Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

Project Address: **M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.**

CHAPTER 1

INTRODUCTION

1. PURPOSE OF THE REPORT

Every anthropogenic activity has its associated impacts on the environment. Consequently, there is a need to harmonize developmental activities with the environmental concerns. It is of prime importance to ensure that the development options under consideration are sustainable. In doing so, environmental consequences must be characterized early in the project cycle and accounted in the project.

Environmental Impact Assessment (EIA) is one of the important tools to understand and then to take corrective measures to control the undesirable impacts on the environment. As per the EIA notification dated 14th September 2006 as amended thereof; it is mandatory to prepare an Environmental Impact Assessment (EIA) report to assess the potential environmental impacts of any proposed expansion or modification of industrial projects.

The project obtained Consent to Operate (CTO) NOC on 11.10.2023 from MPCB.

The project is currently in the operational phase, occupying a total building area of 5084.17 m^2 with ground coverage of 3404.22 m^2. This EIA report addresses the Proposed Establishment of "Magnum" Ice Cream Plant by M/s Hindustan Unilever Ltd. "Magnum" Ice Cream Plant, with a total production capacity of 6250 MT/Annum including proposed Magnum Plant.

1.1 PROJECT PROPONENT

In 1913, Unilever established its first Indian subsidiary, the Hindustan Vanaspati Manufacturing Company. This was followed by the creation of Lever Brothers India Limited in 1933 and United Traders Limited in 1935. In November 1956, these three companies merged to form Hindustan Unilever Limited (HUL). Today,

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

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HUL is India's largest fast-moving consumer goods (FMCG) company, with over 50 brands across 15 different categories, including essentials like tea, coffee, deodorants, haircare, and skincare.

The Nashik plant of HUL is one of the company's largest Foods & Refreshments (F&R) sites. The facility is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001, covering an area of xx square meters. This EIA report addresses the Proposed Establishment of "Magnum" Ice Cream Plant by M/s Hindustan Unilever Ltd. "Magnum" Ice Cream Plant, with a total production capacity of 6250 MT/Annum including proposed Magnum Plant. The details of the project proponent are mentioned in Table 1.1.

TABLE-1.1-DETAILS OF PROJECT PROPONENT

Project Proponent	Hindustan Unilever Ltd.
Name	Chethan Goud
Designation	Safety Executive
Address	A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India
Pin Code	422001
Email	chethana.goud@unilever.com
Phone No.	9742151347

1.2 PROJECT BACKGROUND AND ENVIRONMENT CONSULTANT ENGAGEMENT

The proposed industrial project falls under the EIA Notification dated 14th September 2006, along with subsequent amendments. As such, the project is subject to the preparation of an EIA report in accordance with the guidelines outlined in the EIA Notification dated 14.09.2006. **HUL Nashik** has appointed **M/s Life First Solutions Pvt. Ltd.** to conduct the Environment Impact Assessment Study for the project.

All sampling and analysis has been conducted by external NABL and MoEF & CC accredited Laboratory.

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1.3 GENERAL INFORMATION

The project is on a land measuring xx m^2 with total building area of 5084.17 m^2 & ground coverage of 3404.22 m is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001. This EIA report addresses the Proposed Establishment of "Magnum" Ice Cream Plant in the existing HUL factory by M/s Hindustan Unilever Ltd. "Magnum" Ice Cream Plant, with a total production capacity of 6250 MT/Annum including proposed Magnum Plant. The project is planned as per the guidelines of the Maharashtra Industrial Development Corporation (MIDC) and MoEF & CC. The coordinates of the project site along with its brief connectivity are shown in **Table 1.2**.

TABLE-1.2-COORDINATES AND CONNECTIVITY

Parameters	Description		
Location	A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, 422001		
Coordinates	**S. No.**	**Latitude**	**Longitude**
	1.	19°86'82"N	73°97'76"E
	2.	19°86'71"N	73°97'78"E
	3.	19°86'64"N	73°97'96"E
	4.	19°86'74"N	73°97'74"E
Total building area	5084.17 m^2		
Nearest Town	Malegaon Town		
Nearest Railway Station	Devlali Train Station		
Nearest Airport	Gandhinagar Army Airport		

Source: Site Visit & Satellite imagery of Project Area, Google Earth Inc, USA

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Pictogram of the proposed project is shown in Figure 1.1

1.3 THE STUDY

This EIA report addresses the likely environmental impacts of the establishment project in addition to the findings of the Risk Assessment (hereinafter referred to as "RA") study and the On-site Emergency Management Plan/ Disaster Management Plan (hereinafter referred to as "DMP").

During preparation of EIA report of the project, all the parameters mentioned in the table below have been taken into consideration. Study area for the project has been taken as 10 km from the project site. The baseline data has been taken as collected for March 2024 & June 2024; to determine the existing conditions of various environmental attributes and are outlined in **Table 1.3**

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TABLE-1.3-ENVIRONMENTAL ATTRIBUTES AND FREQUENCY OF MONITORING

S. No.	Attributes	Parameters	Frequency/ Methodology
1.	Ambient Air Quality	PM10, PM2.5, SO2, NOX, CO	As per CPCB guidelines
2.	Meteorology	Wind speed and direction, temperature, relative humidity, rainfall and cloud cover	At Site, continuous for study period With hourly recording and from secondary sources like IMD station Safdarjung, Delhi
3.	Water quality	Physical, Chemical and Bacteriological parameters	Ground water samples and surface Water samples were collected during the study period.
4.	Ecology	Existing terrestrial and aquatic flora and fauna within 10 km radius circle	Primary Inventory and Secondary Data collection.
5.	Noise levels	Noise levels in dB(A)	Noise quality monitoring
6.	Soil Characteristics	Physicochemical soil quality	Soil quality monitoring
7.	Land use /Land cover	Land use classification for different categories as per NRSA	Based on Survey of India Toposheet from NRSC; Survey of India OSM and ground truth collection using Sophisticated image processing and IS software have been used
8.	Socio-economic Status	Demographic and Working Status	On the basis of, Census of India – 2011 and primary consultations
9.	Drainage Pattern & Hydrology	Pattern and nature of streams	Site survey & based on data Collected from secondary sources like Survey of India Maps Hydrology Atlas of India, CGWB etc.
10.	Risk assessment and Disaster Management	Identification of areas where disaster can occur by fires and	Site specific Hazard Identification and Risk assessment (as and when

	Plan	release of toxic substances	there is change in quantity of hazardous materials or process at site)

Source: (i) Guidelines of Central Pollution Control Board, New Delhi, (ii) Model Terms of Reference (iii) Survey of India (iv) Census of India (v) CGWB (vi) Field Survey.

