்.4406 2496 1345-(4), மேற்படி திண்டிவனம் வட்டம், தீவனூர்
கிராமம், ஈ.பி எதிரில், கதவுஎண்.168 என்ற முகவரியில் வசிக்கும் காலஞ்சென்ற கன்னியான் (எ)
கண்ணாயிரம் அபூர்களின் குமாரர் க.ராமு ஆதார்எண்.6393 4881 4984-(5), மேற்படி திண்டிவனம்
வட்டம், தீவனூர் கிராமம், ராஜீவகாந்தி நகர், கதவுஎண்.2/46 என்ற முகவரியில் வசிக்கும்

எழுதிவாங்குபவர்கள் : J. Rishel & Sarasa

எழுதிகொடுப்பவர்கள் :

கவயத்திசை
செல்வகுமார் க.ராஜி

P. Annapoorni

சுந்திரா

V. Annapoorni
S. சித்ரா

செல்வகுமார்

S. Megala
P. Ravi

க.ராஜி

செல்வகுமார்
சுந்திரா

செல்வகுமார்

செல்வகுமார்

செல்வகுமார்

செல்வகுமார்

செல்வகுமார்

செல்வகுமார்

2021ம் ஆண்டு 288
ஆணம் 59
வது தாள்





தமிழ்நாடு தமிழ்நாடு TAMILNADU

M. Sarasa AV 270034

K. ராஜேசுக்
K. செந்தில்குமார்
யசுச்சேசு

ம.சா.வி. சிவசுப்பிரமணியன்
L.No. 2493-B1-2018
கல்முனை

காலஞ்சென்ற கன்னியான் (எ) கண்ணாயிரம் அவர்களின் குமாரர் க.கிரஷ்ணமூர்த்தி ஆதாரஎண்.7820 1474 7977-(6), மேற்படி திண்டிவனம் வட்டம், தீவனூர் கிராமம், ஈழி எதிரில், கதவுஎண்.168 என்ற முகவரியில் வசிக்கும் காலஞ்சென்ற கன்னியான் (எ) கண்ணாயிரம் அவர்களின் குமாரர் க.பொய்யாது ஆதாரஎண்.9398 5281 6812-(7), சென்னை-600118,

எழுதிவாங்குபவர்கள்

J. Rajal K. Sarasa

எழுதிகொடுப்பவர்கள்

P. Sarasa

செல்வலட்சுமி

V. Annapurna

சந்திரா

S. சந்திரா

S. mekala

P. Sarasa

K. Sarasa

செல்வலட்சுமி
சந்திரா
செல்வலட்சுமி

பொய்யாது

செல்வலட்சுமி

செல்வலட்சுமி

K. Sarasa

2021ம் ஆண்டு 288
59
6



தமிழ்நாடு தமிழ்நாடு TAMILNADU

M. Sarasa AV 270035

K. ராஜசேகர்
K. செந்தில்குமார்
யசுச்சேரி

சென்னை
பி.நா.க. 2493-61-2008
தமிழ்நாடு

கொடுங்கையூர், ஆர்.ஆர்.நகர், டி பிளாக், கதவுஎண்.133 என்ற முகவரியில் வசிக்கும் காலகுசென்ற சின்னசாமி அவர்களின் குமாரத்தியும், ஆனந்தன் அவர்களின் மனைவியுமான ஆ.பூபதி ஆதார்எண்.2112 1766 0011-(8), மேற்படி திண்டிவனம் வட்டம், தீவனூர் கிராமம், ஈ.பி எதிரில், கதவுஎண்.171 என்ற முகவரியில் வசிக்கும் காலகுசென்ற பூவன் அவர்களின் மனைவி

எழுதிவாங்குபவர்கள் : J. Rajadil K. Sarasa

எழுதிகொடுப்பவர்கள் :

சென்னை

சென்னை

சென்னை

சென்னை

சென்னை

சென்னை

சென்னை

சென்னை

P. Sarasa

V. Annaswami

S. Meegala

P. Rajadil

சென்னை

சென்னை

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சென்னை

சுற்றுலா



தமிழ்நாடு தமில்நாடு TAMILNADU

AV 270106

17.2.2021

K. ஜானகி
K. செந்திரிசுமார்
யசுமதி

M. Sarasa
M. சரசா
ம.சரசா சிவசுப்பிரமணியம்
L.No 2493-81-2008
கட்டுநாடு

பூசுள்ளியம்மாள் ஆதாரண்.7695 3402 4394(9), மேற்படி முகவரியில் வசிக்கும் காலகூடுசென்ற
பூவன் அவர்களின் குமாரர் பூசுரேஷ் ஆதாரண்.9849 4925 9534-(10), சென்னை-600014,
ராயப்பேட்டை யானைக்குளம் இரண்டாவது தெரு, கதவுஎண்.20/41 என்ற முகவரியில் வசிக்கும்
காலகூடுசென்ற பூவன் அவர்களின் குமாரத்தியும், வசந்தகுமார் அவர்களின் மனைவியுமான

எழுதிவாங்குபவர்கள் : K. Rajal M. Sarasa

எழுதிக்கொடுப்பவர்கள் : P. Annapoorni

செந்திரிசுமார் S. Megala

சந்திரா P. Reetha

K. Rajal கருமணி

செந்திரிசுமார் கருமணி

செந்திரா கருமணி

செந்திரிசுமார் கருமணி

செந்திரா கருமணி

செந்திரிசுமார் 2021
செந்திரிசுமார்
செந்திரிசுமார்



தமிழ்நாடு தமில்நாடு TAMILNADU

M. Soreasa AV 270107
ம. சாசா

1770
17.2.2011

K. ராஜேசுக்
K. செந்தில்குமார்
யசுச்சா

மதுரை சுவாமிநாதர்
L.No 2493-B1-2008
தமிழ்நாடு



வ.அன்னபூரணி ஆதார்எண்.4140 4702 0006-(11), சென்னை-600118, கொடுங்குண்டி ஆர்.ஆர்
நகர், டி பிளாக், கதவுஎண்.133 என்ற முகவரியில் வசிக்கும் காலஞ்சென்ற புவன் அப்பர்களின்
குமாரத்தியும், சேகர் அவர்களின் மனைவியுமான சே.சித்ரா ஆதார்எண்.9461 1464 1154-(12),
மேற்படி திண்டிவனம் வட்டம் தீவனூர் கிராமம், கதவுஎண்.171 என்ற முகவரியில் வசிக்கும்
எழுதிவாங்குபவர்கள் : J. Rindal K. Soreasa

எழுதிகொடுப்பவர்கள் :
கி.சு.சு.சு.
சு.சு.சு.சு.
சு.சு.சு.சு.

P. Soreasa
V. Annasoreasa
S. சித்ரா
S. Megala
P. Soreasa

சு.சு.சு.சு.
சு.சு.சு.சு.
சு.சு.சு.சு.
சு.சு.சு.சு.

சு.சு.சு.சு.
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சு.சு.சு.சு.
சு.சு.சு.சு.

சு.சு.சு.சு.
சு.சு.சு.சு.
சு.சு.சு.சு.
சு.சு.சு.சு.

காலஞ்சென்ற பூவன் அவர்களின் குமாரத்தியும், சரவணன் அவர்களின் மனைவியுமான ச.மேகலா ஆதார்எண்.4264 3347 8324-(13), மெற்படி முகவரியில் வசிக்கும் காலஞ்சென்ற பூவன் அவர்களின் குமாரர் பூ.ரமேஷ் ஆதார்எண்.9936 3205 5811-(14), சென்னை-600118, கொடுங்கையூர், ஆர் ஆர் நகர், சி பிளாக், கதவுஎண்.89 என்ற முகவரியில் வசிக்கும் காலஞ்சென்ற செல்லன் அவர்களின் மனைவி செ.சந்திரா ஆதார்எண்.9429 2886 7836-(15), சென்னை-600001, மண்ணடி, செம்புதாஸ்தெரு, கதவுஎண்.52 என்ற முகவரியில் வசிக்கும் காலஞ்சென்ற செல்லன் அவர்களின் குமாரத்தி சரளா ஆதார்எண்.2555 2903 1461-(16), சென்னை-600021, வண்ணாரப்பேட்டை, கொடுக்குப்பேட்டை, முதல்தெரு, சத்தியமூர்த்திதெரு, கதவுஎண்.4 என்ற முகவரியில் வசிக்கும் காலஞ்சென்ற செல்லன் அவர்களின் குமாரத்தியும், கணேசன் அவர்களின் மனைவியுமான க.செல்வி ஆதார்எண்.7021 4984 2615-(17), சென்னை-600118, கொடுங்கையூர், ஆர்ஆர் நகர், சி பிளாக், கதவுஎண்.89 என்ற முகவரியில் வசிக்கும் காலஞ்சென்ற செல்லன் அவர்களின் குமாரத்தியும், ஆறுமுகம் அவர்களின் மனைவியுமான ஆ.சங்கீதா ஆதார்எண்.8729 1546 9777-(18), விழுப்புரம் மாவட்டம், திண்டிவனம் வட்டம், தீவனூர் கிராமம், ராஜீவகாந்தி நகர், கதவுஎண்.2/46 என்ற முகவரியில் வசிக்கும் கிருஷ்ணமூர்த்தி அவர்களின் குமாரர் கி.கனகராஜி

எழுதிவாங்குபவர்கள் : *J. R. ...*

எழுதிக்கொடுப்பவர்கள் : *செல்வி*

P. ...
V. Annapoornan
S. சந்திரா
S. Megala
P. ...



செல்வி

சரளா



செல்வி

செல்வி



செல்வி



செல்வி



செல்வி

செல்வி



செல்வி

K. Pyt

புத்தகம் 202-ம் வகுப்பு...
ஆவணம் 59
10...
...



(எ) கிராஜி ஆதார் எண். 8716 8922 7440 - (19) ஆகிய நாங்கள் அனைவரும் சேர்ந்து சம்மதித்து எழுதிக்கொடுத்த கத்த விற்கிரையப்பத்திரம். என்னவென்றால்,

இதனடியில் சொத்து விவரத்தில் விவரிக்கப்பட்டுள்ள சொத்துக்கள் காலஞ்சென்ற கன்னியான், காலஞ்சென்ற கன்னியான் (எ) கண்ணாயிரம், காலஞ்சென்ற பூவன், காலஞ்சென்ற செல்லன், எங்களில் 8-வது நபர் பூபதி என்பவர்களின் தகப்பனாரான காலஞ்சென்ற சின்னசாமி என்பவர் பெயரில் சுயமாய் கிரையம் பெற்ற கிரையப்பத்திரங்களானது வல்லம் சார்பதிவாளர் அலுவலகத்தில் 1 புத்தகம், 202 தொகுதி, 113 பக்கத்தில் 1959 ஆம் ஆண்டின் 943 ஆவணமாகவும், மேற்படி அலுவலகத்தில் 1 புத்தகம், 203 தொகுதி, 41 முதல் 42 வரையுள்ள பக்கங்களில் 1959 ஆம் ஆண்டின் 945 ஆவணமாகவும் பதிவுசெய்யப்பட்டுள்ள கிரையப்பத்திரங்களின்படியும், எங்களில் 1, 2, 3 நபர்களின் தாயாரான காலஞ்சென்ற முனியம்மாள் என்பவர் பெயரில் சுயமாய் கிரையம் பெற்ற கிரையப்பத்திரமானது மேற்படி அலுவலகத்தில் 1 புத்தகம், 374 தொகுதி, 451 பக்கத்தில் 1973 ஆம் ஆண்டின் 131 ஆவணமாகவும், எங்களில் 15-வது நபருக்கு கணவரும், எங்களில் 16, 17, 18 நபர்களுக்கு தகப்பனாருமான காலஞ்சென்ற செல்லன் என்பவர் பெயரில் சுயமாய் கிரையம் பெற்ற கிரையப்பத்திரமானது மேற்படி அலுவலகத்தில் 1 புத்தகம், 309 தொகுதி,

எழுதிவாங்குபவர்கள்

J. Rindal K. Suresh

எழுதிக்கொடுப்பவர்கள் :

மேல்குடி

செல்வன்

சீதாரா

சீனிவாசன்

க.ராஜ

சீனிவாசன்

பெரியாசு

சீனிவாசன்

சீனிவாசன்

P. Annapoorn

V. Annapoorn

S. சீதாரா

Simegala

P. Raj

சீனிவாசன்

சீனிவாசன்

சீனிவாசன்

K. Peter

புத்தகம் 2021 ம் தொகுதி 288 ம்
ஆவணம் 59 தாள்களாக கொண்டுவர
11 வது தாள்

பதிவு செய்யப்பட்டது



47 முதல் 48 வரையுள்ள பக்கங்களில் 1989 ஆம் ஆண்டின் 942 ஆவணமாகவும், பதிவுசெய்யப்பட்டுள்ள கிரையப்பத்திரங்களின்படியும், மேற்படி காலஞ்சென்ற சின்னசாமி என்பவர் பெயரில் திண்டிவனம் வட்டம், தீவனூர் கிராம வருவாய் கணக்கில் தனிப்பட்டாண்டு 1983-ன்படியும் கிடைக்கப்பெற்று அவர்கள் அனுபவித்து வந்து மேற்படி சின்னசாமி, முனியம்மாள், செல்லன் அவர்கள் காலஞ்சென்றபிறகு அவர்களின் சட்டப்படியான வாரிசுகள் என்ற முறையில் நாங்கள் அனைவரும் அனுபவித்துவருவதும், எங்களில் 19-வது நபர் கனகராஜி (எ) ராஜி என்பவர் பெயரில் சுயமாய் கிரையம் பெற்ற கிரையப்பத்திரமானது மேற்படி அலுவலகத்தில் 1 புத்தகம், 917 தொகுதி.

181 முதல் 184 வரையுள்ள பக்கங்களில் 2004 ஆம் ஆண்டின் 1399 ஆவணமாக பதிவுசெய்யப்பட்டுள்ள கிரையப்பத்திரத்தின்படியும் கிடைக்கப்பெற்று அதுமுதல் நாங்கள் அனைவரும் சேர்ந்து அனுபவித்து வரும் எங்களுக்கு உரிமையும் அனுபவமுமான விவரத்தில் கண்ட சொத்துக்களை இன்று தங்கள் இருவருக்கும் இதன் மூலம் நாங்கள் கத்தக்கிரையம் செய்து கொடுத்து அதன் பேரில் எங்களது குடும்ப செலவிற்காக இன்று தேதியில் நாங்கள் அனைவரும் கீழ்கண்ட சாட்சிகளின் முன்னிலையில் ரொக்கமாய் பெற்றுக் கொண்ட கிரையத்தொகை ரூபாய்.15,54,400/- இந்த தொகை ரூபாய் பதினைந்து லட்சத்து இரம்பத்து நான்காயிரத்து நானூறும் எங்கள் அனைவரின் பற்றாகிவிட்டபடியால் இன்றே இதன் கீழ் வரும் சொத்துக்களை நாங்கள்

எழுதிவாங்குபவர்கள் : *J. Rigel K. Suresh*

எழுதிக்கொடுப்பவர்கள் :

செந்திரன்
செந்திரன்

சந்திரா

செந்திரன்

கராசு

செந்திரன்

பொய்யாசு

செந்திரன்

செந்திரன்

P. Anni

P. Annasoorani

செந்திரா

S. Megala

P. Ruzh

செந்திரன்

சரோஜா

செந்திரன்

செந்திரன்

K. Peeta

புத்தகம் 2021ம் வருடத்து 288ம் ஆவணம் 19 தாள்களைக் கொண்டது 12-வது தாள்



அனைவரும் தங்கள் இருவர் வசமும் ஒப்புக்கொடுத்து அதற்குண்டான பட்டா மாறுதல் மனுவிலும் கையொப்பம் செய்து கொடுத்திருப்பதால் தாங்கள் இன்று முதல் இதன் கீழ்வரும் சொத்துக்களை தாங்கள் இருவரும் கைப்பற்றி கிரைய வாசக வரத்துப்படி சம்பாசகமாக அடைந்து தானாதி வினிய விற்கிரையங்களுக்கு யோக்கியமாய், புத்திர பௌத்திர பாரம்பரியமாய், சர்வ கதந்திர பாத்தியமாய் ஆண்டு அனுபவித்துக்கொள்ள வேண்டியது. இந்த கிரைய சொத்துக்களில் எவ்வித வில்லங்கமும் இல்லை. அப்படி ஏதேனுமிருந்து அது பின்னாளில் தங்களுக்கு தெரியவந்தால் நாங்களே முன்னின்று எங்களது சொந்த செலவிலும் பொறுப்பிலும் தீர்த்துக்கொடுக்கவும், மற்றும் கிரையம் பொருத்து பிழைத்திருத்தல் ஆவணம் அல்லது வேறு துணை ஆவணங்கள் எழுத தேவையேற்படின் தங்களது செலவில் எழுதிதரவும் சம்மதிக்கிறோம். கீழ்க்கண்ட சொத்துக்களுக்குண்டான வரி வகையறாக்களை இன்று தேதிவரையில் பாக்கியில்லாமல் செலுத்தி விட்டோம். தங்களுக்கு கிரையம் செய்யும் கீழே சொத்து விவரத்தில் விவரிக்கப்பட்ட சொத்துக்களின் மீது இனிமேல் எங்களுக்கோ, எங்களைப் பின்னிட்டு வரும் எங்களது வாரிசுகளுக்கோ, எந்தவிதமான உரிமையோ, அக்கு பாத்தியமோ, பின்தொடர்ச்சியோ ஏதும் கிடையாது என்று இதன் மூலம் உறுதி கூறுகிறோம். இந்தப்படிக்கு நாங்கள் அனைவரும் சேர்ந்து சம்மதித்து கீழ்க்கண்ட சாட்சிகளின் முன்னிலையில் எழுதிக்கொடுத்த சுத்த விற்கிரையப்பத்திரம். எங்களில் 19-வது நபரின் பெயர் கிகனகராஜி (எ) கிராஜி என இருந்தபோதிலும் கிராஜி என கையொப்பமிடுவது வழக்கம்.

எழுதிவாங்குபவர்கள் :

J. Rajal K. S. S. S.

எழுதிக்கொடுப்பவர்கள் :

கிருஷ்ணமூர்த்தி
செல்வமணி

சுந்தரா

கிருஷ்ணமூர்த்தி

K. ராம

கிருஷ்ணமூர்த்தி

பெய்யாசு

கிருஷ்ணமூர்த்தி

கிருஷ்ணமூர்த்தி

P. Anil

V. Anaprasad

S. சிஞ்சுரா

Simasala

P. S. S.

கிருஷ்ணமூர்த்தி

சுந்தரா

செல்வமணி

கிருஷ்ணமூர்த்தி

K. Peje

புத்தகம் 201 ம் வலுக்காய் 288 ம்
ஆவணம் 59 தாளகையெழுத்து
13 வது தளம்

புதித சிஞ்சுரா



சொத்து விபரம்

திண்டிவனம் ரிடி, வல்லம் சப்.ரிடி, திண்டிவனம் வட்டம், தீவனூர் கிராமத்தில்.

1) அயன் புஞ்சை சர்வே எண்.30/2 பூரா ஹெக்டர் 1.51.0 ஏர்ஸுக்கு ஏக்கர் 3.73 சென்ட். இதற்கு பழைய சர்வே எண்கள்.188/3பி, 189/6, 191/1, 193/3ஏ இவைகளில் சம்மந்தம்.

2) அயன் புஞ்சை சர்வே எண்.30/3 பூரா ஹெக்டர் 0.18.0 ஏர்ஸுக்கு ஏக்கர் 0.44 சென்ட். இதற்கு பழைய சர்வே எண்கள்.190/1, 190/2ஏ, 193/3ஏ இவைகளில் சம்மந்தம்.

3) அயன் புஞ்சை சர்வே எண்.30/4 பூரா ஹெக்டர் 0.19.0 ஏர்ஸுக்கு ஏக்கர் 0.47 சென்ட். இதற்கு பழைய சர்வே எண்கள்.190/1, 190/2, 193/3ஏ இவைகளில் சம்மந்தம்.

ஆக மேற்படி 1, 2, 3 அயிட்டங்களின் கூடுதல் விஸ்தீரணம் ஏக்கர் 4.64 சென்ட் முழுவதும்.

மேற்படி சொத்துக்கள் முழுவதும் இன்று தங்களுக்கு இதன் மூலம் நாங்கள் அனைவரும் சேர்ந்து கத்தக்கிரையம் செய்து கொடுத்துவிட்டோம்.

எழுதிவாங்குபவர்கள் :

J. Rajesh K. Suresh

எழுதிகொடுப்பவர்கள் :

*மேல்புறம்
சுந்திரா*

*P. Hari
V. Ganapatharani
S. சித்ரா
S. mekala*

*மேல்புறம்
க.ராஜ்*

*P. Hari
மேல்புறம்
மேல்புறம்
மேல்புறம்*

*மேல்புறம்
மேல்புறம்*

*மேல்புறம்
மேல்புறம்
க. ரேஜ்*

மேல்புறம்

*மேல்புறம்
மேல்புறம்*

புத்தகம் 2021ம் வருடத்திய 288...ம்
ஆவணம் 59...
14...
புதிர்



மேற்படி கிரைய சொத்துக்கள் தீவனூர் கிராம பஞ்சாயத்து எல்லைக்கும், மயிலம் யூனியன் எல்லைக்கும் உட்பட்டதாகும். மேற்படி கிரைய சொத்துக்களின் தற்கால சந்தை மதிப்பு ரூபாய்.15,54,400/-

எழுதிவாங்குபவர்கள்

எழுதிகொடுப்பவர்கள்

120923225
செ.சுவாமிநாதன்

சந்திரா

செ.சுவாமிநாதன்

செ.சுவாமிநாதன்

செ.சுவாமிநாதன்

செ.சுவாமிநாதன்

செ.சுவாமிநாதன்

J. Rindal v. Suresh

P. Anant

V. Annaprasarthi

S. சித்ரா

S. Megala

P. S

செ.சுவாமிநாதன்

செ.சுவாமிநாதன்

செ.சுவாமிநாதன்

S. Pyi

சாட்சிகள்

பா. செல்வன். S/O பாவாடை, புலம்புலி - 605007

செ.சுவாமிநாதன் S/O கண்ணகன், தீவனூர் கிராமம்.

இந்த ஆவணத்திற்கு வரைவளித்து தட்டச்சு செய்தவர்.

V. Kannappan
V. கன்னப்பன்
பத்திர எழுத்தா.மருத்திரி
உ.எண்: AJ/152/2000/TDM
Cell:9442896950 / 7418482858

பத்திரம் 2021ம் வருத்திய 288...ம்
ஆவணம் 59
15 வது தரம்
பத்திர எழுத்தா.