1.4 ENVIRONMENT CLEARANCE PROCESS

Environmental clearance of any new project or expansion of existing projects adheres to the Gazette notification of the Ministry of Environment and Forests & Climate Change (MoEF & CC), Govt. of India dated 14th September, 2006 and amended till date. According to the notification, project requires prior environmental clearance from competent central govt. or state govt. authorities, as may be the case. The projects are further classified into Category A or Category B projects based on spatial extent of potential impacts on human health, natural and man-made resources. Category A projects require prior clearance by the MoEF & CC, Govt. of India while the Category B projects requires clearance from the State level Environment Impact Assessment Authority (SEIAA), constituted by the Central Government for this purpose. In the absence of duly constituted SEIAA/SEAC, a Category 'B' project shall be treated as Category 'A" project.

The environment clearance procedure for Industrial Development project will require maximum of three stages. These stages are as follows:

Stage 1- Screening: It refers to the definite assignment of environmental category to projects or activities where the same is not completely specified. In case of Category 'B' projects, scrutiny of application at State level to categorize project in 'B1' or 'B2' is done.

Stage 2 - Scoping: It refers to the process where EAC or SEAC determines detailed and comprehensive TOR for the EIA report and can also include site visits by the committee if required.

Stage 3-Appraisal: This refers to detailed scrutiny of the application and EIA report to make categorical recommendations to the regulatory authority. The process of environmental clearance for the project is shown in the schematic diagram **Fig 1.2.**

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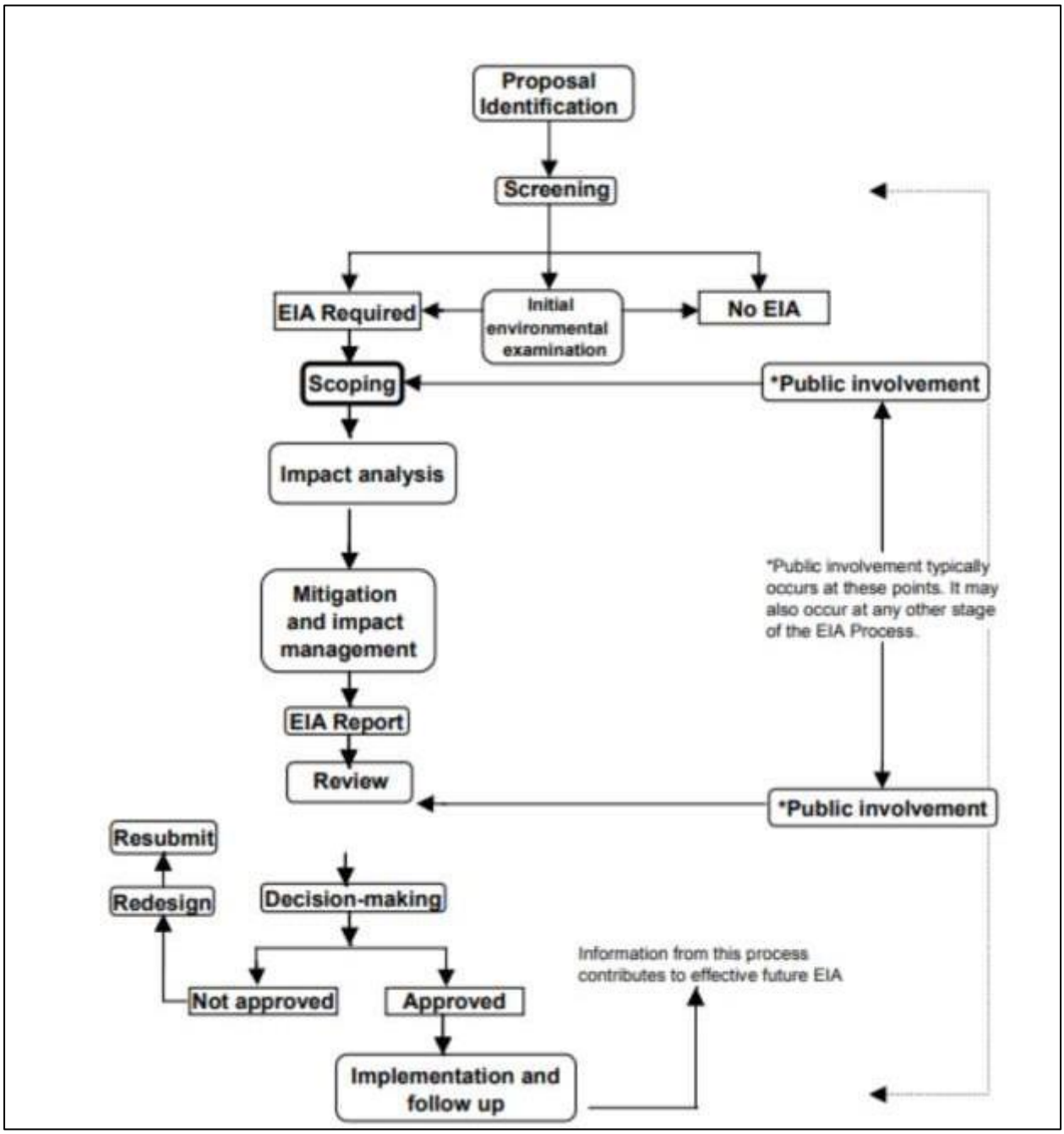

FIG-1.2-FLOW CHART OF ENVIRONMENT CLEARANCE

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

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1.6 LEGISLATIVE & REGULATORY FRAMEWORK

The environmental regulations, legislations and policy guidelines and control that may impact the project are the responsibility of a various Government agencies. The principal environmental regulatory agency in India is the Ministry of Environment and Forests & Climate Change (MoEF & CC), Delhi that formulates environmental policies and also accords environmental clearance for different projects. These legal enactments can be broadly classified in the terms of focus areas, viz. pollution, natural resources and linkages

between pollution and natural resources. The important environmental legislations related to environmental clearance for new projects are briefly described in the Table 1.4.

The MoEF & CC is the nodal agency to set up policy and standards for the protection of environment, along with Central Pollution Control Board (CPCB). This includes air, noise, water and hazardous waste standards. The relevant standards, which are of significance to the project, are discussed in the table below:

TABLE-1.4-KEY ENVIRONMENTAL LEGISLATION

Name	Scope and Objectives	Key Areas	Operational Agencies
Water (Prevention and Control of Pollution) Act 1974	To provide for prevention & of water pollution and enhancing water quality	Control of sewage and industrial effluent discharges	Central and State Pollution Control Boards
Air (Prevention and Control of Pollution) Act 1981	To provide for the prevention and control of air pollution	Controls emission and air pollutants	Central and State Pollution Control Boards
Forest Conservation Act 1980	To halt rapid deforestation & resulting environment degradation	Restriction on de-Reservation & using forest for non-forest purpose	Forest Department
Environment Protection Act 1986; Environment Protection Rules1986 its Subsequent amendments on time to time	To provide for the protection And improvement of environment	An umbrella legislation; Supplement pollution laws	Central Govt. MoEF, can delegate power to Dept. of environment, CPCB & SPCB
Noise Pollution	To control & take measure	Noise in urban area and	Central Government, nodal

(Prevention & Control) Rules 2000	for abatement of noise and that level doesn't cross standard	Around industrial sites	Agencies MoEF&CC, State governments
Hazardous and Other Wastes (Management And Transboundary Movement) Rules, 2016.	To the adequate handling of hazardous materials or wastes	Hazardous waste generated from the industrial activity	MoEF & CC, CPCB & SPCB
Solid Waste Management Rules, 2016.	To regulate the management And handling of the municipal solid wastes	Municipal Solid Waste Generated from Domestic Activity	MoEF & CC, CPCB, SPCB & Local Authorities
Wetlands (Conservation And Management) Rules, 2017	Protection of Wetlands & Birds	Bird Conservation, wetland rejuvenation	Forest Department

Central Pollution Control Board has set certain pollution standards in the Environment (Protection) Rules 1986 and its subsequent amendments on time to time. These standards are generally applicable to air environment, noise environment and water environment.

1.7 REPORT STRUCTURE

The overall contents of the EIA report has been prepared as per the generic structure prescribed in the Appendix III of EIA Notification issued by Ministry of Environment & Forests, Govt. of India on 14th September 2006 and subsequent amendments. The report consists of ten chapters. However, the Cost Benefit Analysis chapter is required in Chapter 9 if it is recommended at the scoping stage. Since, it is not recommended in ToR, hence, this chapter is not covered in this report. In this context, the content of the chapters is briefly described in this section.

Chapter-1 Introduction: The present chapter gives basic information about the project proponent along with project background. It also discusses purpose and scope of the EIA study.

Chapter-2 Description of the Project: This chapter provides information related to various features of the proposed project incorporating land, water and power requirements, parking needs other proposed infrastructure facilities.

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

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Chapter-3 Meteorology: This chapter describes about the Meteorology which is the scientific study of atmospheric conditions and their impact on weather and climate. Meteorology plays a crucial role in understanding how pollutants are dispersed, transported, and diffused in the environment. Factors such as wind speed, wind direction, temperature, turbulence, and humidity significantly influence air pollution levels.

Chapter- 4 Air & Water Environment: This chapter provides the evaluation of air and water environments which is crucial to ensure that industrial projects are developed sustainably, minimizing environmental damage and complying with regulatory standards. The EIA requires monitoring baseline air quality to assess key pollutants such as particulate matter (PM10, PM2.5), nitrogen oxides (NOx), sulfur dioxide (SO2), carbon monoxide (CO), and volatile organic compounds (VOCs). Predictive dispersion models are employed to estimate the spread of pollutants during both construction and operational phases. Mitigation strategies, such as dust control, emissions reduction, and continuous air quality monitoring, are designed to minimize adverse effects on human health and the environment.

The baseline data for surface and groundwater quality is collected, focusing on parameters such as pH, total dissolved solids (TDS), biological oxygen demand (BOD), chemical oxygen demand (COD), and the presence of heavy metals. This chapter evaluates potential impacts on local water resources, including contamination risks, changes in water flow, and depletion. Water management strategies, including wastewater treatment, recycling, and conservation measures, are proposed to protect water bodies and maintain ecosystem balance.

Together in this chapter, these assessments provide a comprehensive understanding of the environmental impacts related to air and water, ensuring that industrial projects are developed responsibly while mitigating pollution and preserving natural resources.

Chapter- 5 Noise Environment: This chapter describes the noise environment which is evaluated to assess potential noise pollution from Existing & proposed industrial activities. Baseline noise levels are measured in key areas industrial zones to determine the existing noise conditions. Predictive modeling is then used to estimate noise levels during both construction and operational phases of a project. The assessment considers sources like machinery, transportation, and site operations. Mitigation measures, such as installing noise barriers, using quieter equipment, and implementing restricted operating hours,

are recommended to minimize the impact on nearby communities and comply with regulatory noise standards.

Chapter-6 Soil Environment: This chapter describes the soil environment & also assess the impact of industrial activities on soil quality and land use. Baseline studies involve sampling soil at various locations to analyze its physical and chemical properties, including texture, pH, nutrient content, and contaminant levels. The assessment identifies potential risks such as erosion, contamination from chemicals, or degradation due to construction activities. Mitigation measures are proposed, including proper waste management, soil conservation techniques, and remediation plans, to protect soil health and maintain its productivity, ensuring compliance with environmental regulations.

Chapter-7 Biological Environment: This chapter describes the flora and fauna in and around the project area. Baseline studies assess the biodiversity, including endangered and endemic species, habitats, and ecosystems. The impact of the proposed development on terrestrial and aquatic ecosystems is evaluated, considering factors like habitat destruction, pollution, and changes in land use. The assessment also identifies sensitive or protected areas, such as wildlife sanctuaries or wetlands. Mitigation measures are suggested to minimize biodiversity loss, such as habitat restoration, conservation plans, and biodiversity monitoring, ensuring ecological balance and compliance with environmental regulations.

Chapter-8 Demography, Socio Economic & Land use pattern: This chapter describes the crucial components to understand the human environment surrounding a project. The demographic analysis examines the population structure, growth trends, and density of the area. Socio-economic studies focus on the livelihood, employment, income levels, education, healthcare, and quality of life of local communities, assessing how the project might affect them positively or negatively. Land use pattern analysis includes studying the current utilization of land for agriculture, housing, industry, and natural ecosystems, along with potential changes due to the project. The assessment identifies areas where the project could displace communities, alter traditional land use, or bring economic opportunities, recommending measures to mitigate adverse social and economic impacts while promoting sustainable development.

Chapter-9 Air Quality predictions through Mathematical Modelling: This chapter describes the air quality predictions to understand how a project may affect the local atmosphere. These predictions are

made using mathematical modeling techniques that simulate the dispersion, transportation, and concentration of pollutants emitted from industrial or construction activities. The most commonly used models, such as AERMOD, CALPUFF, or Gaussian Plume Models, factor in meteorological conditions like wind speed, wind direction, temperature, and atmospheric stability to estimate the spread of pollutants.

These models calculate the Ground-Level Concentration (GLC) of pollutants, such as particulate matter (PM10, PM2.5), nitrogen oxides (NOx), sulfur dioxide (SO2), and volatile organic compounds (VOCs), to assess potential air quality impacts. The predictions help to identify areas where pollutant levels may exceed permissible limits, highlighting sensitive receptors like residential areas, schools, or hospitals. The modeling process supports the design of mitigation strategies, such as emission controls, and helps ensure compliance with national ambient air quality standards (NAAQS).

Chapter-10 Environmental Management Plan: This chapter describes the vital part of the Environmental Impact Assessment (EIA) process, aimed at mitigating and managing potential environmental impacts throughout a project's lifecycle. It outlines strategies for minimizing harm to air, water, soil, noise, and biodiversity during construction, operation, and decommissioning. The EMP includes mitigation measures, regular monitoring of environmental conditions, and procedures for waste management and emergency response. It assigns specific roles for implementation, ensures continuous staff training, and promotes compliance with environmental regulations. The plan is adaptable, evolving based on monitoring outcomes, ensuring ongoing protection of the environment.