1968-ம் ஆண்டு திருத்தப்பட்ட சென்னை முத்திரை தீர்வை குறைவு தடுப்புச்சட்டம்

விதி 3 (1) ன் படி நமூனா

கிராமம். தீவனூர்

வ. எண்	சர்வே எண்	விஸ்தீரணம்	சொத்தின் தன்மை	மார்க்கெட் மதிப்பு
1	30/2 பூரா	3.73	பஞ்சை	12,49,550/-
2	30/3 பூரா	0.44	பஞ்சை	1,47,400/-
3	30/4 பூரா	0.47	பஞ்சை	1,57,450/-
ஆக கூடுதல் ஏக்கர் 4.64 செண்ட்				15,54,400/-

எழுதிவாங்குபவர்கள் : *J. Ramesh*

எழுதிக்கொடுப்பவர்கள் :

P. Annas
V. Annaswari
S. S. Srinivas
S. Meera
P. Srinivas
K. Ramesh
S. Srinivas
S. Srinivas
K. Ramesh
S. Srinivas

புத்தகம் 2021ம் வருத்திய 288
 ஆவணம் 53 தளபணைக்கொண்டது
 16 வது தளம்
 பதிவு ஆவணம்



R/வல்லம்_திண்டிவனம்/புத்தகம்-1/288/2021

2021 ஆம் ஆண்டு பிப்ரவரி மாதம் 18ம் தேதி பி.பி. 08.12 மணியளவில் வல்லம்_திண்டிவனம் சார்பதிவாளர் அலுவலகத்தில் தாக்கல் செய்து கட்டணம் ₹ 62.075/- செலுத்தியவர்.

இடது பெருவிரல்



L. Rindal

கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளது.

எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர்
இடது பெருவிரல்



செல்வசேகரன்

கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளது.

எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர்
இடது பெருவிரல்



செல்வசேகரன்

கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளது.

எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர்
இடது பெருவிரல்













சந்திரா

கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளது.

புத்தகம் 2021ம் வருடம் 288...ம்
ஆவணம் 59...
17...
பதிவு அலுவலர்













R/வல்லம் துண்டி வனம்/புத்தகம்-1/288/2021

<p>எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர் கூடது பெருவிரல்</p>  	<p>திரு. இளையப்பன்</p> <p>கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளபடி</p>
<p>எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர் கூடது பெருவிரல்</p>  	<p>K-ராஜ</p> <p>கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளபடி</p>
<p>எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர் கூடது பெருவிரல்</p>  	<p>திரு. கிருஷ்ணமூர்த்தி</p> <p>கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளபடி</p>
<p>எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர் கூடது பெருவிரல்</p>  	<p>திரு. சண்முகம்</p> <p>கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளபடி</p>
<p>எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர் கூடது பெருவிரல்</p>  	<p>திரு. முகேஷ்</p> <p>கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளபடி</p>

புத்தகம் 2021 ம் வருடத்திய 288 ம்
ஆணைம... தாளமனைக்கொண்டது
18 வது திகி
பதிவு அலுவலர்











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<p>எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர் இடது பெருவிரல்</p>  	<p>தின சிவசுப்பிரமணியன்</p> <p>கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளது</p>
<p>எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர் இடது பெருவிரல்</p>  	<p>P. Dush.</p> <p>கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளது</p>
<p>எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர் இடது பெருவிரல்</p>  	<p>V. Annapoorani</p> <p>கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளது</p>
<p>எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர் இடது பெருவிரல்</p>  	<p>S. சீத்ரா</p> <p>கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளது</p>
<p>எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர் இடது பெருவிரல்</p>  	<p>S. mekala</p> <p>கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளது</p>







புத்தகம் 2021ம் வருடத்தில் 2021...ம்
 உட்காணம் 59 எனவே கவனம் காட்டுக
 19 வது தரம்
 பதிவு இலுவலர்

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<p>எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர் இடது பெருவிரல்</p>  	<p>P. Row</p> <p>கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளபடி</p>
<p>எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர் இடது பெருவிரல்</p>  	<p>சுருதி சம்பந்த</p> <p>கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளபடி</p>
<p>எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர் இடது பெருவிரல்</p>  	<p>சுருதி</p> <p>கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளபடி</p>
<p>எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர் இடது பெருவிரல்</p>  	<p>செல்வி</p> <p>கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளபடி</p>
<p>எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர் இடது பெருவிரல்</p>  	<p>சார்ஜி</p> <p>கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளபடி</p>

புத்தகம் 201 ம் வகுப்பு 288 ..ib
 ஆவணம் 59 தாளமலையம்/மொண்டது
 20.08.2021
 புதிஷ் சிவலட்சுமி

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<p>எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர் இடது பெருவிரல்</p>  	<p><i>K. Pige</i></p> <p>கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளது</p>
<p>எழுதி வாங்கியதாக ஒப்புக் கொண்டவர் இடது பெருவிரல்</p>  	<p><i>S. Rivalal</i></p> <p>கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளது</p>
<p>எழுதி வாங்கியதாக ஒப்புக் கொண்டவர் இடது பெருவிரல்</p>  	<p><i>K. Senthil</i></p> <p>கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளது</p>
<p>இன்னொரு திருபித்தவர்கள்</p> <p>1. <i>யா. சிவசுப்பிரமணியன்</i> திரு குமரேசன் தபெ பூவாண்ட கதவுஎண் 34 மாதா கோவில் தெரு, கொருக்கமேடு பெரியகாட்டுபாளையம், தவளக்குப்பம் அரியாங்குப்பம், பூங்குச்சேரி, இந்தியா, 605007</p> <p>2. <i>சு. சிவசுப்பிரமணியன்</i> திரு கிருஷ்ணன் தபெ கணேசன் கதவுஎண் 2-111 பூங்காவளி தீவனூர், திண்டிவனம், விழுப்பரம், தமிழ்நாடு, இந்தியா, 604206</p>	

2021 ஆம் ஆண்டு பிரெவரி மாதம் 18ம் நாள்


 சாரியுத்தரணம்
 வல்லம்-604206

2021ம் வருடத்திய 288ம்
 ஆவணம் 59 நாள் கணக்காக
 21 வது நாள்
 புதிது சிவசுப்பிரமணியன்



R/வல்லம் திண்டிவனம்/புத்தகம்-1/288/2021

R/வல்லம் திண்டிவனம்/புத்தகம்-1/288/2021 எண்ணகப் பதிவு செய்யப்பட்டது

நாள் 18/02/2021
வல்லம் திண்டிவனம்

சுற்றுலா துறை
வண்ணம்-604 206.



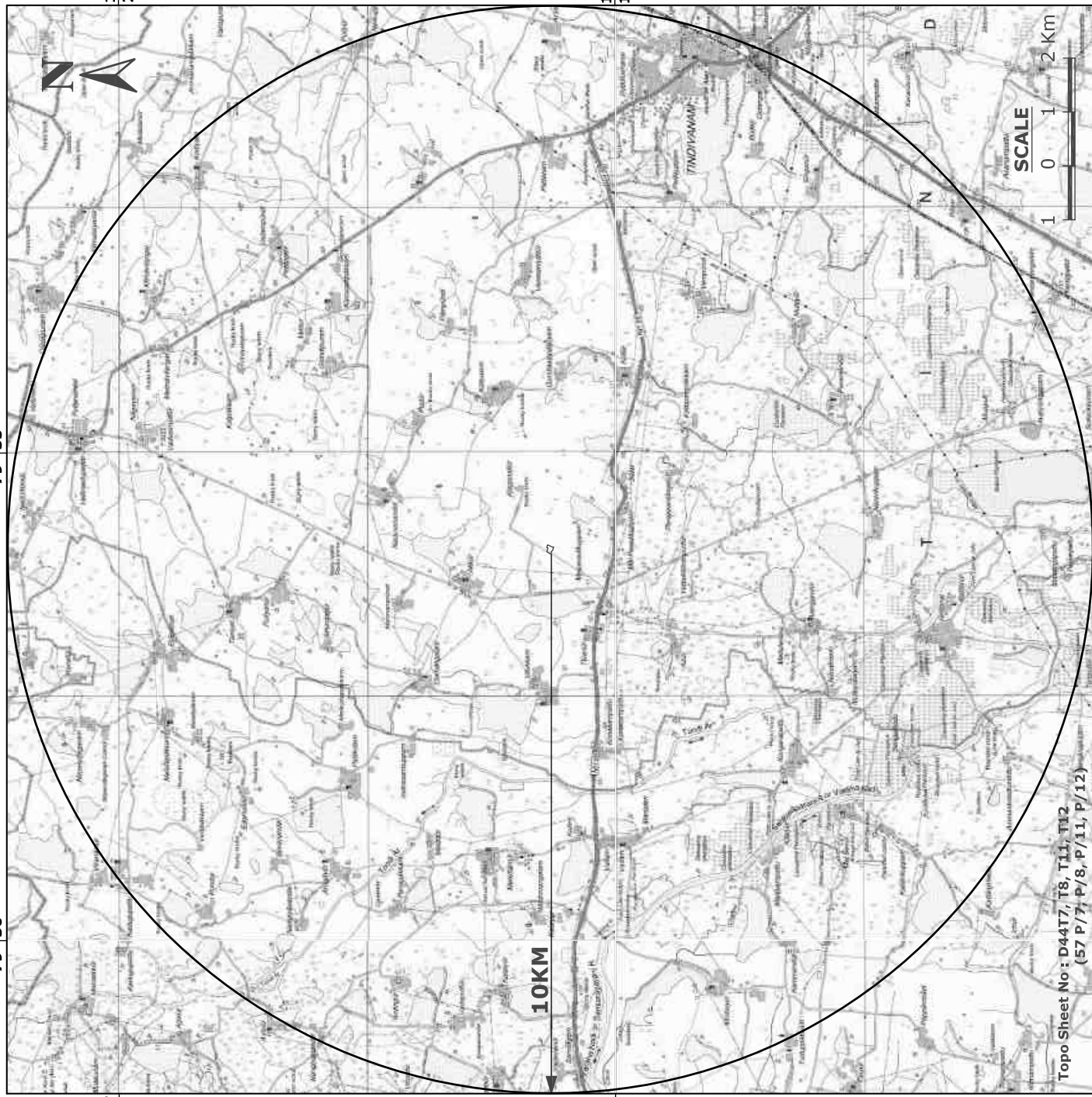
புத்தகம் 2021ம் வருஷம் 288ம்
அவணம் 59 தாள்களாகப் பதிவு செய்யப்பட்டது
22 வது தாள்
பதிவு அலுவலர்

Annexure - II

Survey of India Toposheet

12° 20' 12° 30'

79° 30' 79° 35'



Topo Sheet No : D4417, T8, T11, T12
(57 P/7, P/8, P/11, P/12)

79° 30' — Plant Site Boundary

CONVENTIONAL SYMBOLS

Express highway with cut, with bridge, with distance stone	
Roads, indicated according to importance	
Roads, unclassified, according to importance	
Unimproved road, Cart track, Puck-track, Wall track, Road/canal	
Stream, with track in bed, unimproved Canal	
Dam, masonry or rock, Head, cutweir, Weir	
River, dry with water channel, with island & nodis, Tidal river	
Submerged rocks, Shoal, Wherry, Shoals	
Wells, Well, unwell, Tank, well, Tank, perennial, dry	
Embankments, road or rail, bank, Public ground	
Railways, broad gauge, double, single, with station, under-construction	
Railways, other gauges, double, single, with distance stone, 90	
Mineral line or railway, kds, Cluding with level	
Cookers with infra-reds, Paddy, slopes, Cills	
Sand features (1/16) (7/16) (1/16) (1/16) (1/16) (1/16)	
Towns or Villages, unincorporated, Fort	
Huts, permanent, temporary, Tower, Antennas	
Temple, Chattr, Chattr, Mosque, Jilath, Tomb, Graves	
Lighthouses, Lightships, Rings, Lighted, unlighted, Approach	
Mine, Vein or shaft, Glass, Shaft	
Palm, palm, other, Poplar, Cactus, Bamboo, Other trees	
Artic, cultivated, wooded, Surveyed tree	
Boundary, international	
State (Administrative) (Indicative)	
district, subdivision, town or village, forest	
Boundary pillars surveyed, unlocated	
Height, triangulation, station's point, approximate	
Bench-mark, geodetic, arbitrary, aneroid	
BM 53-3, BM 65-2	
Post office, Telegraph office, Overland tank, Rest house or inspection bungalow, Circuit house, Police station	
Camping ground, Forest, reserved, protected	
Special name, administrative, locality or field	
Hospital, Dispensary, Veterinary hospital / Dispensary	
Sanitary, Hospital, Trench, etc.	
Power line, with poles surveyed, with poles unsurveyed	

Plant Boundary Corner Co-Ordinates
A : 12°15'39.70" N 79°33'56.02" E
B : 12°15'42.69" N 79°33'57.99" E
C : 12°15'42.04" N 79°34'00.04" E
D : 12°15'42.93" N 79°34'00.43" E
E : 12°15'42.36" N 79°34'02.23" E
F : 12°15'39.12" N 79°34'00.81" E

Annexure - III

Summary of AAQ Data for One Season

PM 10

S. No.	Date	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7	AAQ8
Location Name		Plant site	Naduvandal	Alaganalur	Salai	Tivanur	Vilukkam	Pallikolam	Akkur
1	03/04/2023	48.27	48.83	74.16	69.41	43.75	43.41	76.76	43.30
2	07/04/2023	36.67	37.10	56.34	52.74	33.24	32.98	58.32	32.90
3	10/04/2023	48.61	49.18	74.68	69.90	44.06	43.72	77.30	43.61
4	14/04/2023	37.86	38.31	58.17	54.45	34.32	34.05	60.22	33.97
5	17/04/2023	38.93	39.39	59.81	55.99	35.29	35.01	61.91	34.92
6	21/04/2023	37.10	37.53	56.99	53.35	33.63	33.36	58.99	33.28
7	24/04/2023	49.55	50.13	76.12	71.25	44.91	44.56	78.80	44.45
8	28/04/2023	37.01	37.45	56.86	53.23	33.55	33.29	58.86	33.20
9	02/05/2023	37.95	38.39	58.30	54.57	34.40	34.13	60.35	34.04
10	05/05/2023	39.23	39.69	60.27	56.41	35.56	35.28	62.39	35.19
11	08/05/2023	37.40	37.83	57.45	53.78	33.90	33.63	59.47	33.55
12	12/05/2023	49.89	50.47	76.65	71.74	45.22	44.87	79.34	44.75
13	15/05/2023	38.43	38.88	59.04	55.27	34.84	34.56	61.12	34.47
14	19/05/2023	48.38	48.94	74.32	69.57	43.85	43.51	76.93	43.39
15	23/05/2023	38.38	38.83	58.96	55.19	34.79	34.52	61.03	34.43
16	30/05/2023	35.60	36.02	54.70	51.20	32.27	32.02	56.62	31.94
17	02/06/2023	49.68	50.26	76.32	71.44	45.03	44.68	79.00	44.56
18	05/06/2023	50.74	51.34	77.96	72.97	45.99	45.64	80.69	45.52
19	09/06/2023	42.78	43.28	65.65	61.46	38.79	38.49	67.95	38.39
20	12/06/2023	49.21	49.78	75.60	70.76	44.60	44.26	78.25	44.14
21	16/06/2023	37.52	37.96	57.65	53.96	34.01	33.75	59.67	33.66
22	19/06/2023	48.82	49.40	75.01	70.21	44.25	43.91	77.64	43.80
23	23/06/2023	36.67	37.10	56.34	52.74	33.24	32.98	58.32	32.90
24	27/06/2023	50.10	50.69	76.97	72.05	45.41	45.06	79.68	44.94
	N	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00
	Min	35.60	36.02	54.70	51.20	32.27	32.02	56.62	31.94
	Max	50.74	51.34	77.96	72.97	45.99	45.64	80.69	45.52
	Mean	42.70	43.20	65.60	61.40	38.70	38.40	67.90	38.30
	Median	39.08	39.54	60.04	56.20	35.42	35.15	62.15	35.06
	SD	5.88	5.95	9.04	8.46	5.33	5.29	9.35	5.28
	C V %	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8
	98 Percentile	50.45	51.04	77.50	72.55	45.73	45.37	80.23	45.25

PM 2.5

S. No.	Date	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7	AAQ8
Location Name	Plant site	Naduvandal	Alaganalur	Salai	Tivanur	Vilukam	Pallikolam	Akkur	
1		15.94	16.16	25.22	24.76	14.47	14.35	25.55	14.24
2	03/04/2023	12.11	12.28	19.16	18.81	10.99	10.90	19.41	10.82
3	07/04/2023	16.05	16.28	25.40	24.93	14.57	14.46	25.73	14.34
4	10/04/2023	12.50	12.68	19.78	19.42	11.35	11.26	20.04	11.17
5	14/04/2023	12.86	13.04	20.34	19.97	11.67	11.58	20.61	11.49
6	17/04/2023	12.25	12.42	19.38	19.03	11.12	11.03	19.64	10.94
7	21/04/2023	16.36	16.59	25.89	25.41	14.85	14.73	26.23	14.62
8	24/04/2023	12.22	12.40	19.34	18.98	11.09	11.01	19.59	10.92
9	28/04/2023	12.53	12.71	19.83	19.46	11.37	11.29	20.09	11.20
10	02/05/2023	12.95	13.14	20.50	20.12	11.76	11.67	20.76	11.57
11	05/05/2023	12.35	12.52	19.54	19.18	11.21	11.12	19.79	11.03
12	08/05/2023	16.47	16.71	26.07	25.59	14.95	14.84	26.41	14.72
13	12/05/2023	12.69	12.87	20.08	19.71	11.52	11.43	20.34	11.34
14	15/05/2023	15.97	16.20	25.28	24.81	14.50	14.39	25.61	14.27
15	19/05/2023	12.67	12.85	20.05	19.68	11.50	11.41	20.31	11.32
16	23/05/2023	11.76	11.92	18.60	18.26	10.67	10.59	18.85	10.50
17	30/05/2023	16.40	16.64	25.96	25.48	14.89	14.77	26.29	14.66
18	02/06/2023	16.76	16.99	26.51	26.03	15.21	15.09	26.86	14.97
19	05/06/2023	14.22	14.42	22.42	22.01	12.92	12.82	22.71	12.72
20	09/06/2023	16.25	16.48	25.71	25.24	14.75	14.63	26.05	14.52
21	12/06/2023	12.39	12.57	19.61	19.25	11.25	11.16	19.86	11.07
22	16/06/2023	16.12	16.35	25.51	25.04	14.63	14.52	25.84	14.40
23	19/06/2023	12.11	12.28	19.16	18.81	10.99	10.90	19.41	10.82
24	23/06/2023	16.54	16.78	26.18	25.70	15.02	14.90	26.52	14.78
	N	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00
	Min	11.76	11.92	18.60	18.26	10.67	10.59	18.85	10.50
	Max	16.76	16.99	26.51	26.03	15.21	15.09	26.86	14.97
	Mean	14.10	14.30	22.31	21.90	12.80	12.70	22.60	12.60
	Median	12.90	13.09	20.42	20.04	11.71	11.62	20.69	11.53
	SD	1.94	1.97	3.07	3.02	1.76	1.75	3.11	1.74
	C V %	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8
	98 Percentile	16.66	16.89	26.36	25.87	15.12	15.00	26.70	14.88

SO2

S. No.	Date	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7	AAQ8
Location Name		Plant site	Naduvandal	Alaganalur	Salai	Tivanur	Vilukkam	Pallikolam	Akkur
1	03/04/2023	7.91	8.14	14.13	12.20	7.80	7.57	14.01	7.23
2	07/04/2023	6.01	6.18	10.73	9.27	5.93	5.75	10.65	5.50
3	10/04/2023	7.97	8.20	14.23	12.29	7.85	7.63	14.11	7.28
4	14/04/2023	6.21	6.38	11.08	9.57	6.12	5.94	10.99	5.67
5	17/04/2023	6.38	6.56	11.39	9.84	6.29	6.11	11.30	5.83
6	21/04/2023	6.08	6.26	10.86	9.38	5.99	5.82	10.77	5.56
7	24/04/2023	8.12	8.35	14.50	12.53	8.01	7.77	14.39	7.43
8	28/04/2023	6.07	6.24	10.83	9.36	5.98	5.81	10.75	5.55
9	02/05/2023	6.22	6.40	11.11	9.59	6.13	5.95	11.02	5.69
10	05/05/2023	6.43	6.61	11.48	9.92	6.34	6.15	11.39	5.88
11	08/05/2023	6.13	6.31	10.94	9.45	6.04	5.87	10.86	5.60
12	12/05/2023	8.18	8.41	14.60	12.61	8.06	7.83	14.48	7.48
13	15/05/2023	6.30	6.48	11.25	9.72	6.21	6.03	11.16	5.76
14	19/05/2023	7.93	8.16	14.16	12.23	7.82	7.59	14.05	7.25
15	23/05/2023	6.29	6.47	11.23	9.70	6.20	6.02	11.14	5.75
16	30/05/2023	5.84	6.00	10.42	9.00	5.75	5.59	10.34	5.34
17	02/06/2023	8.14	8.38	14.54	12.56	8.03	7.79	14.42	7.44
18	05/06/2023	8.32	8.56	14.85	12.83	8.20	7.96	14.73	7.60
19	09/06/2023	7.13	7.33	12.62	10.92	7.03	6.83	12.52	6.53
20	12/06/2023	8.07	8.30	14.40	12.44	7.95	7.72	14.29	7.37
21	16/06/2023	6.15	6.33	10.98	9.49	6.06	5.89	10.89	5.62
22	19/06/2023	8.00	8.23	14.29	12.34	7.89	7.66	14.18	7.32
23	23/06/2023	6.01	6.18	10.73	9.27	5.93	5.75	10.65	5.50
24	27/06/2023	8.21	8.45	14.66	12.67	8.10	7.86	14.55	7.51
	N	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00
	Min	5.84	6.00	10.42	9.00	5.75	5.59	10.34	5.34
	Max	8.32	8.56	14.85	12.83	8.20	7.96	14.73	7.60
	Mean	7.00	7.20	12.50	10.80	6.90	6.70	12.40	6.40
	Median	6.41	6.59	11.44	9.88	6.31	6.13	11.35	5.86
	SD	0.96	0.99	1.72	1.49	0.95	0.92	1.71	0.88
	C V %	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8
	98 Percentile	8.27	8.51	14.77	12.75	8.15	7.91	14.65	7.56