CHAPTER 2

PROJECT DESCRIPTION

In 1913, Unilever established its first Indian subsidiary, the Hindustan Vanaspati Manufacturing Company. This was followed by the creation of Lever Brothers India Limited in 1933 and United Traders Limited in 1935. In November 1956, these three companies merged to form Hindustan Unilever Limited (HUL). Today, HUL is India's largest fast-moving consumer goods (FMCG) company, with over 50 brands across 15 different categories, including essentials like tea, coffee, deodorants, haircare, and skincare.

The Nashik plant of HUL is one of the company's largest Foods & Refreshments (F&R) sites. The facility is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India – 422001. The geographical coordinates of the plant are approximately 19°86'82"N latitude and 73°97'76"E longitude.

This EIA report addresses the Proposed Establishment of "Magnum" Ice Cream Plant by M/s Hindustan Unilever Ltd. "Magnum" Ice Cream Plant, with a total production capacity of 6250 MT/Annum including proposed Magnum Plant.

HUL is dedicated to continually improving the management of its environmental impact, with a long-term goal of developing a sustainable business. Unilever will collaborate with others to promote environmental stewardship, enhance awareness of environmental issues, and share best practices.

The total plot area of the project is XX m2. Earlier, the project has obtained the Consent to Establish (CTE) NOC from Maharashtra State Pollution Control Board (MPCB) on a total building area of 5084.17 m² with ground coverage of 3404.22 m²**.** Then, the project obtained Consent to Operate (CTO) NOC from MPCB is attached.

2.1 SITE LOCATION & SURROUNDING

The 500 m buffer map showing the location of the project and 10 km & 15 km map showing physical features are shown in Figure 2.1 (A) and Figure 2.1 (B) respectively

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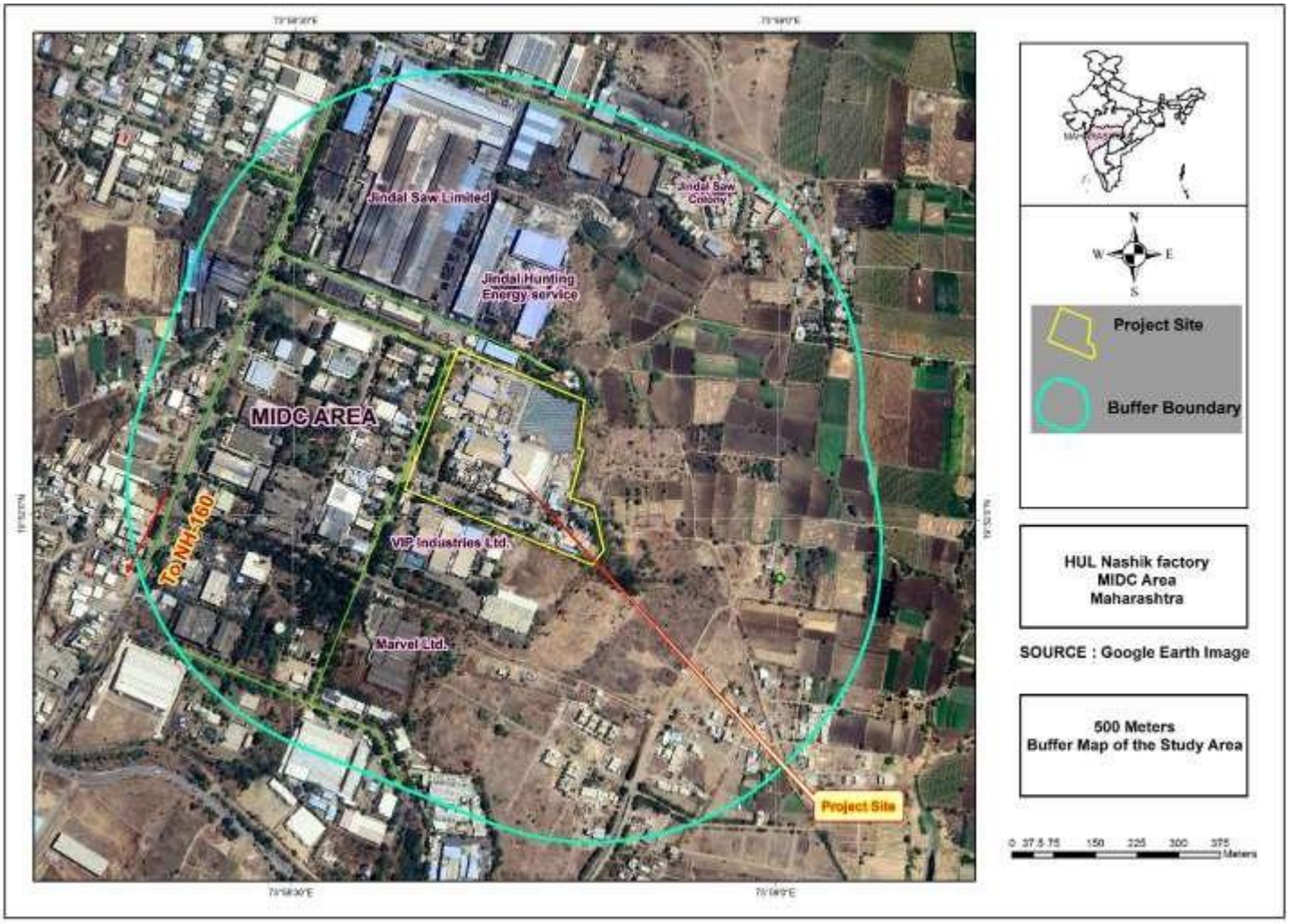

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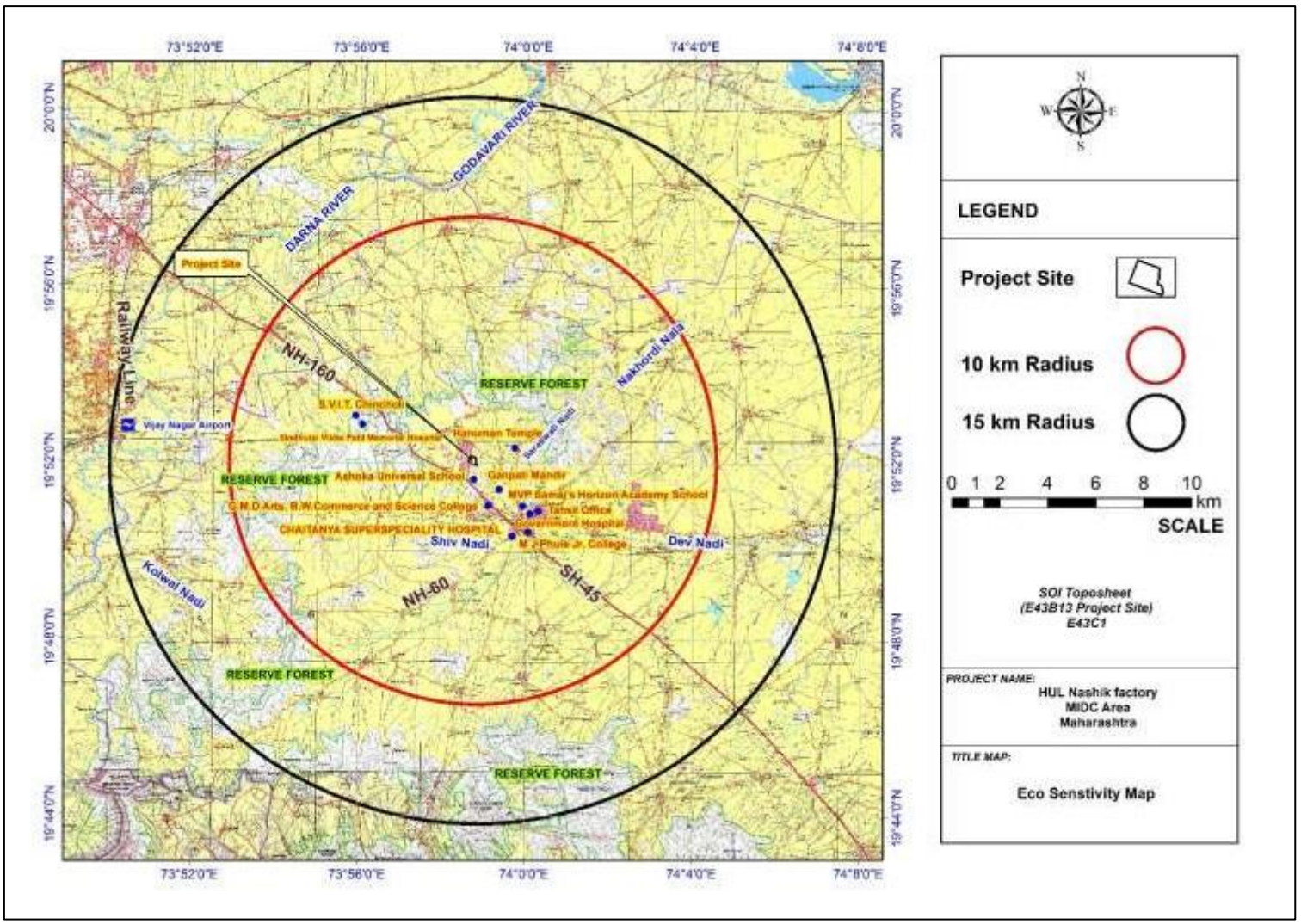

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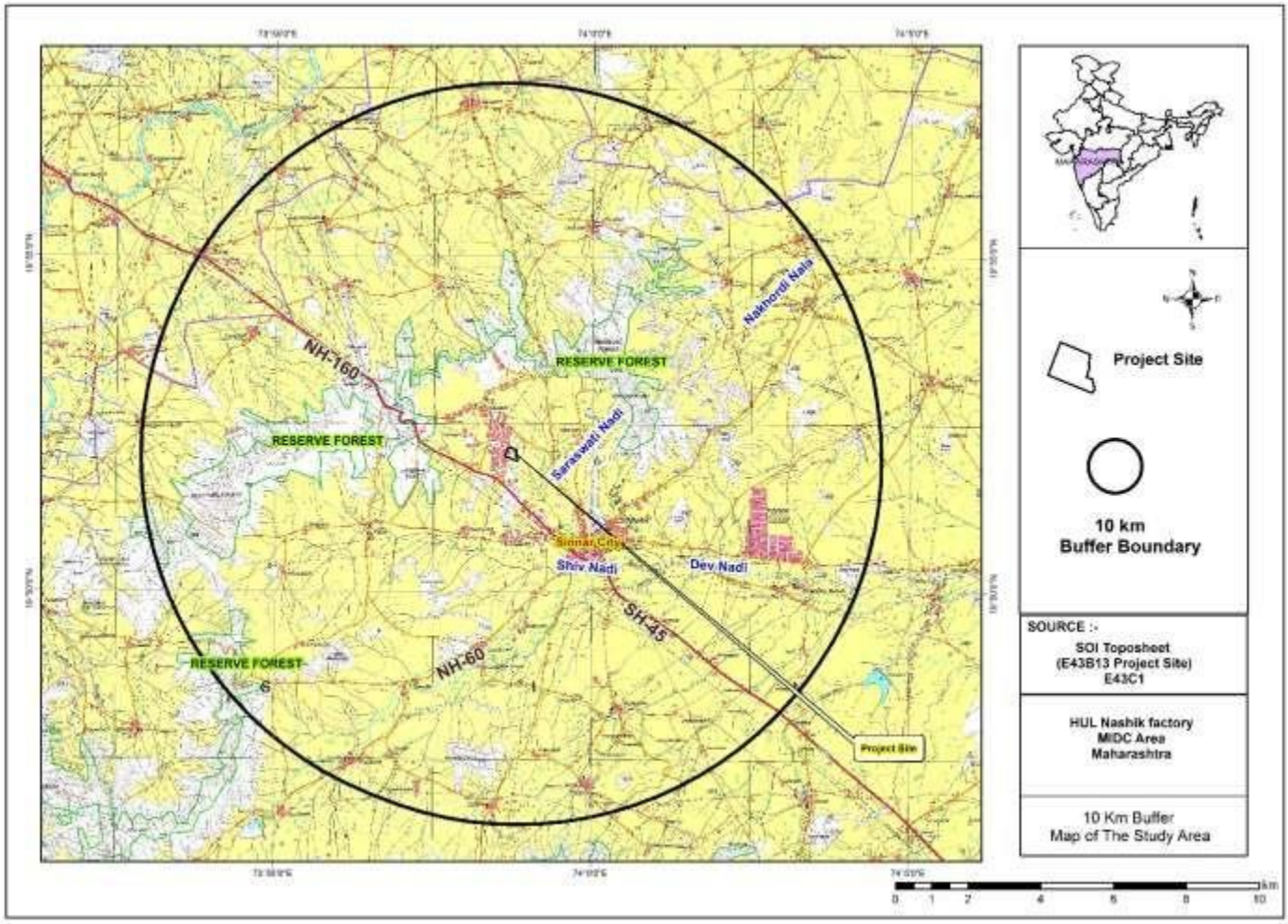

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The site is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001. The project site is around approx. 15 km (aerial distance) from Devlali Train Station in West direction. Gandhinagar Army Airport is around approx. 20.6 km in WNW direction. The project site is well connected with road and rail network. The details of nearest amenities for site connectivity as given in table 2.1 (A).