NO2

S. No.	Date	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7	AAQ8
Location Name		Plant site	Naduv anandal	Alagan alur	Salai	Tivanur	Viluk kam	Pallik olam	Akkur
1	03/04/2023	13.67	14.81	25.78	22.95	12.77	12.77	25.66	12.76
2	07/04/2023	10.39	11.25	19.58	17.43	9.70	9.70	19.50	9.69
3	10/04/2023	13.77	14.91	25.96	23.11	12.86	12.86	25.84	12.85
4	14/04/2023	10.73	11.62	20.22	18.00	10.02	10.02	20.13	10.01
5	17/04/2023	11.03	11.94	20.79	18.51	10.30	10.30	20.70	10.29
6	21/04/2023	10.51	11.38	19.81	17.63	9.81	9.81	19.72	9.80
7	24/04/2023	14.04	15.20	26.46	23.55	13.11	13.11	26.34	13.10
8	28/04/2023	10.49	11.35	19.76	17.59	9.79	9.79	19.68	9.78
9	02/05/2023	10.75	11.64	20.27	18.04	10.04	10.04	20.18	10.03
10	05/05/2023	11.11	12.03	20.95	18.65	10.38	10.38	20.86	10.37
11	08/05/2023	10.59	11.47	19.97	17.78	9.89	9.89	19.88	9.88
12	12/05/2023	14.13	15.30	26.64	23.72	13.20	13.20	26.52	13.19
13	15/05/2023	10.89	11.79	20.52	18.27	10.17	10.17	20.43	10.16
14	19/05/2023	13.70	14.84	25.83	23.00	12.80	12.80	25.72	12.79
15	23/05/2023	10.87	11.77	20.49	18.24	10.15	10.15	20.40	10.14
16	30/05/2023	10.09	10.92	19.01	16.93	9.42	9.42	18.93	9.41
17	02/06/2023	14.07	15.24	26.53	23.61	13.14	13.14	26.41	13.13
18	05/06/2023	14.38	15.57	27.10	24.12	13.42	13.42	26.98	13.41
19	09/06/2023	12.22	13.22	22.91	20.41	11.42	11.42	22.81	11.41
20	12/06/2023	13.94	15.09	26.28	23.39	13.02	13.02	26.16	13.01
21	16/06/2023	10.63	11.51	20.04	17.84	9.93	9.93	19.95	9.92
22	19/06/2023	13.83	14.98	26.07	23.21	12.92	12.92	25.96	12.90
23	23/06/2023	10.39	11.25	19.58	17.43	9.70	9.70	19.50	9.69
24	27/06/2023	14.19	15.37	26.75	23.82	13.25	13.25	26.64	13.24
	N	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00
	Min	10.09	10.92	19.01	16.93	9.42	9.42	18.93	9.41
	Max	14.38	15.57	27.10	24.12	13.42	13.42	26.98	13.41
	Mean	12.10	13.10	22.80	20.30	11.30	11.30	22.70	11.29
	Median	11.07	11.99	20.87	18.58	10.34	10.34	20.78	10.33
	SD	1.67	1.80	3.14	2.80	1.56	1.56	3.13	1.55
	C V %	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8

CO

S. No.	Date	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7	AAQ8
Location Name		Plant site	Naduvandal	Alaganalur	Salai	Tivanur	Vilukkam	Pallikolam	Akkur
1	03/04/2023	335	281	282	289	275	273	282	276
2	07/04/2023	255	213	214	219	209	207	214	210
3	10/04/2023	337	283	284	291	277	275	284	278
4	14/04/2023	263	220	221	226	216	214	221	217
5	17/04/2023	270	226	227	233	222	220	227	223
6	21/04/2023	258	216	217	222	211	210	217	212
7	24/04/2023	344	288	289	296	282	280	289	284
8	28/04/2023	257	215	216	221	211	209	216	212
9	02/05/2023	263	221	222	227	216	214	222	217
10	05/05/2023	272	228	229	235	224	222	229	224
11	08/05/2023	260	217	218	224	213	211	218	214
12	12/05/2023	346	290	291	298	284	282	291	285
13	15/05/2023	267	224	224	230	219	217	224	220
14	19/05/2023	336	281	282	289	276	273	282	277
15	23/05/2023	266	223	224	230	219	217	224	220
16	30/05/2023	247	207	208	213	203	201	208	204
17	02/06/2023	345	289	290	297	283	281	290	284
18	05/06/2023	352	295	296	303	289	287	296	290
19	09/06/2023	296	248	249	255	243	241	249	244
20	12/06/2023	342	286	287	294	280	278	287	282
21	16/06/2023	260	218	219	224	214	212	219	215
22	19/06/2023	339	284	285	292	278	276	285	279
23	23/06/2023	255	213	214	219	209	207	214	210
24	27/06/2023	348	291	293	300	286	283	293	287
	N	24.00	24	24	24	24	24	24	24
	Min	247	207	208	213	203	201	208	204
	Max	352	295	296	303	289	287	296	290
	Mean	296	248	249	255	243	241	249	244
	Median	271	227	228	234	223	221	228	224
	SD	41	34	34	35	34	33	34	34
	C V %	14	14	14	14	14	14	14	14
	98 Percentile	350	293	295	302	287	285	295	289

Annexure - IV

Socio Economic Demography of the Study area as per Census 2011

Annexure - V

**Land use pattern of the
study area as per Census 2011**

S.No.	Name of Village	Forests	Irrigated Land Area	Un-irrigated Land Area	Culturable Waste Land	Barren and uncultivated land	Total Area
0 to 3 Km Radius							
1	Agoor	0	97.8	228	146.2	0	472
2	Asur	0	124.4	53.3	0.1	50.4	228.2
3	Deevanur	0	125.1	43.2	0	75.7	244
4	Peradikuppam	0	37.2	195.8	16.3	48.5	297.8
5	Salai	0	41	112.7	6.4	47.6	207.7
6	Vilukkam	0	166.3	52.5	0.6	193.5	412.9
	Sub Total	0	591.8	685.5	169.6	415.7	1862.6
3 to 7 Km Radius							
1	Edaimalai	0	70.6	25.6	0.5	45.5	142.2
2	Ilamangalam	0	133.4	92.1	119	0	344.5
3	Kalpakkam	0	18.5	115.5	15	17	166
4	Kattusiviri	0	19.2	120.3	0.4	0	139.9
5	Kirandipuram	0	105.2	0.7	3.7	0	109.6
6	Kollar	0	156.1	93.8	0.9	0	250.8
7	Kongarappattu	0	511.4	219.2	2	92.9	825.5
8	Mannampoondi	0	61.2	62.1	73.5	0	196.8
9	Maruderi	0	38.5	0	5.2	6.2	49.9
10	Melathipakkam	0	76.8	106.8	4.2	3.2	191
11	Melathur	0	47.5	2.9	0.7	11.2	62.3
12	Nattarmangalam	0	77.2	62.8	10.5	0	150.5
13	Nettiyur	0	139	21.8	0	0	160.8
14	Pallikulam	0	28	0	20	0	48
15	Pampundi	0	81.7	209.7	0.8	0	292.2
16	Peramandur	0	578.9	212	26.3	0	817.2
17	Pulaiyur	0	125.6	49.3	0	0.1	175
18	Puliyannur	0	124.9	179.4	10	14.6	328.9
19	Taniyal	0	66	124.3	1	0	191.3
20	Vallam	0	262.4	21.8	2.1	0	286.3
21	Vempundi	0	85	139.7	76.3	0	301
22	Vengandur	0	208.7	135.8	3.2	100	447.7
	Sub Total	0	3015.8	1995.6	375.3	290.7	5677.4
7 to 10 Km Radius							
1	Anangur	0	55.7	22.6	23.1	2.1	103.5
2	Avayakuppam	0	92.4	285.6	60.4	120.4	558.8
3	Aviyur	0	166.5	76.9	0.1	225.4	468.9
4	Bondai	0	136.5	148.7	0	0	285.2
5	Ethanemili	0	305.2	161.3	15.9	7.1	489.5
6	Jaggampettai	0	110.1	61.3	0	0	171.4
7	Kadambur	0	93	46.9	0	3.4	143.3
8	Kalaiyur	0	101	57.9	0	20.2	179.1
9	Kammandur	0	166.6	113	11.6	6.9	298.1
10	Karuvapakkam	0	125	50.8	4	0	179.8
11	Kilmavilangai	0	51	101	1	2	155
12	Kodiam	0	207.6	109.4	0	0	317
13	Konalur	0	14	56	0	0	70
14	Chittamur (Mel)	0	395.8	101.1	8.2	93.2	598.3
15	Modaiyur	0	699.4	36.6	6.3	12.6	754.9
16	Muppuli	0	10.6	81.2	0	0	91.8
17	Nagavaram	0	34	80	6	0	120
18	Neduntondi	0	46.1	0	0	37.7	83.8
19	Neykuppi	0	192.5	100.5	0	0.1	293.1
20	Padamangalam	0	26.3	94.4	1.5	0	122.2
21	Palakuppam	0	57.3	106.2	6	5	174.5
22	Panappakkam	0	52.1	66.2	0	13.6	131.9
23	Pattanam	0	70.2	83	10.1	42	205.3
24	Perapari	0	71.8	7.2	0	0	79
25	Puttanandal	0	53.3	5	0	14	72.3
26	Rettanai	0	230.9	678.1	0	0	909
27	Singanur	0	143.6	80.2	0	0	223.8
28	Ural	0	229.8	41.2	0	0	271
29	Siruvallur (Vada)	0	58	325	0	12	395
30	Vadampundi	0	105.6	27.4	5.2	0	138.2
31	Viranamur	0	277.2	146	5.1	0	428.3
	Sub Total	0	4379.1	3350.7	164.5	617.7	8512
	Grand Total	0	7986.7	6031.8	709.4	1324.1	16052

Note: All the areas are represented hectare (ha)

Annexure - VI

Dheevanur Village Map

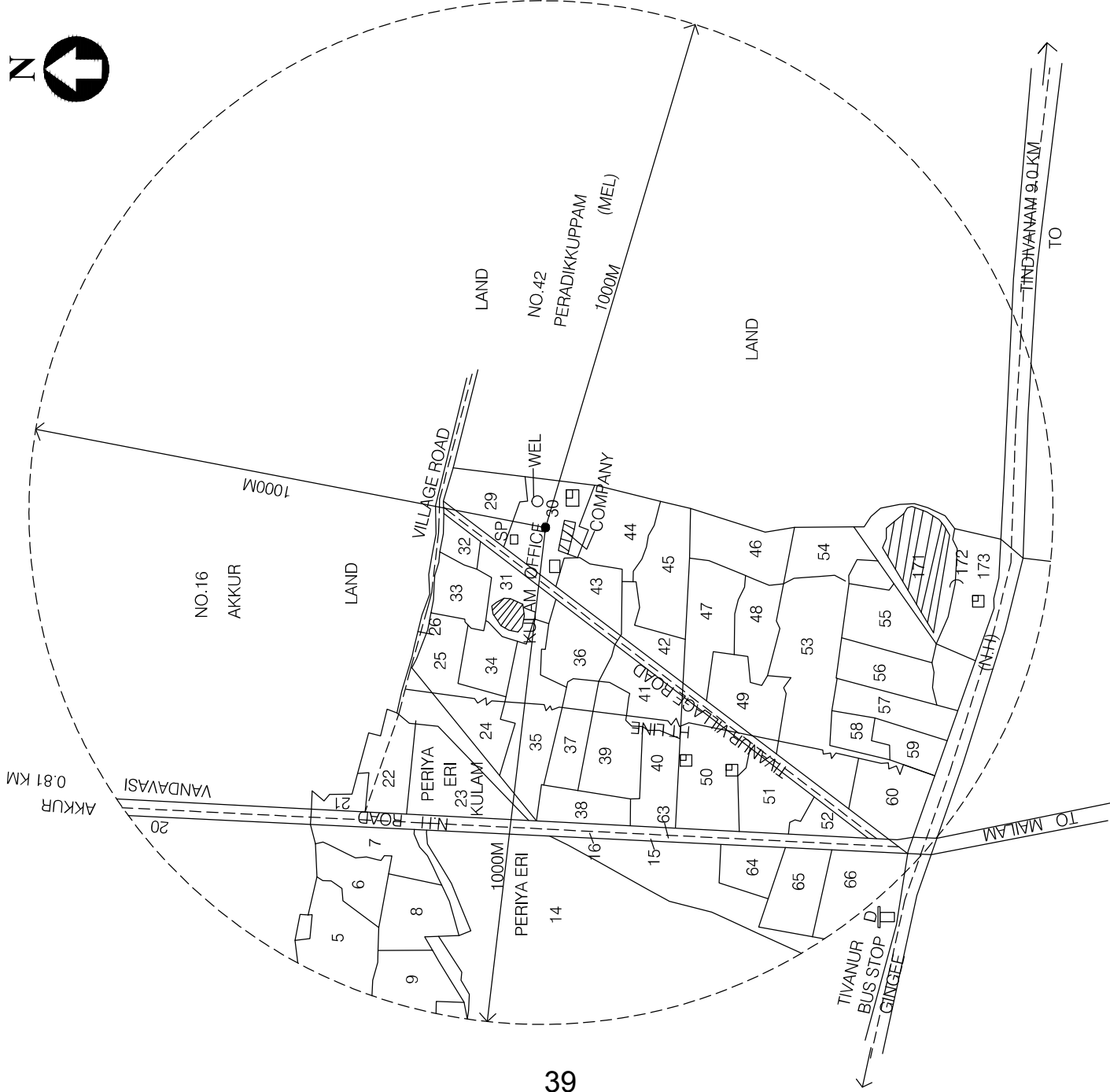
**TOPO PLAN SHOWING THE PROPOSED
SAKTHI PRIYAN CEMENT'S AT IN**

**S.F.NO:30/2, 30/3, 30/4, TIVANUR VILLAGE
AND PANCHAYAT, TINDIVANAM TALUK,**

VILLUPURAM DISTRICT. (SCALE: 1:5000)

REFERENCE:-

- Owner's Boundary Shown in Green
- Proposed Const. Site Shown in Red
- Existing Road Shown in Yellow



TOPO PLAN

APPLICANT SIGNATURE

ENGINEER

Annexure - VII

FMB sketch

TINDIVANAN

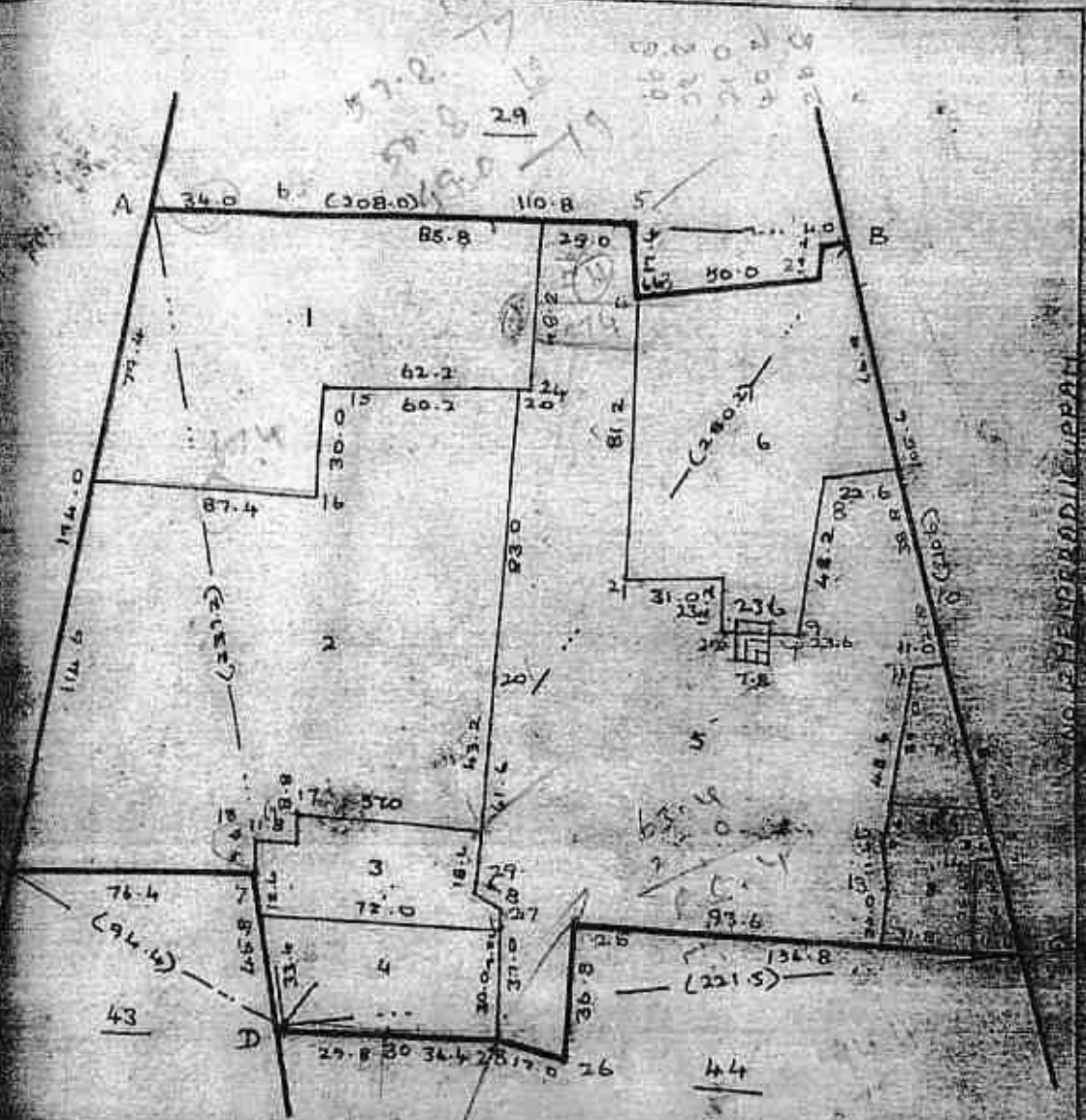
Village

No. 15.

Name TIVANUR

Field No. 30

Area H 5.20.5 Acres



B:																				
(2802)																				
18.6	42.6	W			B					17	11.8	173.4								
18.8	48.2				(2802)					16	31.8	86.2								
10.0					184.2					15	41.8	57.4								
221.8					179.0	31.0	23					A								
22.0					168.8	37.4	22					(2102)								
160.6	28.4	20			162.4	4.6	21					182.8	2.2	14						
160.6	28.4	20	B-2		113.6							180.0	31.6	13.4	1.4					
156.4	28.4	20			D:							162.6	29.2	12						
154.0	26.8	27			(2312)							123.8	10.2	11	4	16.0				
140.4	21.6	26		11.2	182.2							108.4	11.0	10	3	17.0				
135.0	21.6	26			180.4	0.4	18					108.2	11.2	9	2	16.0				
					177.2	13.2	E					112.0	22.6	8	1	16.0				

Drawn by K. Zindhu

Scale 1/4 inch = One Chain

Compared by 5/1/75

Annexure - VIII

A-Register- Land Classification

15. Budget cont.

3	4	5	6	7	8	9	10	11	12	1
5-1 -2 -3	8-1	6	3 40	0 00.0	0 18	1555 - 01st GE (200000) 783. 1st GE (2000000)	...	6 183
5-2	8-2	6	3 60	0 26.0	0 88	1555 83. 1st GE (2000000) 124 1st GE (2000000)	...	6 186
5-3	8-3	6	3 40	0 35.5	1 21	57 0th GE (2000000) 17th GE	...	6 189
5-4	8-3	6	3 40	0 30.5	1 72	163 0th GE (2000000) 17th GE	...	6 192
5-5 5-2	8-3	6	3 40	0 54.0	1 54	187 0th GE (2000000)	...	6 195
5-6 5-1	8-3	6	3 40	0 64.0	2 18	229 0th GE (2000000)	...	6 198
5-7 5-3	8-3	6	3 40	0 53.0	1 87	243 0th GE (2000000)	...	6 201
						3 49.0	11 85			6 204
5-8 5-4	8-3	6	3 40	0 78.0	3 65	273 0th GE (2000000) 17th GE	...	6 207
5-9 5-5	8-3	6	3 40	1 31.0	5 13	163 0th GE (2000000)	...	6 210
5-10 5-1	8-3	6	3 40	0 18.0	0 61	244 0th GE (2000000)	...	6 213
5-11 5-2	8-3	6	3 40	0 19.0	0 65	163 0th GE (2000000)	...	6 216
5-12 5-3	8-3	6	3 40	1 75.0	5 95	408 0th GE (2000000) 17th GE	...	6 219
5-13 5-4	8-3	6	3 40	0 60.5	2 06	188 0th GE (2000000)	...	6 222
5-14 5-5	8-3	6	3 40	0 05.5	0 22	345 0th GE (2000000)	...	6 225
5-15 5-6	8-3	6	3 40	0 11.0	0 37	250 0th GE (2000000)	...	6 228
5-16 5-7	8-3	6	3 40	0 01.5	0 05	245 0th GE (2000000)	...	6 231
						5 20.5	17 69			6 234
5-17 5-2	1 32.0	6 237
5-18 5-3	8-3	6	3 40	1 39.0	4 73	319 0th GE (2000000)	...	6 240

Handwritten notes and dates: B1/86/15, Dt: 10/04/15

Annexure - IX

Land-use classification certificate and Land Deed

நகர் ஊரமைப்பு துறை

அனுப்புநர்,

பொது தகவல் அலுவலர்/
மேற்பார்வையாளர்,
நகர் ஊரமைப்பு உதவி இயக்குநர்,
மாவட்ட நகர் ஊரமைப்பு அலுவலகம்,
விழுப்புரம் மாவட்டம்,
எண்.56/ஏ. தாட்கோ வளாகம்,
அரசு மருத்துவமனை சாலை,
விழுப்புரம்-605 602.

பெறுநர்,

திரு. ராஜசேகர் மற்றும்
செந்தில் குமார்,
த/பெ. கல்யாண சுந்தரம்,
எண்.78, பகவத்சிங் தெரு,
திவான் கந்தப்ப முதலியார் நகர்,
நைனார் மண்டபம்,
பாண்டி- 605 004.

ந.க.எண்.1040/2022/விமா2, நாள்.15.06.2022

ஐயா,

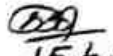
பொருள்: நில உபயோக விவரம் - மாவட்ட நகர் ஊரமைப்பு
அலுவலகம் - விழுப்புரம் மாவட்டம் - திண்டிவனம்
வட்டம் -மயிலம் ஊராட்சி ஒன்றியம் - தீவனூர் கிராமம்
- சர்வே எண்கள். 30/2, 30/3, 30/4 -க் குட்பட்ட
இடத்திற்கு - நில உபயோக விவரம் தெரிவித்தல் -
தொடர்பாக.


- பார்வை: 1) மனுதாரர் திரு. ராஜசேகர் மற்றும் செந்தில் குமார்,
அவர்களின் கடிதம் நாள்.10.06.2022
2) நகர் ஊரமைப்பு இயக்குநர், சென்னை அவர்களின்
சுற்றறிக்கை கடிதம் ந.க.எண்.17394/2011முதி1,
நாள்.29.09.2011
3) அரசாணை எண்.79, வீட்டு வசதி மற்றும் நகர் புற
வளர்ச்சித் துறை நாள்.04.05.2017

விழுப்புரம் மாவட்டம், திண்டிவனம் வட்டம், மயிலம் ஊராட்சி ஒன்றியம், தீவனூர்
கிராமம், சர்வே எண்கள். 30/2, 30/3, 30/4 -க் குட்பட்ட இடமானது நகர் ஊரமைப்பு சட்டம்
1971-ன்படி முழுமைத்திட்டம் மற்றும் விரிவு அபிவிருத்தி திட்டம் ஏதும் தயார் செய்யப்பட
வில்லை. எனவே மேற்படி புல எண்கள் திட்டமில்லா பகுதியில் அமைகிறது என்ற
விவரம் பார்வை (2)-ல் கண்டுள்ள நகர் ஊரமைப்பு இயக்குநர், சென்னை அவர்களின்
சுற்றறிக்கை கடிதத்தில் தெரிவிக்கப்பட்டவாறு கீழ்க்கண்ட நிபந்தனைகளுடன் நில
உபயோக விவரம் வழங்கப்படுகிறது

- 1) இவ்விவரம் தகவலுக்காக மட்டுமே வழங்கப்படுகிறது. இவ்விவரத்தினை
நகர் ஊரமைப்பு துறையின் சட்டபூர்வ அனுமதியாக பொருள்கொள்ள
சுடாது.

- 2) இவ்விவரமானது மாசு கட்டுப்பாட்டு வாரிய அலுவலக பரிசீலினைக்கு மட்டுமே பொருந்தும்.
- 3) பிரஸ்தாப மணையிடத்தினை அபிவிருத்தி செய்யும்முன்னர் நகர் ஊரமைப்பு சட்டம் 1971-பிரிவு 47-A -ன்படி நகர் ஊரமைப்பு துறையின் நடைமுறை விதிகளுக்கு உட்பட்டு உரிய அனுமதி பெறப்பட வேண்டும்.

பொது தகவல் அலுவலர்/மேற்பார்வையாளர்,
மாவட்ட நகர் ஊரமைப்பு அலுவலகம்,
விழுப்புரம். 
15.6.2022


15/6/2022

வேளாண்மைத்துறை

அனுப்பிவர்

திரு.கோ.இராமணன், பி.எஸ்.ஸி(விவ.)
வேளாண்மை இணை இயக்குநர்,
விழுப்புரம் - 605 602

பெறுநர்


நகர் ஊரமைப்பு உதவி இயக்குநர்,
விழுப்புரம் மண்டலம்,
எண்.58/ஏ. தாட்.கோ வளாகம்,
அரசு மருத்துவமனை சாலை,
விழுப்புரம் - 605 602.

கடித எண். இ2/ 6252 / 2022, நாள் 12.05.2022

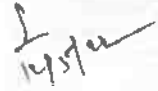
அப்பா

- பொருள் - வேளாண்மை புஞ்சை நிலத்திணை வேளாண் அல்லாத
பிற பயன்பாட்டிற்கு மாற்ற அறிக்கை அனுப்புவதற்குத் தொடர்பாக.
- பார்வை -1) அரசாணை (எம்.எஸ்) எண்.79 வீட்டு வசதி மற்றும் ஊரக
வளர்ச்சி துறை (யு.டி.4) துறை நாள் 04.05.2017.
- 2) நகர் ஊரமைப்பு உதவி இயக்குநர் விழுப்புரம் மண்டலம்
அவர்களின் கடித எண். 437 / 2022, விமா2, நாள் 29.03.2022
- 3) திரு.கராஜசேகர் மற்றும் திரு.செந்தில்குமார் பாண்டிச்சேரி
அவர்களின் விண்ணப்பம்.

பார்வை (1)ல் காணும் அரசாணையின்படியும், பார்வை 2 மற்றும் 3ல் காணும்
தங்கள் கடிதங்களின்படியும் புஞ்சை நிலத்திணை பிற பயன்பாட்டிற்கு மாற்றும் அறிக்கை
இத்துடன் இணைத்து அனுப்பப்படுகிறது.


வேளாண்மை இணை இயக்குநர்,
விழுப்புரம், 12.5.22

இணைப்பு: புஞ்சை நிலத்திற்கான அறிக்கை



நகர ஊராண்மைப் பகுதி இயக்குநருக்கு வேளாண்மை இணை இயக்குநராக வரங்கப்பட்ட வேண்டிய பஞ்சாயத்து நினைவுப் பத்திரம் மூலமாக மாற்றும் அறிக்கை

நகர ஊராண்மைப் பகுதி இயக்குநர் கமிட்டி பெறப்பட்ட நாள்		07.04.2022
கமிட்டியின் பெறப்பட்ட ஆவணங்கள்		
அ)	மனுதாரரின் கமிட்டி பெறப்பட்டுள்ளதா?	இல்லை
ஆ)	சிட்டா பெறப்பட்டுள்ளதா?	ஆம்
இ)	அடங்கல் பெறப்பட்டுள்ளதா?	ஆம்
i)	ஏற்கனவே வேறு உபயோகத்திற்காக இதன் அருகில் உள்ள நிலத்திற்கு தடைமின்மை சான்று பெறப்பட்டுள்ளதா?	இல்லை
ii)	ஆம் எனில் நடப்பு பசுவியுடன் சேர்த்து 2 ஆண்டுகள் தரிசாக உள்ளதற்கான கிராம நிர்வாக அலுவலரின் அடங்கல் இணைக்கப்பட்டுள்ளதா?	.
iii)	இல்லை எனில் நடப்பு பசுவியுடன் சேர்த்து 3 ஆண்டுகள் தரிசாக உள்ளதற்கான கிராம நிர்வாக அலுவலரின் அடங்கல் இணைக்கப்பட்டுள்ளதா?	ஆம்
iv)	இதர இணைக்கப்பட்டுள்ள ஆவணங்கள் (குறிப்பிடுக) (ஆதார் எண் உட்பட) FMB, EC, அபதிவேடு	கிரையப்பத்திரம், ஆதார், FMB, EC
3.	மனுதாரரின் பெயர் / தபெ மற்றும் முகவரி	திரு.க.ராஜசேகர் மற்றும் திரு.செந்தில்குமார், க/பெகல்யாண சுந்தரம், எண் 78, பகவத்சிங் வீதி, திவான் சுந்தரப் பழையார் நகர், ஹைனார் மண்டலம், பாண்டிச்சேரி - 605 004.
4.	மனுதாரரின் நிலம் அமைந்துள்ள	
1.	இடம் - தீவனூர்	கிராமம் - தீவனூர்
2.	புல எண்கள் - 30/2, 30/3, 30/4	வட்டாரம் - மயிலம்
3.	பரப்பளவு - 1.88.0 எக்டர்	மாகாட்டம் - விழுப்புரம்
5.	நிலத்தின் வகைப்பாடு	பஞ்சாயத்து
6.	மனுதாரர் வேளாண்மை அல்லாத உபயோகத்திற்கு கோரியுள்ள நிலத்தின்	
i)	புல எண்கள்	30/2, 30/3, 30/4
ii)	பரப்பளவு	1.88.0 எக்டர்
7.	வேளாண்மை இணை இயக்குநர் கள ஆய்வு மேற்கொண்ட நாள்	12.05.2022
8.	தடைமின்மை சான்று கோரப்பட்டுள்ள நிலத்திலோ அல்லது அருகிலுள்ள வேறு நிலங்களுக்கோ பணவிலக்கும் வகையில் இந்நிலையில் கிணறு மற்றும் ஆற்றாறு கிணறு அமைந்துள்ளதா அல்லது அருகிலுள்ள நிலங்களுக்கான பாசன ஆதாரம் இதன் வழியாக செல்கிறதா	இல்லை
9.	கள ஆய்வின்போது சார்படி ஏதும் செய்யப்பட்டுள்ளதா	இல்லை
10.	கள ஆய்வு செய்த அலுவலரின் பெயர் மற்றும் முகவரி	திரு.கோ.கிராமணன், பி.எஸ்.எஸ். (விவ), வேளாண்மை இணை இயக்குநர், விழுப்புரம்

புஞ்சை நிதைதிணை வேளாண் அகாடமி உபயோகத்திற்கு மாற்ற கோரும் நகர
 ஊராமைப்பு உதவி இயக்குநரின் கடிதத்தோடும் பெறப்பட்ட ஆவணங்களின் அடிப்படையிலும்,
 12.05.2022 தேதியில் என்னால் நேரிடையாக மேற்கொள்ளப்பட்ட கன ஆய்வின்
 அடிப்படையிலும் அறிக்கையில் குறிப்பிட்டுள்ள பண்டிச்சேரி கமலாட்சி மண்டபம் பகுதியில்
 வசிக்கும் மனுதாரரின் புஞ்சை நிதைதிணை சரீகை எண். 30/2, 30/3, 30/4-ல் உள்ள பரப்பில்
 பசலி ஆண்டையும் சேர்த்து கடந்த மூன்று ஆண்டுகளில் சாகுபடி ஏதும்
 மேற்கொள்ளப்படவில்லை எனவும் இந்த நிதைதிணை ஆய்வுமூலம் (அ) கிணறு ஏதுமிக்க
 எனவும் பாசன ஆதாரம் ஏதும் செலவழிக்கலை எனவும் மேற்கண்ட நிதைதிணை பிற
 பயன்பாட்டிற்கு பயன்படுத்தலாம் என தெரிவிக்கப்படுகிறது.

வேளாண்மை இணை இயக்குநர் . 22

விழுப்புரம்

1/14/22

Annexure - X

Private Water Supply Letter

A.Nagaraj

TMS

Contact:7550047699

TMS WATER SUPPLIERS

No:30, KDR Nagar, 2nd Street
Thindivanam-604 001

Date:..04/07/2022

To

Sakthipriyan Cements
No:30/2,30/3,30/4 , Dheevanur Village,
Thindivanam (Tk), Villuppuram District,
Tamil Nadu


Sub: Supply of water-reg

Respected sir,

We are supplying 10 KLD (10000 liters / Day) of water average per day to M/s.
Sakthipriyan Cements by our transport regularly. This is for your kind perusal.

Thanking you,

Yours Sincerely


(TMS water Suppliers)

Annexure - XI

Agreements for Purchase of Raw Materials

AM ARJUN MARKETING

SUPPLIERS Of : ALL Kinds of Cement, Clinker,
Granite, Logistics& Export
GST NO 36ABQFA1351B1ZT

PH-9030793480

TO

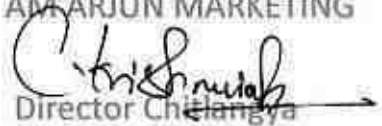
DATE : 05-05-2023

SAKTHIPRIYAN CEMENTS
R.S No.3/234, Azhagenallur Road
Deevanur village and post
Tindivanam Tk, Villupuram Dt
Tamilnadu - 604206

Sir,

Sub: Supply of Clinker Sakthi PriyanCements

Happy to have a deal with SakthiPriyan Cements we are running AM ARJUN MARKETIN in good manner with multi sate suppling quality product We received your letter regarding requirement of clinker to your new cement plant and we hereby agree to supply required quantity clinker material in closed truck to M/S SAKTHI PRIYAN CEMENTS, at Azhagenallur village, Tindivanam Tk and Villupuram District frequently.

Thanks & Regarding
AM ARJUN MARKETING

Director Chitlangya

DHAVAMANI ENTERPRISES

No:110. Trichy road Chinthamani pudhur, Kannampalayam Chennai Tamilnadu 641402

PH-8047305944

DATE: 25-04-2023

TO:

SAKTHIPRIYAN CEMENTS
R.S No.3/234, Azhagenallur Road
Deevanur village and post
Tindivanam Tk, Villupuram Dt
Tamilnadu - 604206

Sir,

Sub : Agreement with SAKTHIPRIYAN CEMENTS regarding supply of(GGBFS)

We are one of the eminent suppliers of Slag (GGBFS) IN Tamilnadu and we supplying Slag(GGBFS) to various cements factors in and around Tamilnadu.

We received your letter regarding requirement of Slag (GGBFS) to your new cement plant and we hereby agreed to supply required quantity of Slag(GGBFS) material in closed Truck to M/S SAKTHIPRIYAN CEMENTS, at Azhagenallur Road, Deevanur village and post Tindivanam Tk, and villupuram Dt frequently.

Thanking You,



Yours faithfully,

ROSHINI SONA CHEM

Manufactures of Gypsum Plaster of Paris Powder, GRG (Glass Fiber Reinforced Gypsum Board) Gypsum Cornices

PH- 04612262266

PH -04612262466

TO:

DATE: 02-05-2023

SAKTHIPRIYAN CEMENTS
R.S No.3/234, Azhagenallur Road
Deevanur village and post
Tindivanam Tk, Villupuram Dt
Tamilnadu - 604206

Sir,

Agreement with SAKTHIPRIYANCEMENTS regarding supply of Gypsum

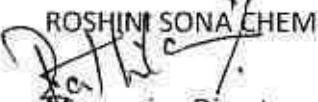
-----*****-----

We are one of the eminent suppliers of Gypsum in Pondicherry and we are supplying Gypsum to various cements factories in and around Tamilnadu.

We received your letter regarding requirement of Gypsum to your new cement plant and we hereby agreed to supply required quantity of Gypsum material in closed Truck to M/S SAKTHIPRIYAN CEMENTS, at Azhagenallur Road, Deevanur village and post , Tindivanam Tk, villupuram Districk frequently.

Thanking You

ROSHINI SONA CHEM


Managing Director

#82/1, Nagampattai Village, PASUVANTHANAI-628718.Thoothukudi Dist.Tamilnadu



LIYA ENTERPRISES

(Fly Ash Supplier)

No.33/1, 1st Street, Valluvar Nagar, Minjur - 601 203.

e-mail : liyaenterprises2707@gmail.com

Date : 27.04.2023

To
Sakthipriyan Cements,
R.S.No:30/234 Azhaganallur Road,
Deevanur Village and Post,
Tindivanam Taluk, Vilupuram,
Tamilnadu - 604206.

Sir,

Sub: Agreement with Sakthipriyan Cement regarding supply of fly ash

We are one of the eminent suppliers of fly ash in Chennai and we supplying fly ash to various cement factories in and around Tamilnadu.

We received your letter regarding requirement of fly ash to your new cement plant and we hereby agreed to supply required quantity of fly ash material in Bulker Truck to M/s **Sakthipriyan Cement** at R.S.No:30/234 Azhaganallur Road, Deevanur Village and Post, Tindivanam Taluk, Vilupuram, frequently.

Thanking You,

Yours Faithfully,
For **LIYA ENTERPRISES**

Authorized Signature

Annexure - XII

GPS Coordinates for Greenbelt Development

GREENBELT CO-ORDINATES

FOR

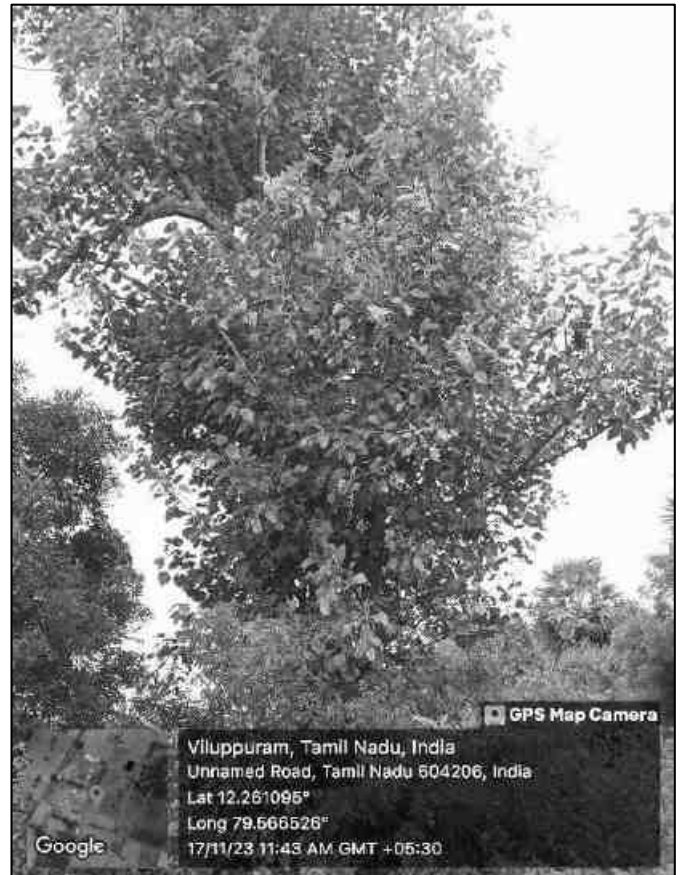
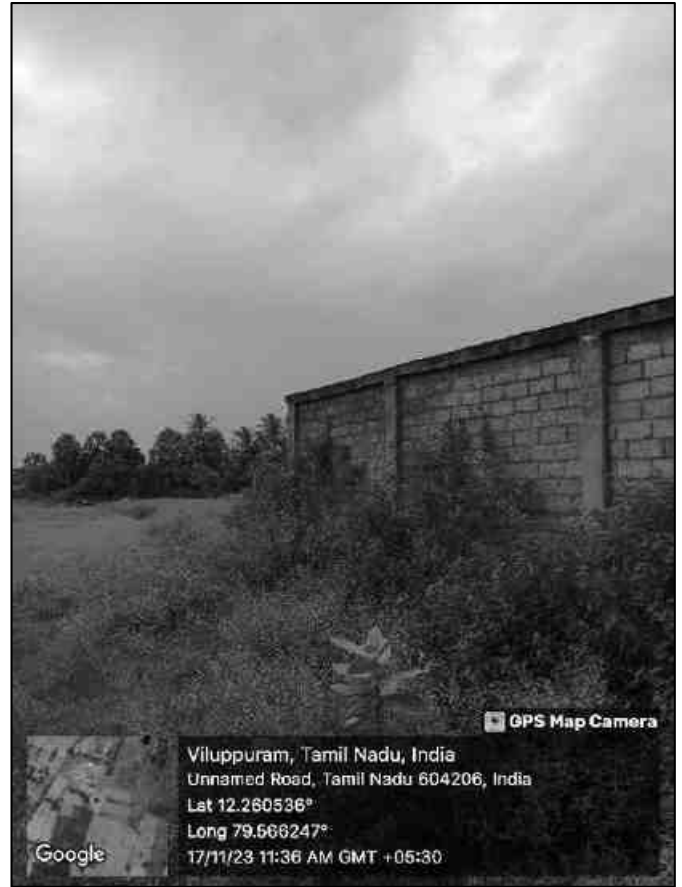
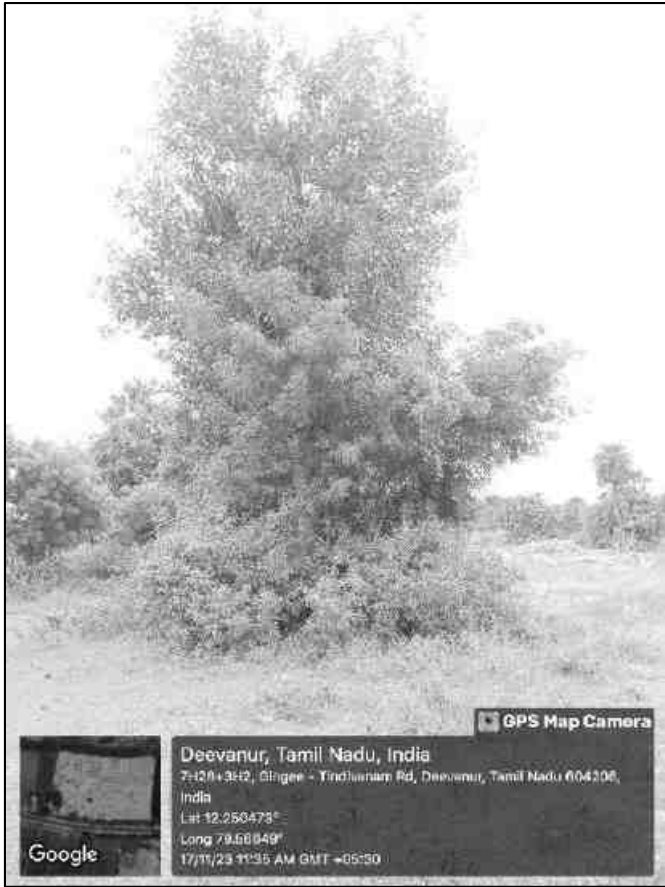
M/s.Sakthipriyan Cements Pvt Ltd