Site Surrounding:

The details of surrounding features of the project site are presented in **Table 2.1 (A) (Site Connectivity) and Table 2.1 (B) Nearest Amenities.**

TABLE-2.1(A)-SITE CONNECTIVITY

S. No.	Surrounding Features	Name	Aerial Distance & Direction from the Project Site
1.	Nearest Highway	NH-160A	4 km; S
2.	Nearest Railway Station	Devlali Train Station	15 km; W
3.	Nearest Airport	Gandhinagar Army Airport	20.6 km; WNW

TABLE-2.1(B)-NEAREST AMENITIES

S. No.	Surrounding Features	Name	Aerial Distance & Direction from the Project Site
1.	Nearest Temple	Hanuman Temple (Maparwadi)	1.66 km; ENE
2.	Nearest School	Ashoka Universal School	0.6 km; S
3.	Nearest Hospital	Chaitanya Super-Specialty Hospital	3.3 km; SE
4.	Administrative Building	Tahsil Office	3 km; SE
5.	Nearest River	Godavari River	11.5 km; N
6.	Eco-Sensitive Zone	Reserve Forest	10.7 km; S

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7.	Nearest City	Sinnar City	3 km; SE
8.	Nearest Town	Malegaon Town	1 km; NW

2.2 LAND USE OF PROJECT SITE

There is no litigation pending against the project in any court of law. The project does not envisage any type of displacement of the living population; hence, there is no need for rehabilitation program. No part of the plot area falls under the Forest Land. Hence, Forest NOC is not required. The land use of the project conforms to Land use Plan of Nashik Municipal Corporation.

The location of project site on Land use Plan of Nashik Municipal Corporation is shown in **Figure 2.2**.

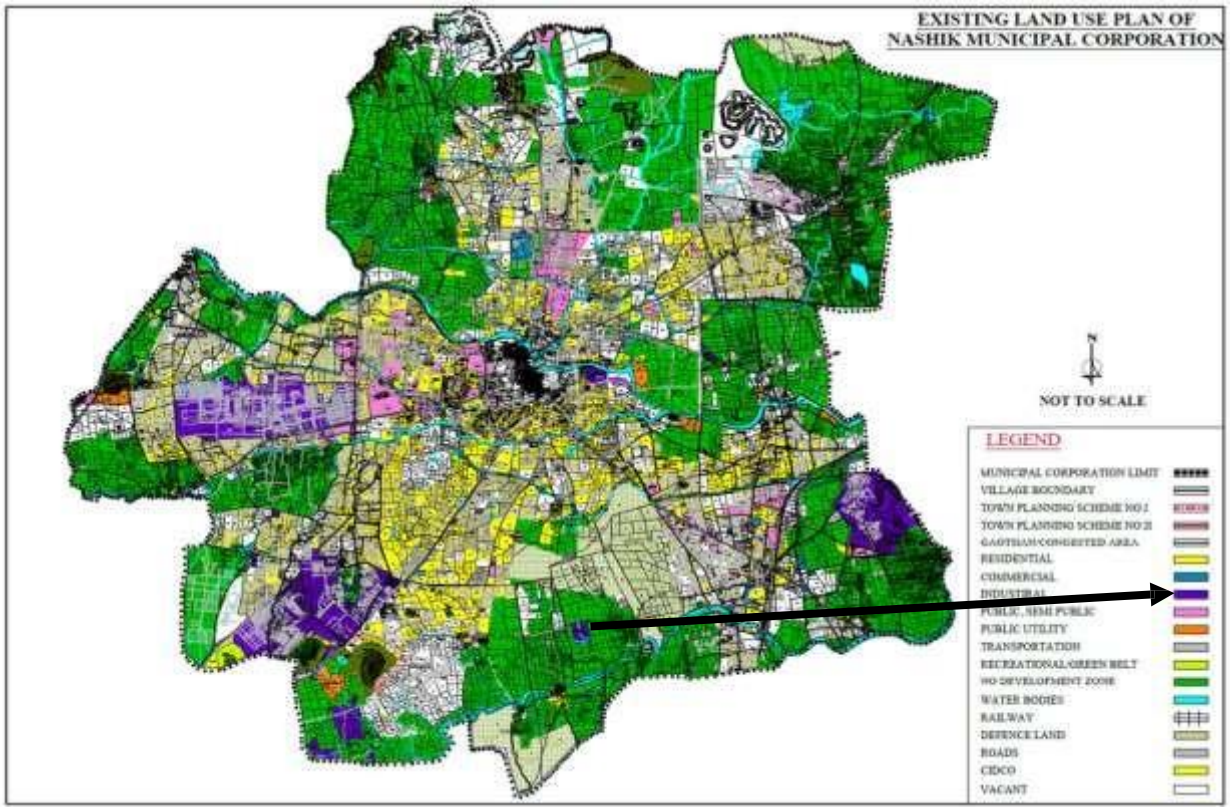

FIGURE-2.2-LOCATION OF PROJECT ON LAND USE PLAN OF NASHIK MUNICIPAL CORPORTATION

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The details of land use of the project are given in **Table 2.2(A).**

TABLE-2.2(A)-LAND-USE DETAILS

S. No.	Particular	Area in sqm
1.	Ground Floor	13272.55
2.	First Floor	1549.68
3.	Second Floor	0
4.	Ext HT area	1698.55
5.	Total	**16633.59**
6.	FSI area	**718.40**

Source: Approved Site Plan

The details of the area statement of proposed project are given in **Table 2.2(B).**

TABLE-2.2(B)-AREA STATEMENT

S. No.	Particular	Area in sqm
1.	Total Plot Area	**XX**
2.	Ground Floor	3404.22
3.	First Floor	277.15
4.	Extra HT area	1403.10
5.	Total Building area	5084.17
6.	Total Green Area	

Source: Approved Building Plan

2.3 MAGNUM ICE CREAM / FD MANUFACTURING PROCESS

Incoming RPM checks:

Every consignment of Raw / Packing material get checked and verified at incoming stage and only quality cleared material is then issued to the production floor. There is set system of ensuring traceability and material storage condition as well.

Batch Preparation

Take process water in batch preparation tank. Add all Ingredients like Emulsifiers, stabilizers, sugar, Liquid Glucose, Skimmed milk powder, Veg oil / Milk fat, colour / Flavours one by one in the water and mix it properly.

Transfer this mix through homogenizer and pasteurizer and store in mix storage tank at defined temperature.

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Quality sampling and analysis:

Once the batch is made take out sample from MST and perform testing as per defined norms. Similarly, when the batch is packed in different formats and perform same testing.

Packing:

Filling of Pasteurized mix through freezer into different pack formats like Cone or Stick Cups, Tubs and Take Home, pack the units in CLD and then transfer to Palletizing section.

Palletizing:

The packed CLD's get stacked over pallet ,stretch wrapped and gets transferred to Cold room.

Dispatch:

Dispatch of product to various locations through refrigerated vans as per demand.