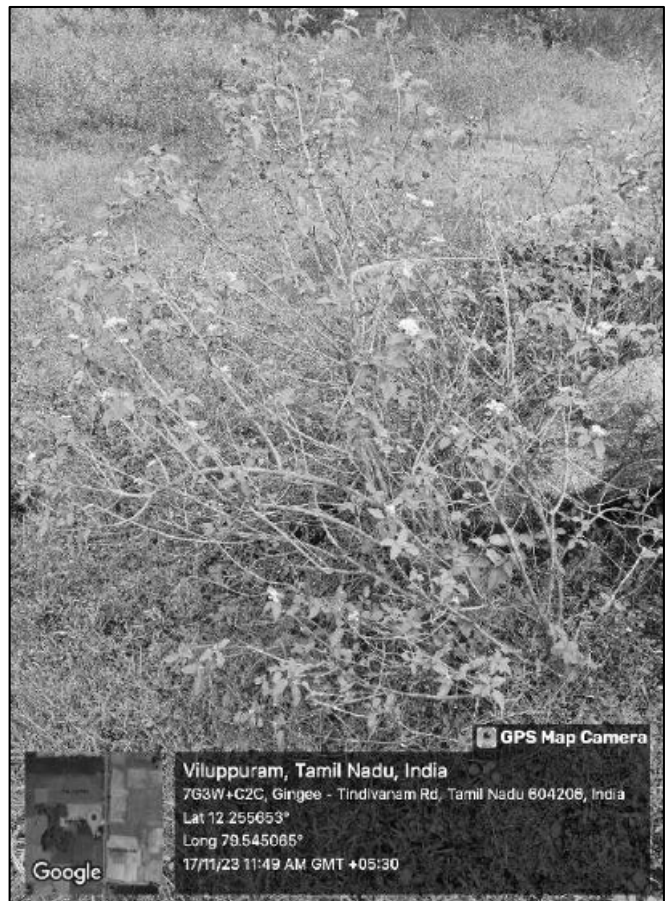
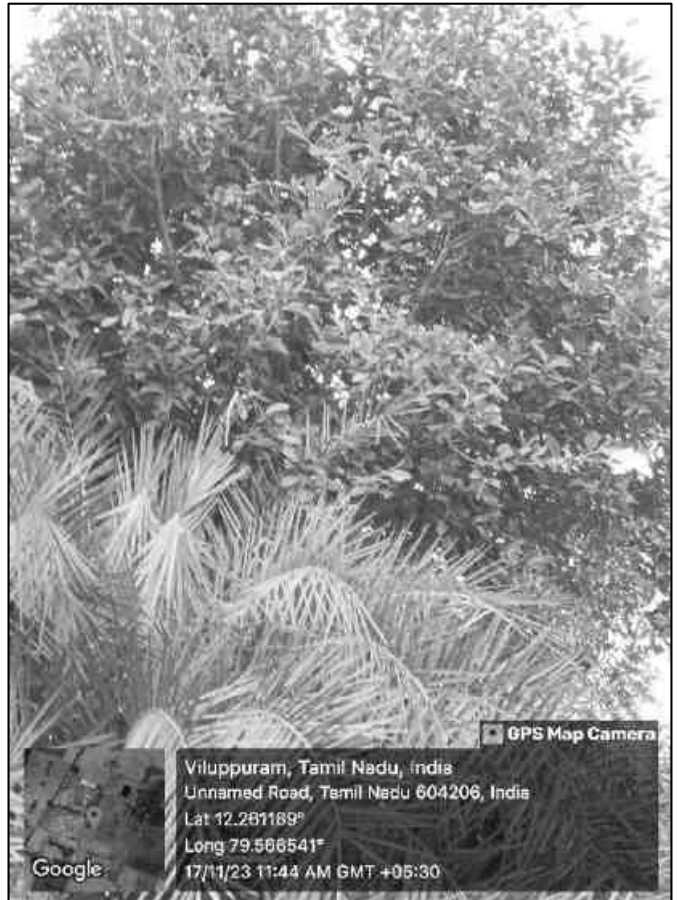
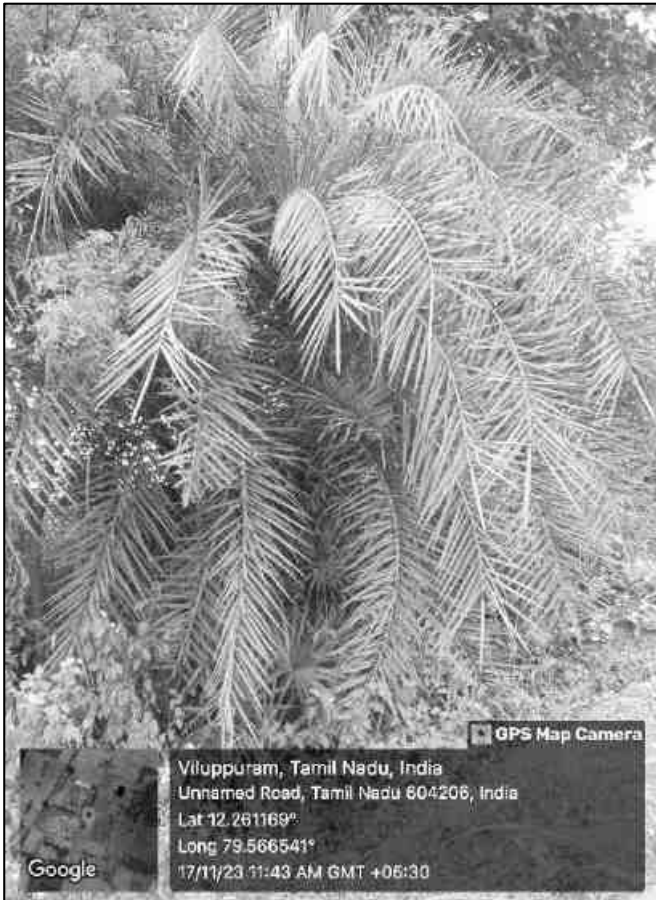
Project Named as

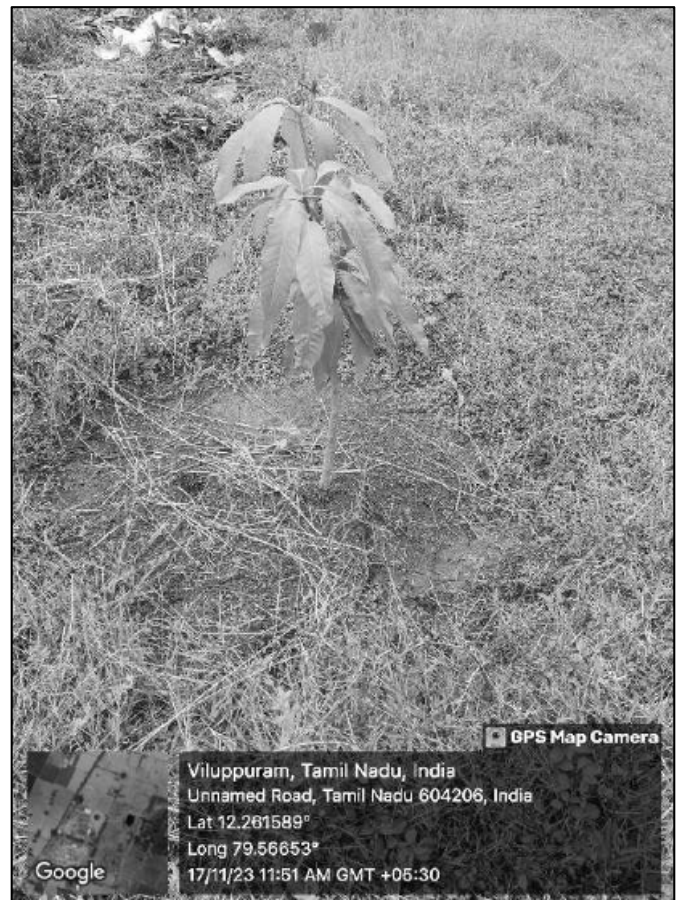
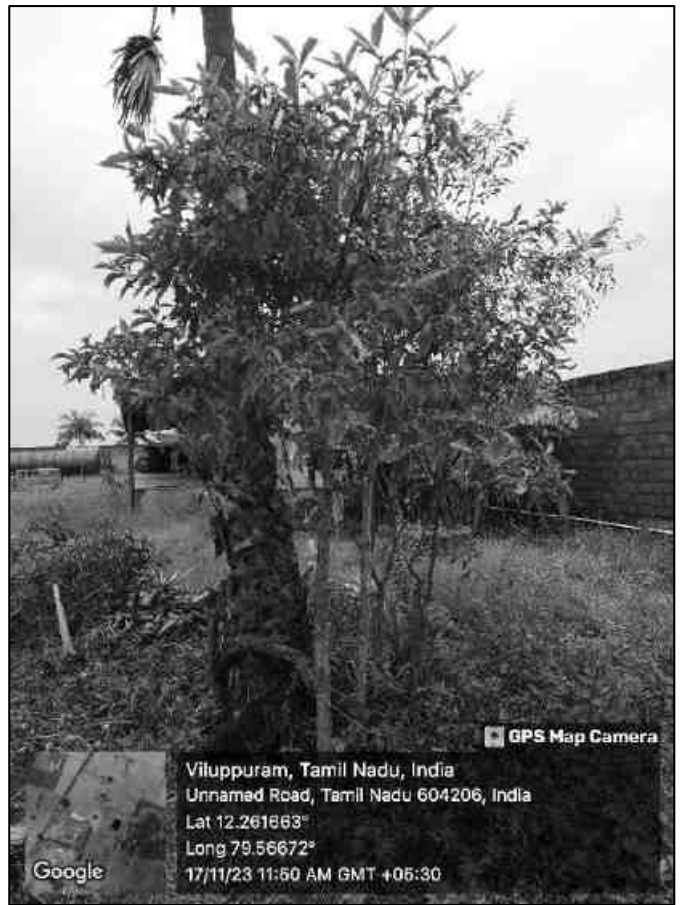
**“PROPOSED STANDALONE CEMENT GRINDING UNIT
OF 500 TPD CAPACITY “**

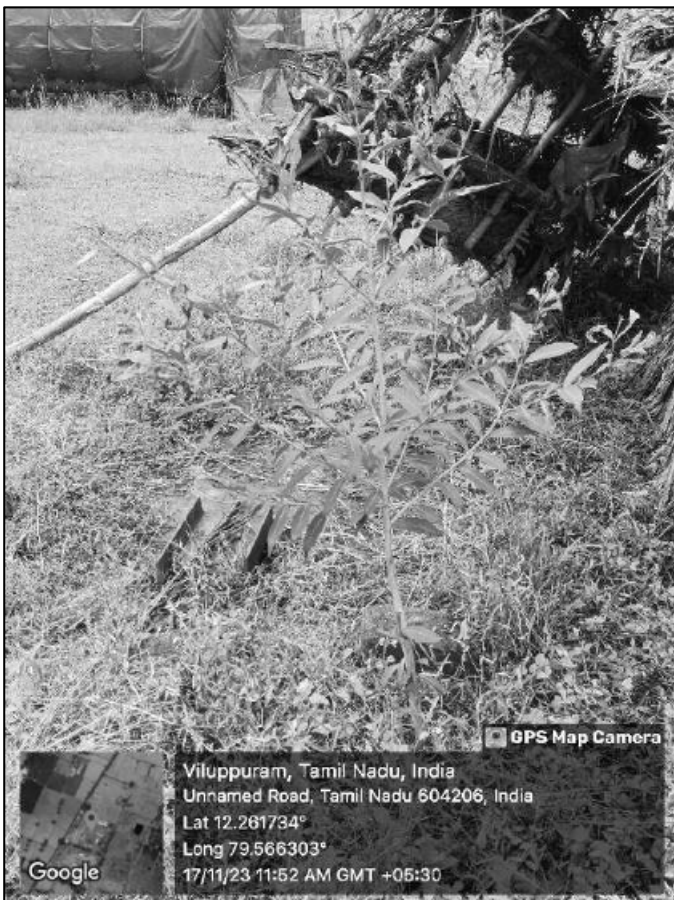
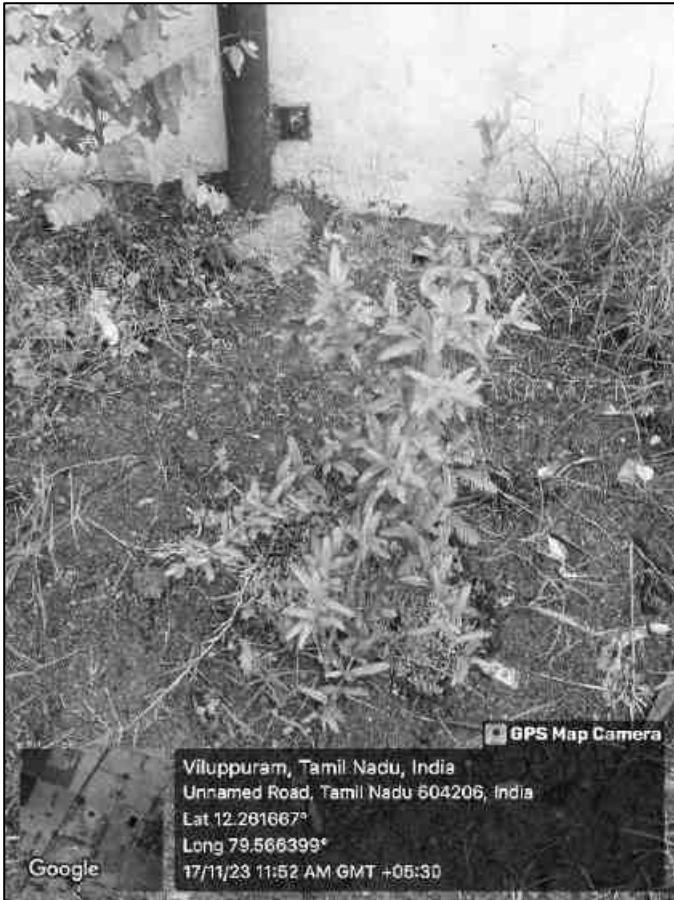
LOCATED AT

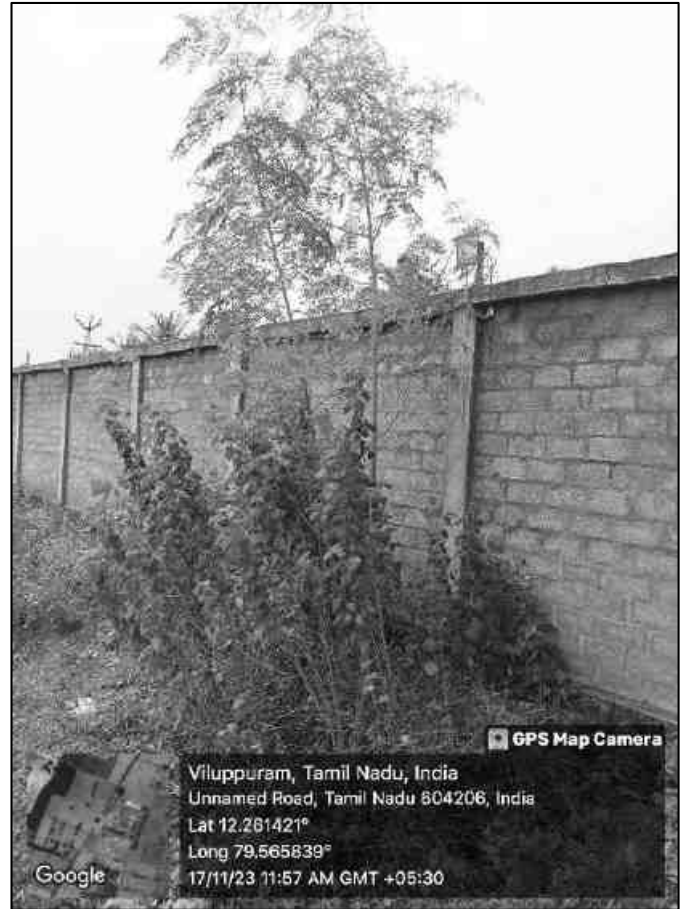
**DHEEVANUR VILLAGE,
TINDIVANAM (TK),
VILLUPPURAM DISTRICT,
TAMIL NADU**











Annexure - XIII

Carbon sink study

Annamalai University

Faculty of Engineering and Technology

DEPARTMENT OF CIVIL ENGINEERING

(NBA Accredited Department)

CENTRE FOR ATMOSPHERIC RESEARCH & CLIMATE
CHANGE

Estimated Carbon Sequestration from Proposed Greenbelt

Prof. Dr. S.Palanivelraja
Professor and Director



Annamalainagar
Tamilnadu – 608 002

☎ : 9865047612

✉ : aucares2014@gmail.com

Estimated Carbon Sequestration from Proposed Greenbelt

The rate of carbon sequestering depends on growth parameters of the plants. Density of wood of plants plays a major role. Trees act as sinks for carbon dioxide by fixing carbon during photosynthesis and storing carbon as biomass (Carbon sequestration). The net long-term carbon dioxide source/sink dynamics of green belt area change through time as trees grow, get pruned, die and decay. Trees in green belt areas sequester and store carbon as they grow. Thus, green belt influence local climate, carbon cycles, energy use and climate change. There are few methods companies will be adopting for capturing carbon emission:

Proposed Emission of CO₂

Table -1 Proposed Emission of CO₂

Main Types	Type Name	Type Notation	Clinker, K	Minor Additional Constituents	Factor (K _{CEMII} /K _{CEMI})	Factor (K _{CEMIII} /K _{CEMI})	CO ₂ max. kg CO ₂ /ton _{cement}
CEM I	Portland cement	CEM I	95-100	0-5	95/95 = 1	1	490
	Portland slag cement	CEM II/A-S-CEM II/B-S	81-88 65-79	0-5	81/95-94/95 65/95-79/95	0.84-0.99 0.68-0.83	410-480 340-410
CEM II	Portland/silica fume cement	CEM II/A-D	90-94	0-5	90/95-94/95	0.95-0.99	460-480
		CEM II/A-P	80-94	0-5	80/95-94/95	0.84-0.99	410-480
	Portland pozzolana cement	CEM II/B-F	65-79	0-5	65/95-79/95	0.68-0.83	340-410
		CEM II/A-Q	80-94	0-5	80/95-94/95	0.84-0.99	410-480
		CEM II/B-Q	65-79	0-5	65/95-79/95	0.68-0.83	340-410
	Portland-fly ash cement	CEM II/A-V	80-94	0-5	80/95-94/95	0.84-0.99	410-480
		CEM II/B-V	65-79	0-5	65/95-79/95	0.68-0.83	340-410
		CEM II/A-W	80-94	0-5	80/95-94/95	0.84-0.99	410-480
	Portland-burnt shale cement	CEM II/B-W	65-79	0-5	65/95-79/95	0.68-0.83	340-410
		CEM II/A-T	80-94	0-5	80/95-94/95	0.84-0.99	410-480
		CEM II/B-T	65-79	0-5	65/95-79/95	0.68-0.83	340-410
	Portland limestone cement	CEM II/A-L	80-94	0-5	80/95-94/95	0.84-0.99	410-480
CEM II/B-L		65-79	0-5	65/95-79/95	0.68-0.83	340-410	
CEM II/A-LL		80-94	0-5	80/95-94/95	0.84-0.99	410-480	
CEM II/B-LL		65-79	0-5	65/95-79/95	0.68-0.83	340-410	
Portland composite cement	CEM II/A-M	80-88	0-5	80/95-94/95	0.84-0.99	410-480	
	CEM II/B-M	65-79	0-5	65/95-79/95	0.68-0.83	340-410	
CEM III	Blast furnace cement	CEM III/A	35-64	0-5	35/95-64/95	0.37-0.67	100-330
		CEM III/B	20-34	0-5	20/95-34/95	0.21-0.36	100-180
		CEM III/C	5-19	0-5	5/95-19/95	0.05-0.20	30-100
CEM IV	Pozzolanic cement	CEM IV/A	65-89	0-5	65/95-89/95	0.68-0.94	340-460
		CEM IV/B	45-64	0-5	45/95-64/95	0.47-0.67	210-330
CEM V	Composite cement	CEM V/A	40-64	0-5	40/95-64/95	0.42-0.67	210-330
		CEM V/B	20-38	0-5	20/95-38/95	0.21-0.49	100-200

The average proposed emission of CO₂ is assumed as 430 Kg of CO₂ per tone of cementitious materials. In order to capture the GHG emission from the industry, the Green Belt is proposed to develop. The number of tree is calculated from the MS Excel spread sheet Tree Carbon Storage Calculator.

<https://environmentalsociety.ca/wp-content/uploads/2023/05/Tree-Carbon-Storage-calculator.xlsx>

Tree Carbon Storage: calculator Success (1) [Compatibility Mode] - Microsoft Excel

Alometri SOURCE: <https://cdnsiencepub.com/doi/full/10.1139/cjss-2016-0107>

Caragana	Green Ash	Hybrid Poplar	Manitoba	Scots Pine	White Spruce	Age
0.26729	0.81343	0.44308	0.03929	0.12223	0.41218	a coefficient
3.40181	1.60683	1.13778	0.07381	0.42049	0.63553	b coefficient
5.6649	2.54611	2.35223	0.81341	0.95923	0.91708	
7.50748	3.57451	4.03502	3.38282	1.77404	1.28625	
9.08902	4.61152	6.0184	5.73514	2.78577	1.75408	
10.5282	5.66725	8.24193	7.67629	3.93851	2.36245	
11.7352	6.6695	10.5012	9.28988	5.08967	3.10366	
12.8326	7.65009	12.8122	10.7631	6.23759	4.02655	
13.8074	8.56268	15.0278	12.0717	7.32566	5.11223	r =N/A
14.7047	9.42633	17.1379	13.7801	8.36331	6.36458	
15.5309	10.2411	19.1177	14.4001	9.34536	7.74273	
16.296	11.0068	20.9589	15.4422	10.265	9.18014	
17.0272	11.7479	22.7203	16.4453	11.1608	10.6601	
17.7139	12.4472	24.368	17.3905	12.0067	12.0583	
18.3726	13.12	25.9389	18.3012	12.8214	13.3561	
19.008	13.7704	27.4431	19.1839	13.6131	14.5443	
19.6085	14.3854	28.8523	20.0216	14.3649	15.6037	
20.1911	14.9817	30.2066	20.8376	15.096	16.5717	
20.7564	15.5604	31.5094	21.633	15.8109	17.4619	
21.2913	16.1076	32.7315	22.3888	16.4879	18.2594	

Calculator						
DBH	18	11	52	5	2	19
	17.7139	11.00682	52.17899593	5.73514	1.77404	19.0142
Age	14	12	42	5	4	21
Above ground biomass	46.56	33.48	818.79	8.10	1.28	77.82
Species ratio	0.91	0.79	0.88	0.71	0.48	0.73
Total biomass	57.49	42.61	930.33	11.88	2.62	107.11

Source : <https://cdnsiencepub.com/doi/10.1139/CJSS-2016-0107>

The methodology adopted by Beyhan Y. Amichev (2017) is used to account Carbon storage in kg per Indian ash tree. Figure -1 shows the relationship between the age of Tree Vs storage of Carbon in Kg.

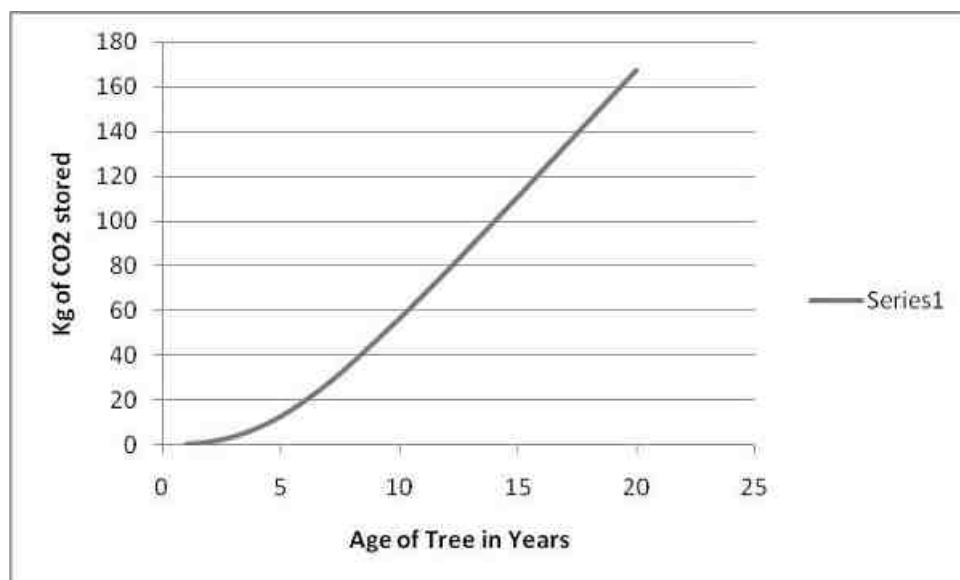


Figure-1 : KgCO2 stored per tree of Indian Green Ash (othayam tree)

The amount of CO₂ sequestered by an Indian ash tree over a period of 20 year is about 180 Kg. However, this number can vary depending on type and age of the trees as well as other environmental factors. But, on an average, one tree can absorb about 22 kg of Carbon dioxide per year. To offset 1 tonne (1000 Kg) of CO₂, it would plant approximately 50 trees. This study suggested to plant $100 \times 50 = 5,000$ trees for the I phase and to plant $200 \times 50 = 10,000$ trees for the II and III phases.

Annexure - XIV

**Study on Impact of Proposed Activity-
From Institution**

Annamalai University

Faculty of Engineering and Technology

DEPARTMENT OF CIVIL ENGINEERING

(NBA Accredited Department)

CENTRE FOR ATMOSPHERIC RESEARCH & CLIMATE
CHANGE

PROPOSED BASELINE STUDIES FOR M/S.SAKTHIPRIYAN
CEMENTS, DHEEVANUR VILLAGE, VILLUPURAM
DISTRICT, TAMIL NADU

Prof. Dr. S.Palanivelraja
Professor and Director



Annamalainagar
Tamilnadu – 608 002
☎ : 9865047612
✉ : aucares2014@gmail.com

a. Impact on lakes and other water bodies.

Cement will be manufactured by dry process technology. No wastewater will be generated from cement plant process. Moreover, no streams are crossing through the project site. The domestic sewage shall be treated in a septic tank followed by dispersion trench, as proposed to meet the discharge norms. Thus no major adverse impact of wastewater is envisaged from the plant. The waste water during construction will contain only suspended impurities. This water would use in gardening and other non-consumption activities.

Impacts on Water Bodies

Since the unit will be operating on zero discharge process, no adverse impact on aquatic ecology is envisaged. The plant drainage system will be suitably designed such that the storm water does not carry any pollutants.

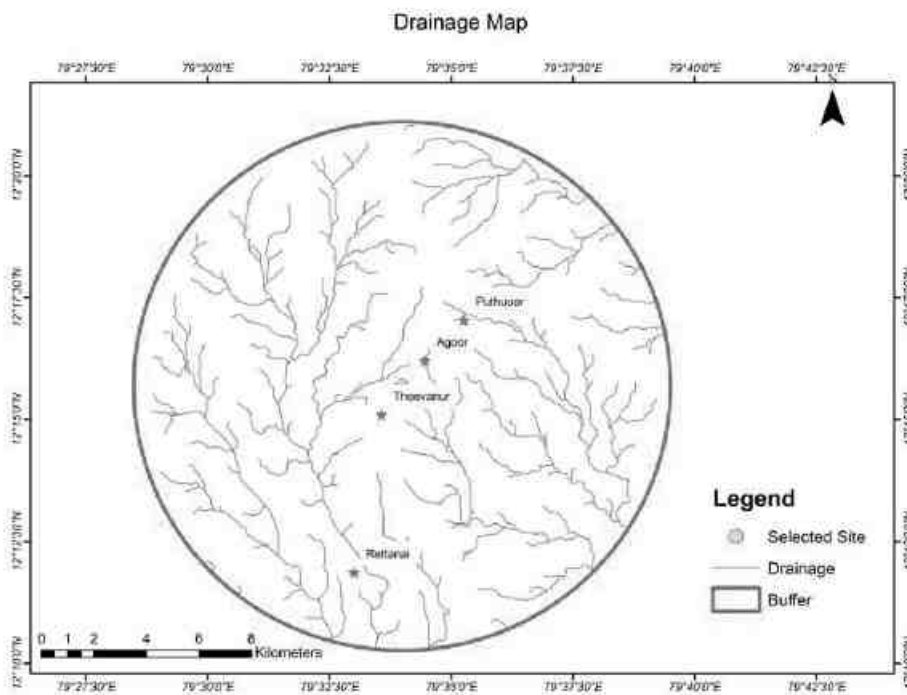


Figure -1: Impact on Water bodies

b. Soil health soil erosion, the soil physical, chemical components, microbial components & bio-diversity.

Soil characteristics were delineated through specific parameters viz. moisture, bulk Density, etc. pH is an important parameter indicative of alkaline or acidic nature of soil. It greatly affects the microbial population as well as solubility of metal ions and regulates nutrient availability. Electrical conductivity (EC), a measure of soluble salts in the soil was in the range of 98 – 210 $\mu\text{S}/\text{cm}$. Regular cultivation practices increase the bulk density of soils thus inducing compaction. This results in reduction in water percolation rate and penetration of roots through soils. The soils with low bulk density have favorable physical conditions whereas those with high bulk density exhibit poor physical conditions for agriculture crops. The bulk density of the soil in the study area ranged between 1.16-1.38 g/cc which indicates favorable physical condition for plant growth. Water holding capacity was found between 44-56 % whereas the texture of soil in the core zone was found to be Sandy Clay. Organic matter present in soil influences its physical and chemical properties and is responsible for stability of soil aggregates. Organic matter was found in the range of 0.60-1.28 %. This shows that soil was deficient in organic matter content.

c. Impact on the natural flow order of the water bodies & closure of the water body (River) mouths nearby the vicinity of the proposed site

The streams of the Sankaraparani river basin have been ranked according to the method described by Strahler (1964). According to Strahler, when two first order streams join, a stream segment of second order is formed; When two second order streams join, a segment of third order is formed, and so on. The study area is a fourth order drainage basin. It is noticed that stream segments up to third order traverse part of the high

altitudinal zones which are characterized by steep slopes while the fourth, third and fourth stream segments occur in comparatively flat lands.

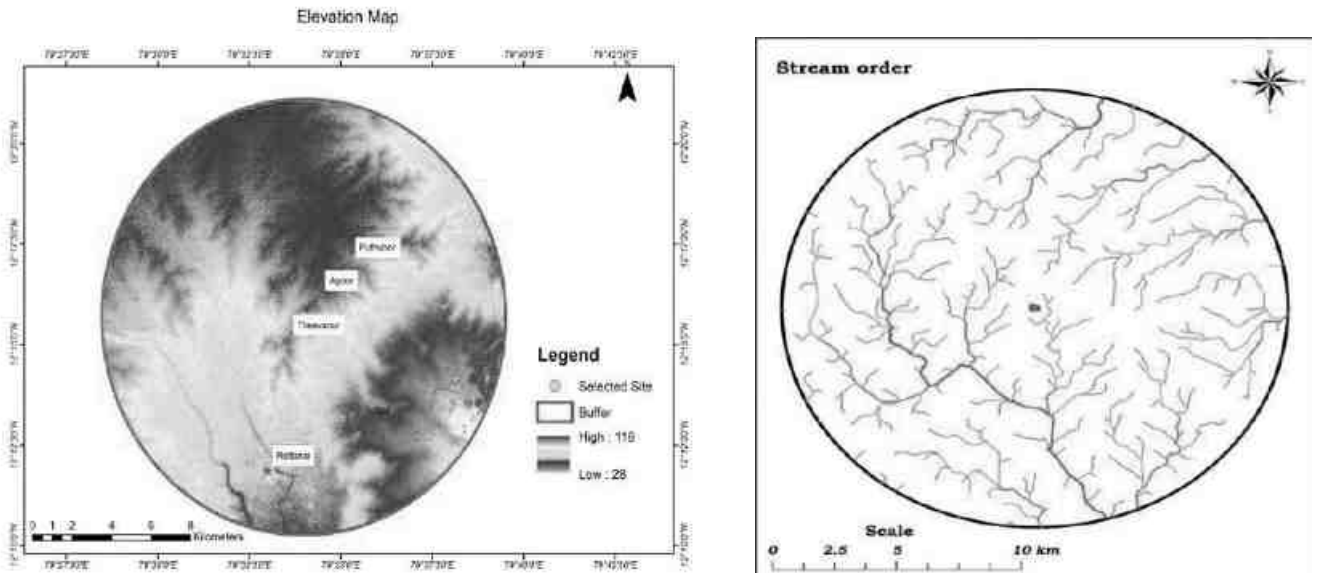


Figure-2 : Impact on the natural flow order of the water bodies

d. Climate change leading to Droughts, Floods, etc.

The climate in Villupuram district is mostly humid and hot. The district is characterized by semi-arid tropical climate. The temperature is moderate. The climate during summer season is very hot and the temperature can go up to 40 °C. The winter climate is moderate with temperature ranging between 30 °C and 35 °C. The average temperature varies from 30°C to 41°C. The humidity is high in the order of 80 per cent. The wind speed is high in the months of July and August and it ranges from 7.4 to 12.6 km/hr. The district, on an average receives a rainfall of 4.96 mm (0.4 per cent) during the winter season, 139.56 mm (11.32 per cent) during the summer season, 410.54 mm (33.31 percent) during the south west monsoon season and 677.54 mm (54.96 per cent) during the north east monsoon season. The district receives the maximum rainfall during the north east monsoon season. The average rainfall of the district is 1060.3 mm. The rainfall is heavier

in the coastal area compared to interior areas. About 93.82% of the normal rainfall is received during the Northeast and South west monsoon seasons. Normally the district does not get heavy rainfall except Marakkanam and Vanur Taluks. In Kandamangalam and Koliyaur blocks, the rainfall is moderate it is scare in kallakurichi and Sankarapuram.

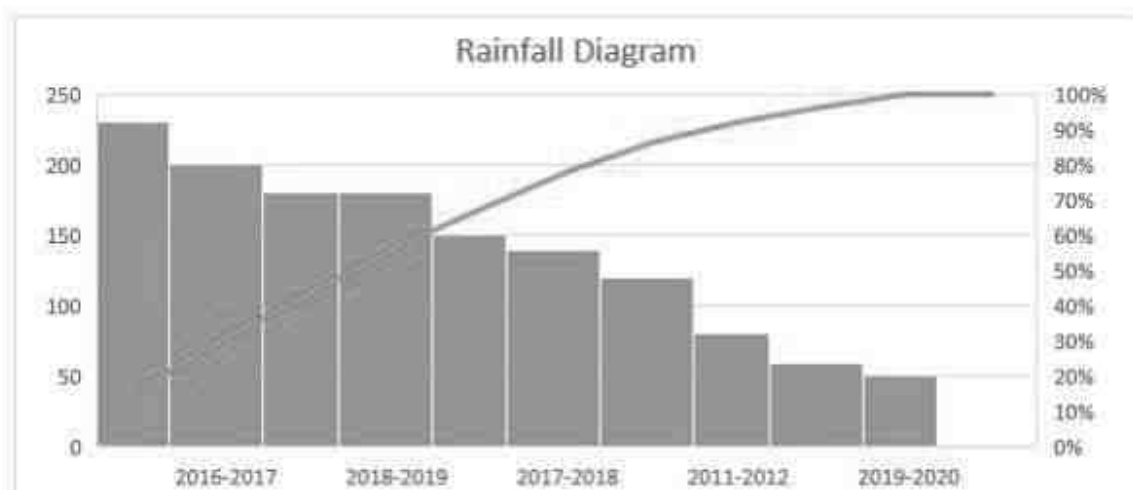
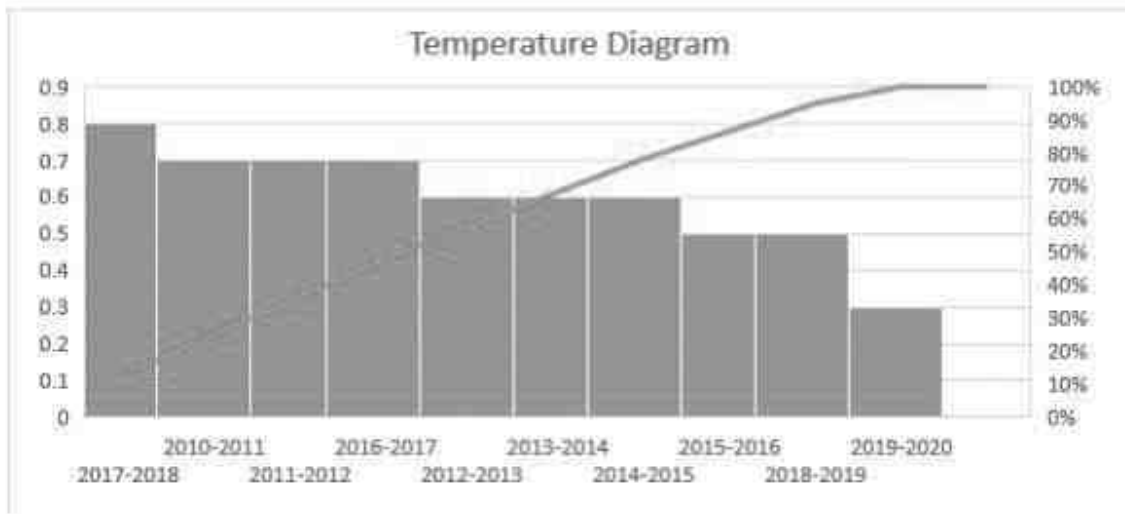
Impact on Climate

Temperature

The average, monthly minimum and maximum temperatures have been monitored at the proposed plant site and also analyzed based on the data from nearest IMD station at Chennai. The trend of temperature shows an increasing trend. The temperature pattern indicates a regional behavior and construction of the cement plant complex will not have any bearing on the macro level temperature patterns.

Rainfall

The average annual rainfall in the region is 1029 mm as per IMD data of Villupuram District. Any changes in the pattern of rainfall will be on regional scale because of cumulative reasons. The operation of plant is not expected to have any adverse effect on the rainfall pattern of the area.



e. Pollution leading to release of Greenhouse gases (GHG), rise in Temperature, pollution, above soil & below soil carbon stock & Livelihood of the local people.

The calculation of the global warming impact category shows that every 1 tonne of cement will produce emissions of 601 kg CO₂ eq. Therefore, based on the global warming impact category, clinkerization is a hotspot that contributes more than 92% (553 kg CO₂ eq) of emissions for every tonne of cement. This global warming potential is because, in the cement production process, there is always a chemical reaction that produces CO₂, of which 60% is produced from the clinkerization process or heating lime (limestone) to manufacture clinker. At this stage, calcium carbonate (CaCO₃) and magnesium carbonate (MgCO₃) will be heated at high temperatures to about 14000C to decompose into CaO and CO₂.

It is found that clinkerization is the most significant contributor to environmental emissions. In general, the industry has made efforts to reduce fuel consumption and electricity usage, but this solution has limitations due to the calcination process, which produces enormous amounts of CO₂. Thus, improving the calcination process using advanced technology efficiently reduces environmental emissions from cement production. One technology that can be an alternative scenario to reduce CO₂ emissions, which is the most significant contribution to the potential impact of global warming potential (GWP), is a carbon recycling system using mineral carbonation. The capture and utilisation of mineral carbon is a mineral carbonation technology where the calcium in alkaline waste reacts with CO₂ to form CaCO₃. Other literature reports that alkaline waste carbonation can reduce between 5% and 12% of primary CO₂ emissions. This newly developed technology can reduce CO₂ emissions from the cement industry. In addition, carbon capture technology using microalgae can also be considered an attractive strategy to reduce emissions. Algae has a high potential as a source of biomass because it has high photosynthetic efficiency and high biomass yield.

Moreover, the emission in excess may release GHG, which will absorb solar heat energy resulting in temperature rise. The temperature rise affect fish resources and hence livelihood as well working efficiency of the local people. By adopting the carbon capture technology, the GHGs emissions to be curtailed.

f. Possibilities of water contamination and impact on aquatic ecosystem health.

Water quality characteristics of aquatic environments arise from multitude of physical, chemical, and biological interactions. The water bodies are continuously subjected to dynamic state of changes with respect to their geo-chemical characteristics.

The dynamic balance in aquatic ecosystem is upset by human activities. It is pertinent to make a reconnaissance survey of the river during the planning stage, noting all sources of wastes, all entering tributaries that might contribute a potential pollutant, and all uses and abstractions of the water. This action will also include a survey of background information such as geography, topography, climate and weather, hydrology, hydrogeology, land use, urbanization, industrialization, and agriculture, including farming in the riverbed. The information required has been collected through primary surveys and secondary sources. Surface water sources and groundwater sources covering 10 km radial distance were investigated.

Within 10 km distance of the project site, no plant or animal species were found to be on the endangered list. No ecologically sensitive area like biosphere reserve, tiger reserve, elephant reserve, migratory corridors of wild elephant, wetland, national park, wildlife sanctuary and Forest are present within 10 km distance of the project site.

g. Agriculture, Forestry & Traditional practices.

Agriculture is the predominant occupation of the people in the district. The major crops grown in the district are paddy, groundnut, sugarcane, tapioca. The other important crops are Cashewnut, Blackgram, Guava, Banana, Turmeric, Chillies, Coriander, Brinjal, Coconut etc., and other Horticulture crops also cultivated. The important feature of the district to be noted is that there is a diverse pattern of cultivation and much number of crops are seen to be cultivated in the district. Villupuram district also contributes to horticulture crops significantly. Yam, watermelon, coleus, turmeric, guava, and tapioca are the predominantly cultivated horticulture crops in the district.

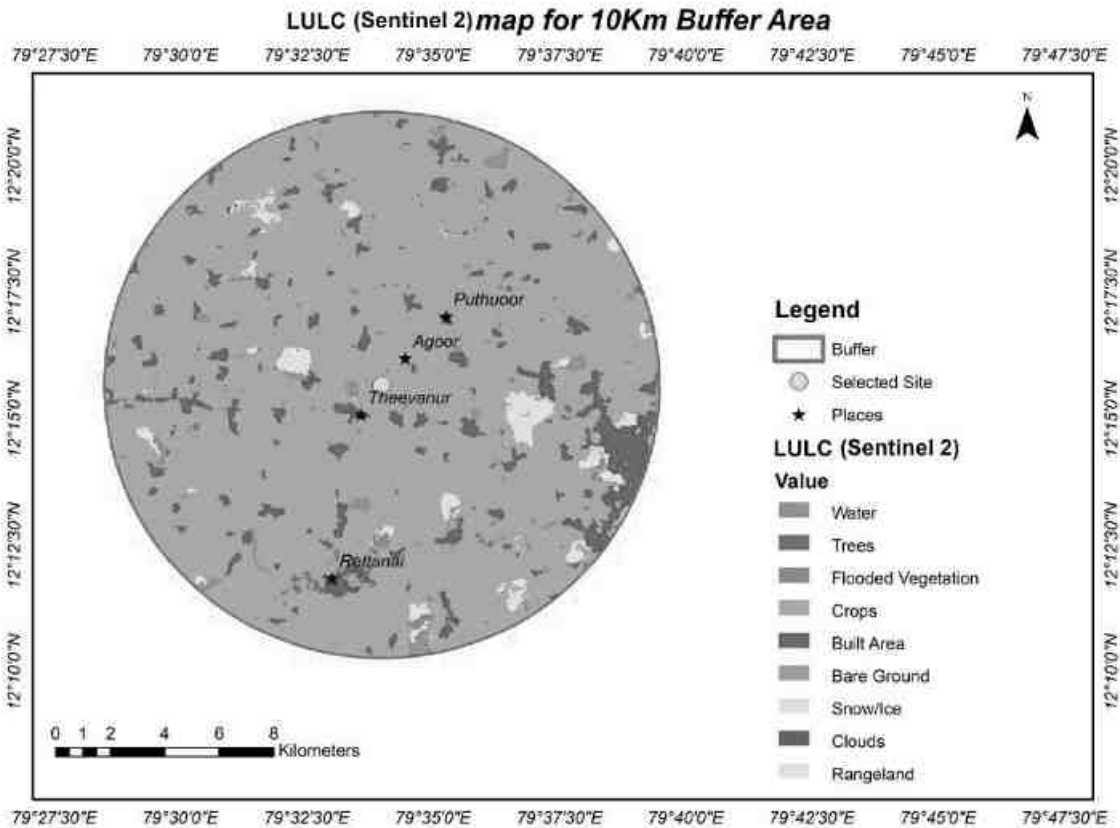


Figure -3 : Agriculture, Forestry & Traditional practices

Recent period 2020 area around mine area is shown above. There is No disturbance agriculture land increases in buffer zone there is no change when during mining operation period. Some built-up and agriculture land developed in buffer zone.

Major portion of the district is characterized by a plain which is predominantly utilized for agricultural purpose. Forest areas in the district constitute about 9.9% of the total area of the district. In the hilly regions, trees like teakwood, sandalwood, rose wood etc., are found to be grown Gingee and Kalrayan Hills along with some medicinal Plants. Eucalyptus and cashew is also grown. Most of the forest in the district is spread over in Gingee and Thiruvanneinallur Taluk. There are Reserve forest in Thiruvanneinallur and

Gingee Taluk. On the east, the Bay of Bengal coastline extends to about 36 kms in Marakkanam and Vanur Taluks. No Reserved Forest is found around 10 km radius of lease boundary. So there is no chance of proposed quarry affecting the forest and forest products.

h. Hydrothermal/Geothermal effect due to destruction in the Environment.

Geothermal refers to any system that transfers heat from within the Earth to its surface. Hot rocks, without water, are geothermal. Hydrothermal is a subset of geothermal, and means that the transfer of heat involves water, either in liquid or vapor state. The various geological formations given below,

Table -1 : Resistivity Survey Layer Depth (m)

Layer	Depth (m)	Nature of Formation	Resistivity value
h1	0-6	Top soil & weathered rock	Low Value
H2	6-34	Massive rock	Medium
H3	34-35	Fracture Zone	Medium
H4	35-100	Massive Formation	High

From the results of Resistivity Survey, it is understood that the study area is composed of Rough stone and gravel deposit, with little geological disturbances by folding and there may be no transfer of heat from earth to its surface by the proposed project.

i. Bio-geochemical processes and its foot prints including environmental stress

Biogeochemical Cycles The chemical elements and water that are needed by organisms continuously recycle in ecosystems. They pass through biotic and abiotic components of the biosphere. That's why their cycles are called biogeochemical cycles. For example, a chemical might move from organisms (bio) to the atmosphere or ocean (geo) and back to organisms again. Elements or water may be held for various periods of time in different parts of a cycle. • Part of a cycle that holds an element or water for a short period of time is called an exchange pool. For example, the atmosphere is an exchange pool for water. It usually holds water (in the form of water vapor) for just a few days. • Part of a cycle that holds an element or water for a long period of time is called a reservoir. The ocean is a reservoir for water. The deep ocean may hold water for thousands of years.