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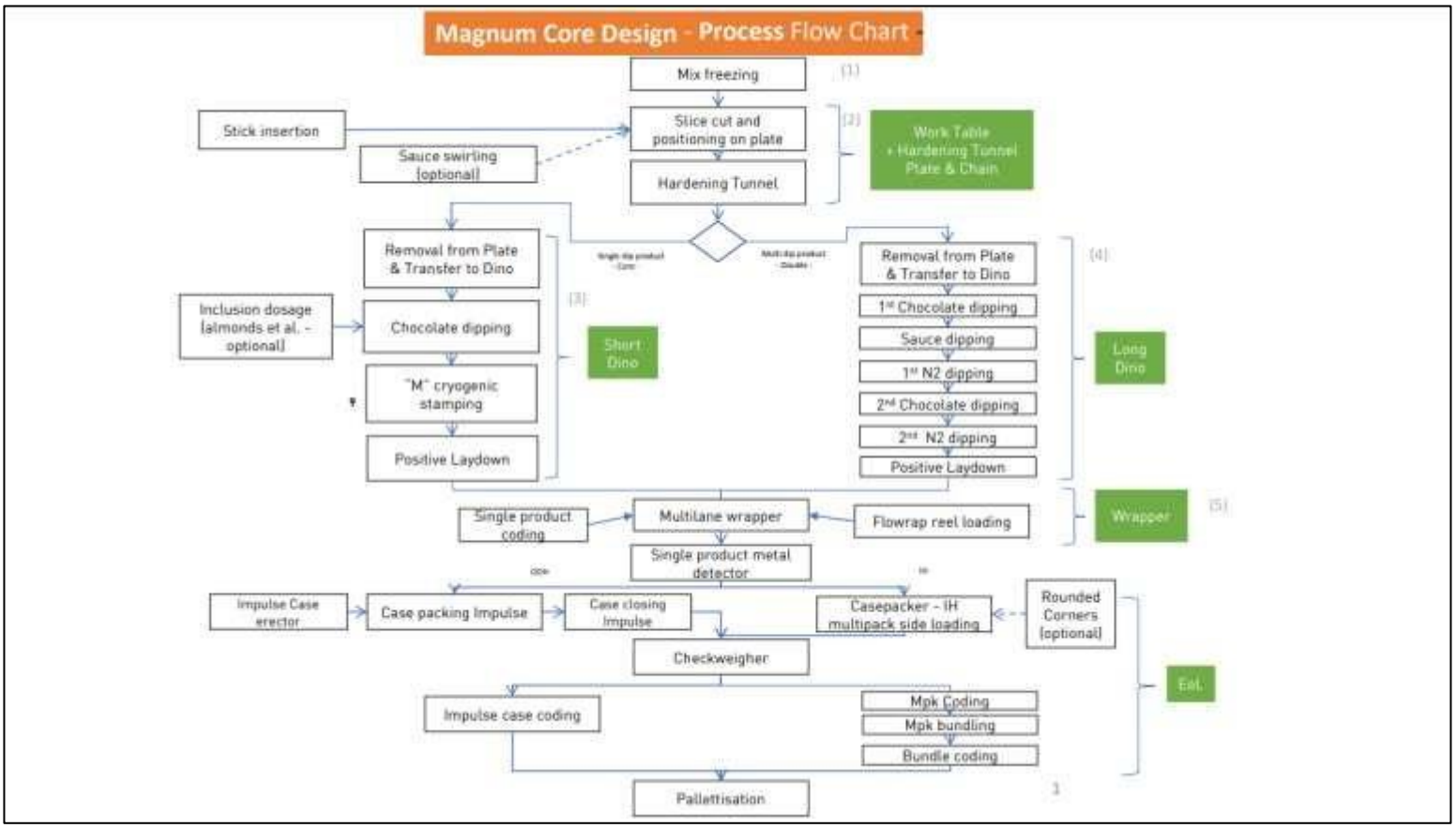

FIGURE-2.3-MAGNUM ICECREAM MANUFACTURING PROCESS

2.4 RAW MATERIAL, MANPOWER & EQUIPMENT USED FOR MAGNUM ICE CREAM / FD MANUFACTURING PROCESS

S. No.	Material Code	Material Description
1.	1000090269	MaxTreat-3100(L)
2.	1000090457	Non- Ferric Alum
3.	1000090891	SU 561 - 1 X 30 kg drum
4.	1000090923	SU 319 - 1 X 25 kg drum
5.	1000091000	SU 120 - 1 X 25 kg drum
6.	1000091009	Zetag 4120

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7.	1000091435	MaxTreat 3006
8.	1000091445	Caustic Soda Lye
9.	1000091446	Calcium Chloride
10.	1000091457	MaxTreat 3221 (35kg)
11.	1000091459	MaxClean powder (kg)
12.	1000091460	Alcosan - 2 X 5 Ltr Cld
13.	1000091462	Sodium Hypochloride (60kg)
14.	1000091469	Antifoam
15.	1000091471	Economix powder 1.5 kg
16.	1000091472	Zetag 8180
17.	1000510871	Sulfamic acid
18.	1000510872	NALCO 3DT 187
19.	1000510873	NALCO N7348
20.	1000510874	NALCO N2593
21.	1000510875	NALCO N90001
22.	1000511385	Ammonia
23.	1000511460	Technomelt Supra 350 (Hotmelt)
24.	1000513840	Softsafe VC 19 - 1 X 30 kg
25.	1000521040	Divoflow 50 VC99
26.	1000521041	Cipton VC11
27.	1000522851	Ultra Antifoam 2X5kg
28.	1000522852	Technomelt Supra 350 HT 26 kg / Technome

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

Project Address: **M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.**

Types of Machines used in the process

- Big Drum: Freezer, cone filling machine, Laser coding, SAM , Tunnel, SAM, CT Pack EOL, Case erector, Case sealer, X-ray, Checkweigher, Outfeed spiral to cold room
- Auto PP: Freezer, PP Filler, Laser coder, MD, Tunnel, Outfeed to Cold room.
- Ria: Freezer, Mould table, Extractor,Choco kettle & Hoystat, HSW, Manual packing conveyor, case sealer, Metal Detector, Checkweigher.Outfeed to cold room.
- Rollo: Freezer, Mould table, Extractor, Choco kettle & Hoystat, HSW, Manual packing conveyor, case sealer, Metal detector, Checkweigher, Outfeed to cold room.
- Oro: Freezer, Filling table, Checkweigher, Tunnel, Oro EOL, Case sealer, Case erector, Checkweigher, Outfeed to cold room.
- Trixy: Freezer, Filling table, laser coder, Trixy EOL, Case sealer, Metal detector, Outfeed to conveyor.
- Magnum: Freezer, Extruder, tunnel, AHS, Choco kettle, Choco deep, HSW, GCS EOL, Case erector, Case sealer, Outfeed to cold room.
- New Tub : Tub machine, Lidding machine, Laser coding, End of line
- Old Tub : Tub machine, Lidding machine, Laser coding, End of line
- Jar : Rinser machine, Filler machine, Capping machine, Laser coding ,Sleeving machine,Shrink machine,Taping machine,Robot
- Shubham Lup : Shubham machine, L sealler machine, Taping machine
- Mix Plant : Vacuum pan, pectin mixer, holding tank, pulper,CIP system
- Utility Equipment: Chiller-02, AHU-4, Cooling tower -7, Old Vaccum pump-02 , New vaccum pump-01, Rinser hot water tanker -01,THE-1, MIX plant AhU-01, PHE 01, UV system

2.4 FINAL PRODUCTS

S. No.	NAME OF THE FINAL PRODUCT	QUANTITY
1.	Ice cream/ Frozen Dessert	6250 MT/A including magnum
2.	Ice cream/ Frozen Dessert Total capacity-19440 ton	9932 ton in 2023

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

Project Address: **M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.**

Manpower Details

Shift	**Manpower**	**No. of Permanent Males**	**Females**	**Contractual Manpower**
		521	6	341
Ist Shift	187			
IInd Shift	157			
IIIrd Shift	142			
G Shift	23			

2.5 WATER REQUIREMENT

2.4.1 Operation Phase

Total Water consumption of the unit is 313 KL/Day out of which process water consumption is 45 KLD and Treated water consumption is 220 KLD.