The Carbon Cycle Flowing water can slowly dissolve carbon in sedimentary rock. Most of this carbon ends up in the ocean. The deep ocean can store carbon for thousands of years or more. Sedimentary rock and the ocean are major reservoirs of stored carbon. Carbon is also stored for varying lengths of time in the atmosphere, in living organisms, and as fossil fuel deposits.

j. Sediment geochemistry in the surface streams.

Villupuram District is underlain by crystalline metamorphic complex in the western parts of district and sedimentary tract in eastern side. An area of 4551 Sq.km is covered by crystalline rocks (63%) and 2671 Sq.km is covered by sediments (37%). The general

geological sequence of formation is given below: Quaternary - Laterites, Sands and Clays
Tertiary - Sandstone, Gravels and Clays Cretaceous - Limestone, Calcareous Sandstone
and Clay unconformity. Archaean - Charnockites, Gneisses, Granites, Dolerites and
Pegmatite

The major part of the area is covered by metamorphic crystalline rocks of charnockite,
granitic gneiss of Archaean age intruded by dolerite dykes and pegmatite veins. These
rocks are highly metamorphosed and have been subjected to very severe folding,
crushing and faulting.

Ground Water occurs under the phreatic condition and wherever there are deep seated
fractures, it occurs under semi-confined to confined conditions.

Occurrence of Ground Water in hard rock depends upon the intensity and depth of
weathering, fractures and fissures present in the rocks.

Granites and gneisses yield moderately compared to the yield in Charnockites.

Depth of well in hard rock generally ranges between 8 and 15m below ground level.

Generally yield in open wells ranges from 30 to 250m³ /day and in bore well between
260 and 430 m³ /day.

The weathered thickness varies from 2.5 m to 42m in general there are 3 to 5 fracture
zones within 100 m and 1 to 4 fracture zones between 100 and 200 m.

The Cretaceous formation is represented by Arenaceous Lime stone, Calcareous sand -
stone and marl.

The Tertiary formation is argillaceous comprising of Silty clay stones, argillaceous Lime
stone.

The Quaternary deposits represented by the river deposits of Ponnaiyar and Varahanadhi spread over as patches in Villupuram District.

The alluvium consists of unconsolidated sands, gravelly sands, clays and clayey sands.

The thickness of the sands ranges between 15 and 25 m in the alluvial formation which also form potential aquifers. In some areas, sand stone of tertiary formation are the potential groundwater reservoirs.

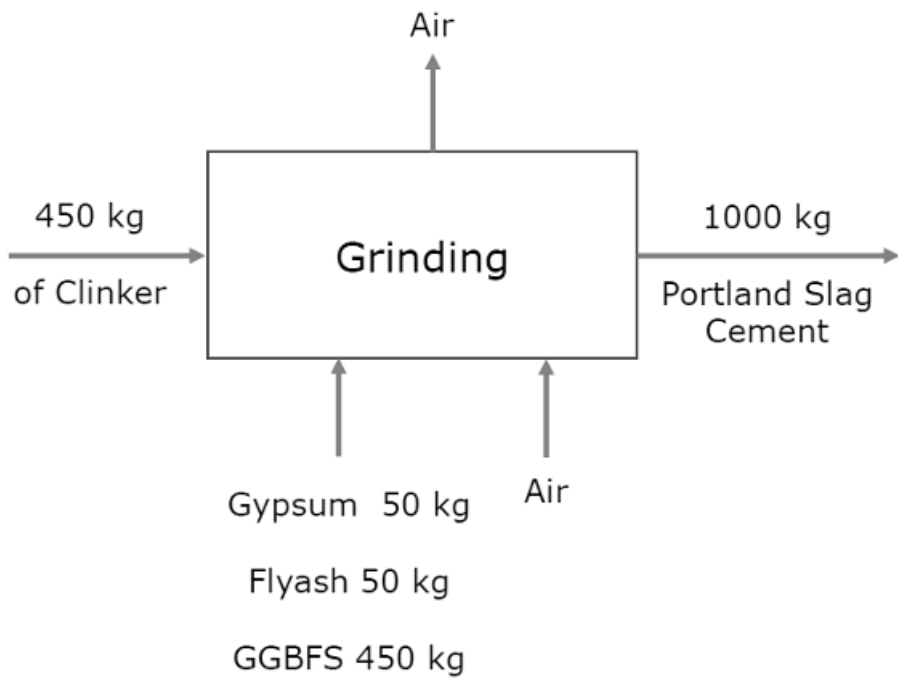
Annexure - XV

Material Balance with Raw Material

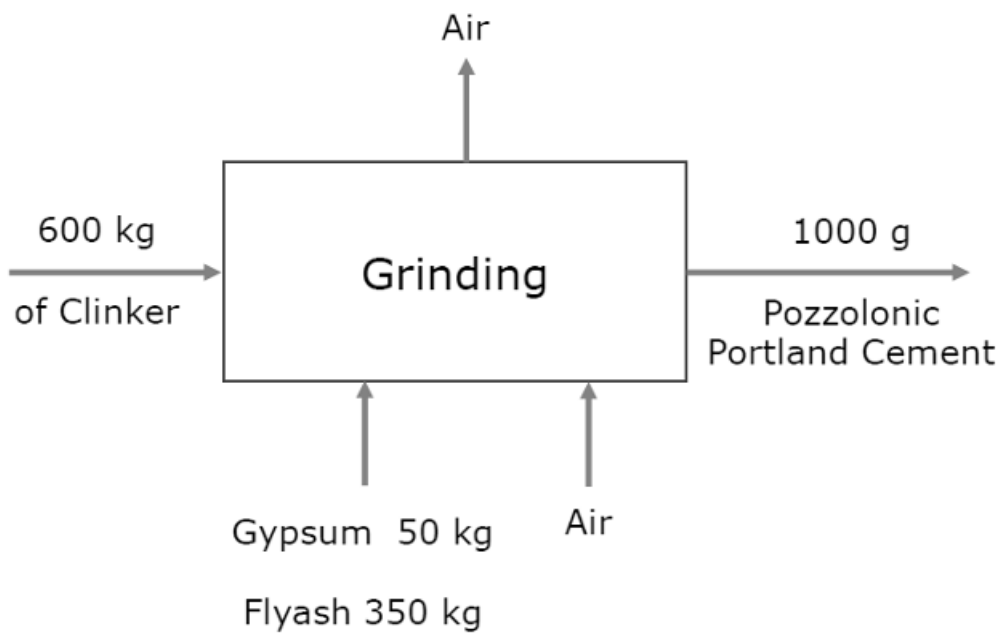
ANNEXURE-IV

Material Balance

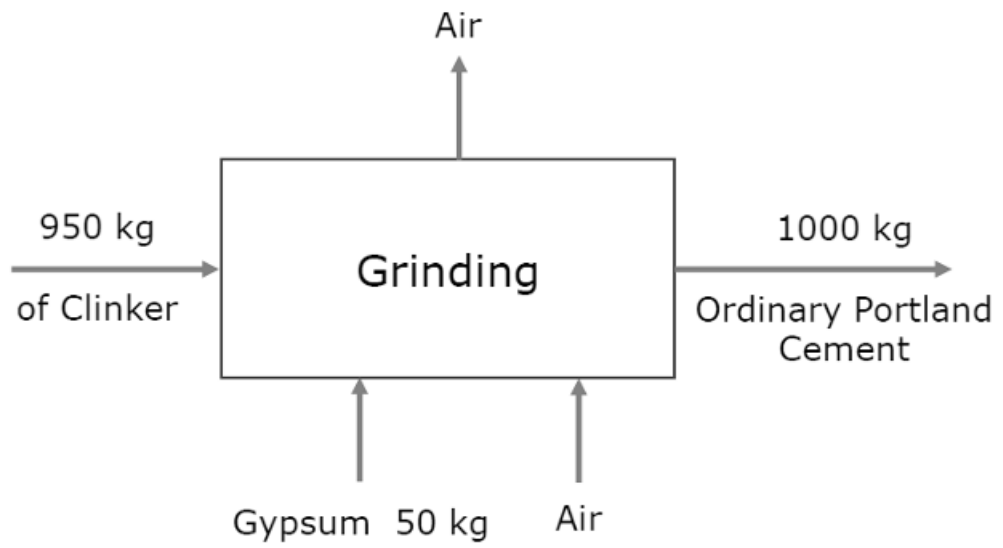
1. Portland Slag Cement- 1 Ton



2. Pozzolonic Portland Cement- 1 Ton



3. Ordinary Portland Cement- 1 Ton



Annexure - XVI

Terms of Reference (ToR)



THIRU.DEEPAK S.BILGI, I.F.S.
MEMBER SECRETARY

STATE LEVEL ENVIRONMENT IMPACT
ASSESSMENT AUTHORITY-TAMILNADU
3rd Floor, PanagalMaaligai,
No.1, Jeenis Road, Saidapet,
Chennai - 600 015.
Phone No. 044-24359973
Fax No. 044-24359975

TERMS OF REFERENCES (ToR)

Letter No.SEIAA-TN/F.No.9460/3(b)/ToR-1300/2022 dated:01 .11.2022

To

SAKTHIPRIYAN CEMENTS
R.S.No 30/2,3,4, Azhageanallur Road,
Dheevanur Village,
Thindivanam (Tk) ,
Viluppuram District-604 206

Sir,

Sub:	SEIAA-TN – Terms of Reference (ToR) With Public Hearing – Proposed Standalone Cement Grinding unit of 500 TPD at SF.No. 30/2, 30/3 & 30/4 Dheevanur Village, Tindivanam Taluk, Villupuram District, Tamil Nadu by M/s. Sakthipriyan Cements– Category “B” and Schedule S.No. 3(b) All standalone cement Grinding Units - Terms of Reference (ToR) with Public Hearing issued – Preparation of EIA Report – Regarding.
Ref:	1. Your application for Terms of Reference dated: 25.08.2022. 2. Online Proposal No. SIA/TN/IND/82341/2022 Dt. 13.08.2022. 3. Minutes of the 321 th meeting of SEAC held on 14.10.2022. 4. Minutes of the 566 th Meeting of SEIAA held 01.11.2022.


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Kindly refer to your proposal submitted to the State Level Impact Assessment Authority for Terms of Reference (ToR).

The project proponent M/s. SakthipriyanCementssubmitted application for Terms of references on: 25.08.2022, in Form-I, Pre- Feasibility report and draft TOR for the Proposed Standalone Cement Grinding unit of 500 TPD at SF.No. 30/2, 30/3 & 30/4 Dheevanur Village, Tindivanam Taluk, Villupuram District, Tamil Nadu.

Discussion by SEAC and the Remarks:-

Proposed Standalone Cement Grinding unit of 500 TPD at SF.No. 30/2, 30/3 & 30/4 Dheevanur Village, Tindivanam Taluk, Villupuram District, Tamil Nadu by M/s. Sakthipriyan Cements - For Terms of reference (SIA/TN/IND/82341/2022 Dt. 13.08.2022)

The proposal was placed in this 321th SEAC Meeting held on 14.10.2022. The project proponent gave detailed presentation. The details of the project furnished by the proponent are available in the website (parivesh.nic.in).

SEAC noted the following:

1. The Proponent, M/s. Sakthipriyan Cements has applied for Terms of reference for the proposed Standalone Cement Grinding unit of 500 TPD at SF.No. 30/2, 30/3 & 30/4 Dheevanur Village, Tindivanam Taluk, Villupuram District, Tamil Nadu.
2. The project/activity is covered under Category "B1" of item 3(b) "Cement plants" of the Schedule to the EIA Notification, 2006.
3. The proposal consists standalone Cement Grinding Unit of 500TPD of PPC, OPC & PSC with plot area – 1.877 Ha.
4. The Raw materials such as Clinker- 200 TPD, Gypsum- 25 TPD, Fly Ash – 175 TPD & GGBFS/Slag- 100 TPD. It is proposed to grind Clinker with other Raw Materials for producing Portland Pozzolana Cement (PPC), Ordinary Portland Cement (OPC) & Portland Slag Cement (PSC) @0.2 Million Tonnes per Annum (MTPA) @ 500 Tonnes per day (TPD).


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Based on the presentation and documents/clarifications furnished by the project proponent, SEAC after detailed deliberations, decided to **recommend the proposal for the grant of Terms of Reference (ToR) with public consultation**, subject to the following ToRs in addition to the standard terms of reference for EIA study and details issued by the MoEF& CC to be included in EIA/EMP report:

1. The PP shall incorporate the Oliver Ridley Sea Turtle conservation measures in consultation with Wild life Warden, Chennai in the EIA Report.
2. Clear village map, FMB sketch & A Register shall be furnished.
3. Ground water for industrial purpose to be phased out in 5 years. The industry to explore possibilities to meet the Water consumption for industrial purpose through treated sewage obtained from nearest local body/rain water harvesting.
4. The project proponent has to submit the reclassification certificate from unclassified land to Industrial Land for the proposed project from the competent Authority.
5. The PP shall obtain fresh water supply commitment letter and disposal of excess treated water from the local body /TWAD.
6. The PP shall furnish An Agreement for purchase of raw material.
7. Details of fugitive emission and control measures shall be furnished.
8. Air modelling study shall be conducted for the CPCB parameters considering the impact on the proposed plant to the nearby village.
9. CER proposal shall be furnished as per the MOEF & CC OM dated: 01.05.2018.
10. A green belt plan at thick canopy shall be furnished all along the boundary at the proposed site along with name of the species, no. of species etc.,
11. The GPS co-ordinates for the boundaries at the green belt proposed & proposed project site shall be furnished separately.

Discussion by SEIAA and the Remarks:-

The proposal was placed in the 566th Authority meeting held on 01.11.2022. After detailed discussions, the Authority accepts the recommendation of SEAC and decided to grant **Terms of Reference (ToR) along with Public Hearing** for the period 3 years for undertaking the Environment Impact Assessment Study and Environment Management Plan


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subject to the ToRs as recommended by SEAC & subject to the specific standard ToR in addition to the following ToRs:

1. As per the MoEF& CC office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management Plan.
2. The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities.
3. The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.
4. The Environmental Impact Assessment should study impact on standing trees and the trees should be numbered.
5. The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and hydrological cycles.
6. Detailed study shall be carried out through the accredited research institutions in regard to impact of proposed activity on the following
 - a) Impact on lakes and other waterbodies.
 - b) Soil health soil erosion, the soil physical, chemical components, microbial components& bio-diversity.
 - c) Impact on the natural flow order of the water bodies & closure of the waterbody (River) mouths nearby the vicinity of the proposed site.
 - d) Climate change leading to Droughts, Floods, etc.
 - e) Pollution leading to release of Greenhouse gases (GHG), rise in Temperature, pollution, above soil & below soil carbon stock& Livelihood of the local people.
 - f) Possibilities of water contamination and impact on aquatic ecosystem health.
 - g) Agriculture, Forestry & Traditional practices.
 - h) Hydrothermal/Geothermal effect due to destruction in the Environment.
 - i) Bio-geochemical processes and its foot prints including environmental stress.


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- j) Sediment geochemistry in the surface streams.
7. The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways.
 8. The project proponent shall furnish the details of trees in the project site with all trees numbered and protected.
 9. The project proponent shall furnish the detailed study regarding impact on the Reserve Forests within 10-15km. (if applicable)
 10. The project proponent shall furnish the detailed study on health with regard to respiratory distress due to allergens on workers, impacts on wild life, surrounding agriculture/horticulture and nearby villagers.
 11. The project proponent shall furnish the impact around proposed grinding unit regard to raw materials transported from long distance.
 12. The project proponent shall furnish the impact on dust pollution on the nearby habitation and livelihoods.
 13. The project proponent shall furnish the Risk assessment plan, EMP and Disaster management plan which should be prepared after thorough study. The EMP should be modified to incorporate plantation and maintenance cost for 5 years. The recurring cost should also be increased.
 14. The GPS co-ordinates for the boundaries at the green belt proposed & proposed project site shall be furnished separately.
 15. Air quality modelling study shall be conducted for the CPCB primary air pollutants specified by considering the impact on the proposed plant to the nearby villages.

STANDARD TERMS OF REFERENCE

- 1) **Executive Summary**
- 2) **Introduction**
 - i. Details of the EIA Consultant including NABET accreditation
 - ii. Information about the project proponent
 - iii. Importance and benefits of the project


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3) Project Description

- i. Cost of project and time of completion.
- ii. Products with capacities for the proposed project.
- iii. If expansion project, details of existing products with capacities and whether adequate land is available for expansion, reference of earlier EC if any.
- iv. List of raw materials required and their source along with mode of transportation.
- v. Other chemicals and materials required with quantities and storage capacities
- vi. Details of Emission, effluents, hazardous waste generation and their management.
- vii. Requirement of water, power, with source of supply, status of approval, water balance diagram, man-power requirement (regular and contract)
- viii. Process description along with major equipments and machineries, process flow sheet (quantities) from raw material to products to be provided
- ix. Hazard identification and details of proposed safety systems.
- x. Expansion/modernization proposals:
 - a. Copy of all the Environmental Clearance(s) including Amendments thereto obtained for the project from MOEF/SEIAA shall be attached as an Annexure. A certified copy of the latest Monitoring Report of the Regional Office of the Ministry of Environment and Forests as per circular dated 30th May, 2012 on the status of compliance of conditions stipulated in all the existing environmental clearances including Amendments shall be provided. In addition, status of compliance of Consent to Operate for the ongoing I existing operation of the project from SPCB shall be attached with the EIA-EMP report.
 - b. In case the existing project has not obtained environmental clearance, reasons for not taking EC under the provisions of the EIA Notification 1994 and/or EIA Notification, 2006 shall be provided. Copies of Consent to Establish/No Objection Certificate and Consent to Operate (in case of units operating prior to EIA Notification 2006, CTE and CTO of FY 2005-2006) obtained from the SPCB shall be submitted. Further, compliance report to the conditions of consents from the SPCB shall be submitted.


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SEIAA-TN

4) Site Details

- i. Location of the project site covering village, Taluka/Tehsil, District and State, Justification for selecting the site, whether other sites were considered.
- ii. A top sheet of the study area of radius of 10km and site location on 1:50,000/1:25,000 scale on an A3/A2 sheet. (including all eco-sensitive areas and environmentally sensitive places)
- iii. Details w.r.t. option analysis for selection of site
- iv. Co-ordinates (lat-long) of all four corners of the site.
- v. Google map-Earth downloaded of the project site.
- vi. Layout maps indicating existing unit as well as proposed unit indicating storage area, plant area, greenbelt area, utilities etc. If located within an Industrial area/Estate/Complex, layout of Industrial Area indicating location of unit within the Industrial area/Estate.
- vii. Photographs of the proposed and existing (if applicable) plant site. If existing, show photographs of plantation/greenbelt, in particular.
- viii. Landuse break-up of total land of the project site (identified and acquired), government/ private - agricultural, forest, wasteland, water bodies, settlements, etc shall be included. (not required for industrial area)
- ix. A list of major industries with name and type within study area (10km radius) shall be incorporated. Land use details of the study area
- x. Geological features and Geo-hydrological status of the study area shall be included.
- xi. Details of Drainage of the project upto 5km radius of study area. If the site is within 1 km radius of any major river, peak and lean season river discharge as well as flood occurrence frequency based on peak rainfall data of the past 30 years. Details of Flood Level of the project site and maximum Flood Level of the river shall also be provided. (mega green field projects)
- xii. Status of acquisition of land. If acquisition is not complete, stage of the acquisition process and expected time of complete possession of the land.


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xiii. R&R details in respect of land in line with state Government policy

5) Forest and wildlife related issues (if applicable):

- i. Permission and approval for the use of forest land (forestry clearance), if any, and recommendations of the State Forest Department. (if applicable)
- ii. Land use map based on High resolution satellite imagery (GPS) of the proposed site delineating the forestland (in case of projects involving forest land more than 40 ha).
- iii. Status of Application submitted for obtaining the stage I forestry clearance along with latest status shall be submitted.
- iv. The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, the project proponent shall submit the map duly authenticated by Chief Wildlife Warden showing these features vis-à-vis the project location and the recommendations or comments of the Chief Wildlife Warden-thereon.
- v. Wildlife Conservation Plan duly authenticated by the Chief Wildlife Warden of the State Government for conservation of Schedule I fauna, if any exists in the study area
- vi. Copy of application submitted for clearance under the Wildlife (Protection) Act, 1972, to the Standing Committee of the National Board for Wildlife.

6) Environmental Status

- i. Determination of atmospheric inversion level at the project site and site-specific micro-meteorological data using temperature, relative humidity, hourly wind speed and direction and rainfall.
- ii. AAQ data (except monsoon) at 8 locations for PM10, PM2.5, SO2, NOX, CO and other parameters relevant to the project shall be collected. The monitoring stations shall be based CPCB guidelines and take into account the pre-dominant wind direction, population zone and sensitive receptors including reserved forests.
- iii. Raw data of all AAQ measurement for 12 weeks of all stations as per frequency


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given in the NAQQM Notification of Nov. 2009 along with - min., max., average and 98% values for each of the AAQ parameters from data of all AAQ stations should be provided as an annexure to the EIA Report.

- iv. Surface water quality of nearby River (100m upstream and downstream of discharge point) and other surface drains at eight locations as per CPCB/MoEF&CC guidelines.
- v. Whether the site falls near to polluted stretch of river identified by the CPCB/MoEF&CC, if yes give details.
- vi. Ground water monitoring at minimum at 8 locations shall be included.
- vii. Noise levels monitoring at 8 locations within the study area.
- viii. Soil Characteristic as per CPCB guidelines.
- ix. Traffic study of the area, type of vehicles, frequency of vehicles for transportation of materials, additional traffic due to proposed project, parking arrangement etc.
- x. Detailed description of flora and fauna (terrestrial and aquatic) existing in the study area shall be given with special reference to rare, endemic and endangered species. If Schedule-I fauna are found within the study area, a Wildlife Conservation Plan shall be prepared and furnished.
- xi. Socio-economic status of the study area.

7) Impact and Environment Management Plan

- i. Assessment of ground level concentration of pollutants from the stack emission based on site-specific meteorological features. In case the project is located on a hilly terrain, the AQIP Modelling shall be done using inputs of the specific terrain characteristics for determining the potential impacts of the project on the AAQ. Cumulative impact of all sources of emissions (including transportation) on the AAQ of the area shall be assessed. Details of the model used and the input data used for modelling shall also be provided. The air quality contours shall be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any.
- ii. Water Quality modelling - in case of discharge in water body


MEMBER SECRETARY
SEIAA-TN

- iii. Impact of the transport of the raw materials and end products on the surrounding environment shall be assessed and provided. In this regard, options for transport of raw materials and finished products and wastes (large quantities) by rail or rail-cum road transport or conveyor-cum-rail transport shall be examined.
- iv. A note on treatment of wastewater from different plant operations, extent recycled and reused for different purposes shall be included. Complete scheme of effluent treatment. Characteristics of untreated and treated effluent to meet the prescribed standards of discharge under E(P) Rules.
- v. Details of stack emission and action plan for control of emissions to meet standards.
- vi. Measures for fugitive emission control
- vii. Details of hazardous waste generation and their storage, utilization and management. Copies of MOU regarding utilization of solid and hazardous waste in cement plant shall also be included. EMP shall include the concept of waste-minimization, recycle/reuse/recover techniques, Energy conservation, and natural resource conservation.
- viii. Proper utilization of fly ash shall be ensured as per Fly Ash Notification, 2009. A detailed plan of action shall be provided.
- ix. Action plan for the green belt development plan in 33 % area i.e. land with not less than 1,500 trees per ha. Giving details of species, width of plantation, planning schedule etc. shall be included. The green belt shall be around the project boundary and a scheme for greening of the roads used for the project shall also be incorporated.
- x. Action plan for rainwater harvesting measures at plant site shall be submitted to harvest rainwater from the roof tops and storm water drains to recharge the ground water and also to use for the various activities at the project site to conserve fresh water and reduce the water requirement from other sources.
- xi. Total capital cost and recurring cost/annum for environmental pollution control measures shall be included.
- xii. Action plan for post-project environmental monitoring shall be submitted.
- xiii. Onsite and Offsite Disaster (natural and Man-made) Preparedness and


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Emergency Management Plan including Risk Assessment and damage control. Disaster management plan should be linked with District Disaster Management Plan.

8) Occupational health

- i. Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers
- ii. Details of exposure specific health status evaluation of worker. If the workers' health is being evaluated by pre designed format, chest x rays, Audiometry, Spirometry, Vision testing (Far & Near vision, colour vision and any other ocular defect) ECG, during pre placement and periodical examinations give the details of the same. Details regarding last month analyzed data of above mentioned parameters as per age, sex, duration of exposure and department wise.
- iii. Details of existing Occupational & Safety Hazards. What are the exposure levels of hazards and whether they are within Permissible Exposure level (PEL). If these are not within PEL, what measures the company has adopted to keep them within PEL so that health of the workers can be preserved,
- iv. Annual report of health status of workers with special reference to Occupational Health and Safety.

9) Corporate Environment Policy

- i. Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report.
- ii. Does the Environment Policy prescribe for standard operating process / procedures to bring into focus any infringement / deviation / violation of the environmental or forest norms / conditions? If so, it may be detailed in the EIA.
- iii. What is the hierarchical system or Administrative order of the company to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions? Details of this system may be given.
- iv. Does the company have system of reporting of non compliances / violations of environmental norms to the Board of Directors of the company and / or


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shareholders or stakeholders at large? This reporting mechanism shall be detailed in the EIA report

- 10) Details regarding infrastructure facilities such as sanitation, fuel, restroom etc. to be provided to the labour force during construction as well as to the casual workers including truck drivers during operation phase.
- 11) Enterprise Social Commitment (ESC)
 - I. Adequate funds (at least 2.5 % of the project cost) shall be earmarked towards the Enterprise Social Commitment based on Public Hearing issues and item-wise details along with time bound action plan shall be included. Socio-economic development activities need to be elaborated upon.
- 12) Any litigation pending against the project and/or any direction/order passed by any Court of Law against the project, if so, details thereof shall also be included. Has the unit received any notice under the Section 5 of Environment (Protection) Act, 1986 or relevant Sections of Air and Water Acts? If so, details thereof and compliance/ATR to the notice(s) and present status of the case.
- 13) A tabular chart with index for point wise compliance of above TOR.

B. SPECIFIC TERMS OF REFERENCE FOR EIA STUDIES FOR CEMENT PLANTS

1. Limestone and coal linkage documents along with the status of environmental clearance of limestone and coal mines
2. Quantum of production of coal and limestone from coal & limestone mines and the projects they cater to;
3. For large Cement Units, a 3-D view i.e. DEM (Digital Elevation Model) for the area in 10 km radius from the proposal site.
4. Present land use shall be prepared based on satellite imagery. High-resolution satellite image data having 1m-5m spatial resolution like quick bird, Icons, IRS P-6 pan sharpened etc. for the 10 Km radius area from proposed site. The same shall be used for land used/land-cover mapping of the area.
5. If the raw materials used have trace elements, an environment management plan shall also be included.
6. Plan for the implementation of the recommendations made for the cement plants in the


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CREP guidelines must be prepared.

7. Energy consumption per ton of clinker and cement grinding
8. Provision of waste heat recovery boiler
9. Arrangement for use of hazardous waste.

The Executive summary of the EIA/EMP report in about 8-10 pages should be prepared incorporating the information on following points:

- 1) Project name and location (Village, District, State, Industrial Estate (if applicable).
- 2) Products and capacities. If expansion proposal then existing products with capacities and reference to earlier EC.
- 3) Requirement of land, raw material, water, power, fuel, with source of supply (Quantitative)
- 4) Process description in brief, specifically indicating the gaseous emission, liquid effluent and solid and hazardous wastes.
- 5) Measures for mitigating the impact on the environment and mode of discharge or disposal.
- 6) Capital cost of the project, estimated time of completion.
- 7) Site selected for the project - Nature of land - Agricultural (single/double crop), barren, Govt/ private land, status of its acquisition, nearby (in 2-3 km.) water body, population, with in 10km other industries, forest , eco-sensitive zones, accessibility, (note - in case of industrial estate this information may not be necessary)
- 8) Baseline environmental data - air quality, surface and ground water quality, soil characteristic, flora and fauna, socio-economic condition of the nearby population
- 9) Identification of hazards in handling, processing and storage of hazardous material and safety system provided to mitigate the risk.
- 10) Likely impact of the project on air, water, land, flora-fauna and nearby population
- 11) Emergency preparedness plan in case of natural or in plant emergencies
- 12) Issues raised during public hearing (if applicable) and response given
- 13) CSR plan with proposed expenditure.
- 14) Occupational Health Measures


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15) Post project monitoring plan

Besides the above, the below mentioned general points should also be followed:-

- a. A note confirming compliance of the TOR, with cross referencing of the relevant sections / pages of the EIA report should be provided.
- b. All documents may be properly referenced with index, page numbers and continuous page numbering.
- c. Copy of permission related to Port facility, Desalination plant, wind mill /solar power plant from competent Authority.
- d. Where data are presented in the report especially in tables, the period in which the data were collected and the sources should be indicated.
- e. While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF vide O.M. No. J-11013/41/2006-IA.II(I) dated 4th August, 2009, which are available on the website of this Ministry should also be followed.
- f. The consultants involved in the preparation of EIA/EMP report after accreditation with Quality Council of India (QCI)/National Accreditation Board of Education and Training (NABET) would need to include a certificate in this regard in the EIA/EMP reports prepared by them and data provided by other organization/Laboratories including their status of approvals etc. In this regard circular no F. No.J - 11013/77/2004-IA-II(I) dated 2nd December, 2009, 18th March 2010, 28th May 2010 , 28th June 2010 ,31st December 2010 & 30th September 2011 posted on the Ministry's website <http://www.moef.nic.in/> may be referred.

▪ After preparing the EIA (as per the generic structure prescribed in Appendix-III of the EIA Notification, 2006) covering the above mentioned points, the proponent will take further necessary action for obtaining environmental clearance in accordance with the procedure prescribed under the EIA Notification, 2006.


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SEIAA-TN

▪ The final EIA report shall be submitted to the SEIAA, Tamil Nadu for obtaining Environmental Clearance.

▪ The TORs prescribed shall be **valid for a period of three years** from the date of issue, for submission of the EIA/EMP report as per OMNo.J-11013/41/2006-IA-II(I)(part) dated 29th August 2017.

The receipt of this letter may be acknowledged.


MEMBER SECRETARY
SEIAA-TN

Copy to:

1. The Additional Chief Secretary to Government, Environment & Forests Dept, Govt. of Tamil Nadu, Fort St. George, Chennai - 9.
2. The Chairman, Central Pollution Control Board, PariveshBhavan, CBD Cum-Office Complex, East Arjun Nagar, New Delhi 110032.
3. The Member Secretary, Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai-600 032.
4. The APCCF (C), Regional Office, MoEF&CC (SZ),34, HEPC Building, 1st& 2nd Floor, Cathedral Garden Road, Nungampakkam, Chennai - 34.
5. Monitoring Cell, I A Division, Ministry of Environment & Forests, ParyavaranBhavan, CGO Complex, New Delhi 110003
6. The District Collector, Villupuram District
7. Stock File.

--X--X--X--

Annexure - XVII

Consent to Establishment



TAMILNADU POLLUTION CONTROL BOARD

Category of the Industry

ORANGE

CONSENT ORDER NO. 2101141030221 DATED: 23/09/2021.

PROCEEDINGS NO.F.1508VPM/OS/DEE/TNPCB/VPM/W/2021 DATED: 23/09/2021

SUB: TNPC Board-Consent for Establishment-M/S SAKTHI PRIYAN CEMENTS S.F No. 30/2, 30/3 & 30/4, DHEEVANUR Village, Tindivanam Taluk, Villupuram District - for the establishment or take steps to establish the industry under Section 25 of the Water (Prevention and control of Pollution) Act, 1974, as amended in 1988 (Central Act 6 of 1974)- Issued- Reg.

RRP: 1. Unit's application No. 41030221 submitted for CIE-new through OCMMS on 10/09/2021
2. IR. No : F.1508VPM/OS/AE/VPM/2021 dated 23/09/2021
3. Minutes of 210th DI CCC meeting held on 23/09/2021 (Item No. 210-14)

Consent to establish or take steps to establish is hereby granted under Section 25 of the Water (Prevention and control of Pollution) Act, 1974, as amended in 1988 (Central Act 6 of 1974) (hereinafter referred to as 'The Act') and the Rules and Orders made there under to

The Partner,
SAKTHI PRIYAN CEMENTS

Authorizing occupier to establish or take steps to establish the industry in the site mentioned below:

S.F. No 30/2, 30/3 & 30/4,
DHEEVANUR Village,
Tindivanam Taluk,
Villupuram District

This Consent to establish is valid upto March 31, 2026, or till the industry obtains consent to operate under Section 25 of the Water (Prevention and control of Pollution) Act, 1974, as amended in 1988 whichever is earlier subject to special and general conditions enclosed.

PALANISAMY (Digitally signed by P. Palanisamy
Date: 2021.09.23 16:56:26 +05'30')

District Environmental Engineer,
Tamil Nadu Pollution Control Board,
VILLUPURAM

To

The Partner,

M/S.SAKTHI PRIYAN CEMENTS,

M/S.SAKTHI PRIYAN CEMENTS S.F.No 30/2,30/3 & 30/4, Dheevanur Village, Tindivanam Taluk, Villupuram District

Pin: 604206

Copy to:

1. The Commissioner, NIYLAM-Panchayat Union, Tindivanam Taluk, Villupuram District.

2. Copy submitted to the Member Secretary, Tamil Nadu Pollution Control Board, Chennai for favour of kind information.

3. Copy submitted to the JCEI/Monitoring, Tamil Nadu Pollution Control Board, Vellore for favour of kind information.

File



TAMILNADU POLLUTION CONTROL BOARD

SPECIAL CONDITIONS

1. This consent to establish is valid for establishing the facility for the manufacture of products/byproducts (Col. 2) at the rate (Col 3) mentioned below. Any change in the product/byproduct and its quantity has to be brought to the notice of the Board and fresh consent has to be obtained.

Sl. No.	Description	Quantity	Unit
Product Details			
1.	Portland Pozzolana Cement (PPC)	100	Ton/Day

2. The unit shall provide Sewage Treatment Plant and /or Effluent Treatment Plant as indicated below.

a Sewage Treatment Plant:			
Treatment status: Septic Tank and SP/DT			
Sl. No.	Name of the Treatment Unit	No. of Units	Dimensions in metres
1.	Septic Tank	1	2.0 x 1.5 x 1.5
2.	Soak Pit	1	1.5 Dia x 1.5
b Effluent Treatment Plant:			
Treatment status: No trade effluent and hence does not arise			
Sl. No.	Name of the Treatment Unit	No. of Units	Dimensions in metres
1.			

3. This consent to establish is valid for establishing the facility with the below mentioned outlets for the discharge of sewage/trade effluent. Any change in the outlets and the quantity has to be brought to the notice of the Board and fresh consent has to be obtained.

Outlet No.	Description of Outlet	Maximum daily discharge in KLD	Point of disposal
Effluent Type : Sewage			
1.	Sewage	1.0	On Industry's own land
Effluent Type : Trade Effluent			

4. Additional Conditions:

1. The unit shall provide the septic tank and soak pit arrangements for the treatment and disposal of sewage into industry's own land.
2. The unit shall ensure that no trade effluent shall be generated from its process under any circumstances.
3. The unit shall provide and maintain the Rain Water Harvesting system within the premises so as to recharge the ground water in that area.
4. The unit shall not evoke any public complaints due to its establishment activity.
5. The unit shall provide compound wall on all sides of the periphery of the unit.
6. The unit shall not use 'use and throwaway plastics' such as plastic sheets used for food wrapping, spreading on dining table etc., plastic plates, plastic coated tea cups, plastic tumbler, water pouches and packets, plastic straw, plastic carry bag and plastic flags irrespective of thickness, within the industry premises. Instead unit shall encourage use of eco-friendly alternative such as banana leaf, arecanut palm plate, stainless steel, glass, porcelain plates/cups, cloth bag, jute bag etc.
7. In case of revision of consent fee by the government, the unit shall remit the difference in amount within one month from the date of notification. Failing to remit the consent fee, this consent order will be withdrawn without any notice and further action will be initiated against the unit as per law.

PALANISAMY
Digitally signed by PALANISAMY
 Date: 2021.09.21 20:56:55
 +05:30'
 District Environmental Engineer,
 Tamil Nadu Pollution Control Board,
 VILU PURAM



TAMILNADU POLLUTION CONTROL BOARD

GENERAL CONDITIONS

1. This consent to establish cannot be construed as consent to operate and the unit shall not commence the operation without obtaining the Consent to operate.
2. The applicant shall make a request for grant of consent to operate at least thirty days, before the commissioning of trial production.
3. Any Change in the details furnished in the conditions has to be brought to the notice of the Board and got approved by the Board, before obtaining consent to operate under the said Act.
4. The unit has to comply with the provisions of Public Liability Insurance Act, 1991 to provide immediate relief in the event of any hazard to human beings, other living creatures/plants and properties while handling and storage of hazardous substances (wherever applicable).
5. Consent to operate will not be issued unless the unit complies with the conditions of consent to establish.
6. The unit shall provide adequate water sprinklers for the control of dust emission during the loading and unloading of construction material so as to minimize the dust emission.
7. The unit shall provide water sprinklers along the temporary roads inside the premises to avoid fugitive dust emission during the vehicle movements.
8. The unit shall develop green belt of adequate width around the premises.
9. In case there is any change in the management, the unit shall inform the change with relevant documents immediately.

PALANISAMY Deputy Director, Palanisamy
Distt. Villupuram 605 001
District Environmental Engineer,
Tamil Nadu Pollution Control Board,
VILLUPURAM



TAMILNADU POLLUTION CONTROL BOARD



TAMILNADU POLLUTION CONTROL BOARD

Category of the Industry :

ORANGE

CONSENT ORDER NO. 2101241030221 DATED: 23/09/2021.

PROCEEDINGS NO.F.1508VPM/OS/DEE/TNPCB/VPM/A/2021 DATED: 23/09/2021

SUB: TNPC Board-Consent for Establishment-M/s. SAKTHI PRIYAN CEMENTS . S.F. No. 30/2, 30/3 & 30/4, DHEEVANUR village, Tindivanam Taluk and Villupuram District - for the establishment or take steps to establish the industry under Section 21 of the Air(Prevention and control of Pollution)Act,1981, as amended in 1987(Central Act, 14 of 1981)-Issued -Reg.

REF: 1.Unit's application No. 41030221 submitted for CTE-new through OCMMS on 10/09/2021
2.IR. No : F.1508VPM/OS/AE/VPM/2021 dated 23/09/2021
3.Minutes of 210th DJ.CCC meeting held on 23/09/2021 (Item No. 210-14)

Consent to establish or take steps to establish is hereby granted under Section 21 of the Air (Prevention and control of Pollution) Act,1981, as amended in 1987 and the Rules and Orders made there under to

The Partner,
M/s. SAKTHI PRIYAN CEMENTS
S.F No.30/2, 30/3 & 30/4,
DHEEVANUR Village,
Tindivanam Taluk,
Villupuram District.

Authorizing occupier to establish or take steps to establish the industry in the site mentioned below:

S.F No. 30/2, 30/3 & 30/4,
DHEEVANUR Village,
Tindivanam Taluk,
Villupuram District

This Consent to establish is valid upto **March 31, 2026**, or till the industry obtains consent to operate under Section 21 of the Air (Prevention and control of Pollution) Act, 1981, as amended in 1987 whichever is earlier subject to special and general conditions enclosed.

PALANISAMY Digitally signed by PALANISAMY
Date: 2021.09.23 10:34:45
+05'30'
District Environmental Engineer,
Tamil Nadu Pollution Control Board,
VILLUPURAM

To
The Partner,
M/S SAKTHI PRIYAN CEMENTS,
M/S SAKTHI PRIYAN CEMENTS S.F No 30/2, 30/3 & 30/4, Dheevanur Village, Tindivanam Taluk, Villupuram District,
Pin: 604206

Copy to:
1.The Commissioner, MYLAM-Panchayat Union, Tindivanam Taluk, Villupuram District.



TAMILNADU POLLUTION CONTROL BOARD

2. Copy submitted to the Member Secretary, Tamil Nadu Pollution Control Board, Chennai for favour of kind information
3. Copy submitted to the JCTE-Monitoring, Tamil Nadu Pollution Control Board, Vellore for favour of kind information
4. Title
.....



TAMILNADU POLLUTION CONTROL BOARD

SPECIAL CONDITIONS

1. This consent to establish is valid for establishing the facility for the manufacture of products/byproducts (Col. 2) at the rate (Col 3) mentioned below. Any change in the product/byproduct and its quantity has to be brought to the notice of the Board and fresh consent has to be obtained.

Sl. No.	Description	Quantity	Unit
Product Details			
1.	Portland Pozzolana Cement (PPC)	100	Ton/Day

2. This consent to establish is valid for establishing the facility with the below mentioned emission/noise sources along with the control measures and/or stack. Any change in the emission source/control measures/change in stack height has to be brought to the notice of the Board and fresh consent has to be obtained if necessary.

I Point source emission with stack :				
Stack No.	Point Emission Source	Air pollution Control measures	Stack height from Ground Level in m	Gaseous Discharge in Nm ³ /hr
1	D.G.Set - 250 KVA	Acoustic enclosures with stack	3.5	
II Fugitive/Noise emission :				
Sl. No.	Fugitive or Noise Emission sources	Type of emission	Control measures	
1.	OPC Cement Silo	Fugitive	Common Dust Collector with bag	
2.	Fly Ash Silo	Fugitive	Common Dust Collector with bag	
3.	PPC Storage Silo	Fugitive	Common Dust Collector with bag	
4.	D.G.Set - 250 KVA	Noise	Acoustic Enclosure	

3. **Special Additional Conditions:**
The unit shall install the approved retrofit emission control device/equipment with at least 70% Particulate matter reduction efficiency on all DG sets with capacity of 125 KVA and above or otherwise the unit shall be shift to gas based generators within the time frame prescribed in the notification No. TNPCB/Labs/DD(I)02151/2019 dated 10.06.2020 issued by TNPCB.
4. **Additional Conditions:**



TAMILNADU POLLUTION CONTROL BOARD

1. The unit shall install, operate and maintain all the Air Pollution Control measures in the processing area so as to satisfy the Ambient Air Quality/Emission standards prescribed by the Board.
2. The unit shall adhere to the Ambient Noise Level standards prescribed by the Board.
3. The unit shall develop adequate green belt with trees having thick canopy cover on all sides of periphery of the unit.
4. The unit shall comply with the provisions of the Plastic Waste Management Rules, 2016 as amended.
5. The unit shall not use 'use and throwaway plastics' such as plastic sheets used for food wrapping, spreading on dining table, etc., plastic plates, plastic coated tea cups, plastic tumbler, water pouches and packets, plastic straw, plastic carry bag and plastic flags irrespective of thickness, within the industry premises. Instead unit shall encourage use of eco friendly alternative such as banana leaf, arecanut palm plate, stainless steel, glass, porcelain plates/cups, cloth bag, jute bag, etc.,
6. In case of revision of consent fee by the government, the unit shall remit the difference in amount within one month from the date of notification. Failing to remit the consent fee, this consent order will be withdrawn without any notice and further action will be initiated against the unit as per law.

PALANISAMY (By) Digitally signed by PALANISAMY
Date: 2024.09.23 20:55:17 +05'30'
District Environmental Engineer,
Tamil Nadu Pollution Control Board,
VILLUPURAM



TAMILNADU POLLUTION CONTROL BOARD

GENERAL CONDITIONS

1. This consent to establish cannot be construed as consent to operate and the unit shall not commence the operation without obtaining the Consent to operate.
2. The applicant shall make a request for grant of consent to operate at least thirty days, before the commissioning of trial production.
3. Any Change in the details furnished in the conditions has to be brought to the notice of the Board and got approved by the Board, before obtaining consent to operate under the said Act.
4. The unit has to comply with the provisions of Public Liability Insurance Act, 1991 to provide immediate relief in the event of any hazard to human beings, other living creatures/plants and properties while handling and storage of hazardous substances (wherever applicable).
5. Consent to operate will not be issued unless the unit complies with the conditions of consent to establish.
6. The unit shall provide adequate water sprinklers for the control of dust emission during the loading and unloading of construction material so as to minimize the dust emission.
7. The unit shall provide water sprinklers along the temporary roads inside the premises to avoid fugitive dust emission during the vehicle movements.
8. The unit shall develop green belt of adequate width around the premises.
9. In case there is any change in the management, the unit shall inform the change with relevant documents immediately.

PALANISAMY Digitally signed by PALANISAMY
Date: 2019.11.05 15:44:55 +05'30'

District Environmental Engineer,
Tamil Nadu Pollution Control Board,
VILLUPURAM