TABLE-2.4-WATER REQUIREMENTS

S. No.	**Description**	**Consumption KLD**
1.	Total Water Consumption	313
2.	Process water consumption	45
3.	Treated water consumption	220

The water balance diagram for the project is shown below in **Figure 2.4**

2.4.3 Measures for water conservation

The following measures will be taken to ensure effective water conservation at the project site.

- Low Flow Fixtures, sensors in washbasins and urinals in non-potable water distribution system
- Dual Plumbing i.e. use of STP/ ETP treated wastewater in Cooling Towers and landscaping
- Rain Water Harvesting proposed at different locations within the campus to recharge groundwater.

2.4.4 Wastewater Treatment & Disposal

Commissioning & Operation Phase

During operational Phase approximately 100 KLD wastewater will be generated from the project and treated in the MBBR based Sewage Treatment Plant of 350 KLD. Approx. 320 KLD of treated wastewater will be recovered from the STP/ ETP which will be used in landscaping and cooling towers to conserve freshwater.

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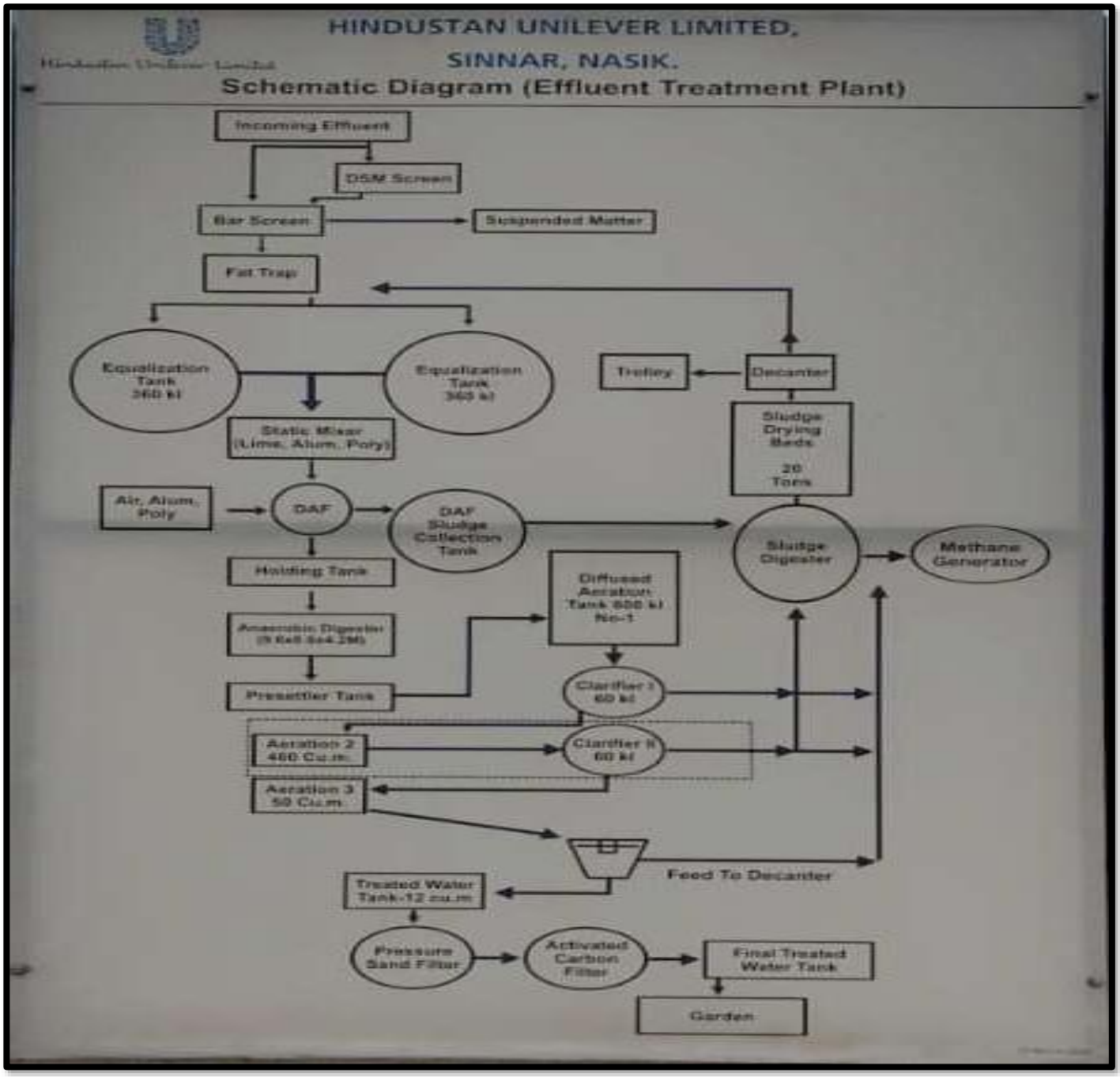
2.4.5 SEWAGE/ EFFLUENT TREATMENT PLANT



Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

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TABLE-2.5(A)-INFLUENT/EFFLUENT PROPERTIES

Parameter	Inlet (ppm)	Outlet (ppm)	CPCB Limits
BOD	295	10	<30
COD	1030	29	<250
Chloride	132	96	Not Specified
Oil & Grease	1	<1	<10
TDS	2810	1397	<2100
Sulphate	28.5	7.21	Not Specified
TSS	77	13	<100

COMPONENTS OF THE PLANT

The treatment scheme includes the following component unit:

- DSM/ Bar Screen /FST trap within Equalization tank.
- Equalization tank
- Submersible type raw sewerage re-lifts pumps.
- Anaerobic Digestor
- Pre Settling Tank
- Aeration tank
- Secondary settling tank
- Clarified Water & Filtered Water Storage Tanks
- Filter/Softener feed pump
- Decantor
- Sludge Digestor
- Tertiary Treatment Units (PSF/ACF/Softener)
- Disinfection System
- Treated Water Supply Pumps
- Centrifuge

2.5 RAIN WATER HARVESTING

The stormwater can be harvested based on the surface runoff potential from the project site. Runoff collected from the rooftop area will be directed toward rainwater harvesting, while rainwater from paved areas and landscaped zones will also be collected. For the design of the rainwater harvesting pit, a peak hourly rainfall of 55 mm/hr has been considered. A mesh will be installed to prevent leaves, solid waste, and debris from entering the pit. The collected water will be utilized to replenish the ground aquifers.

Total 04 no. of rain water harvesting pits are available in the project.

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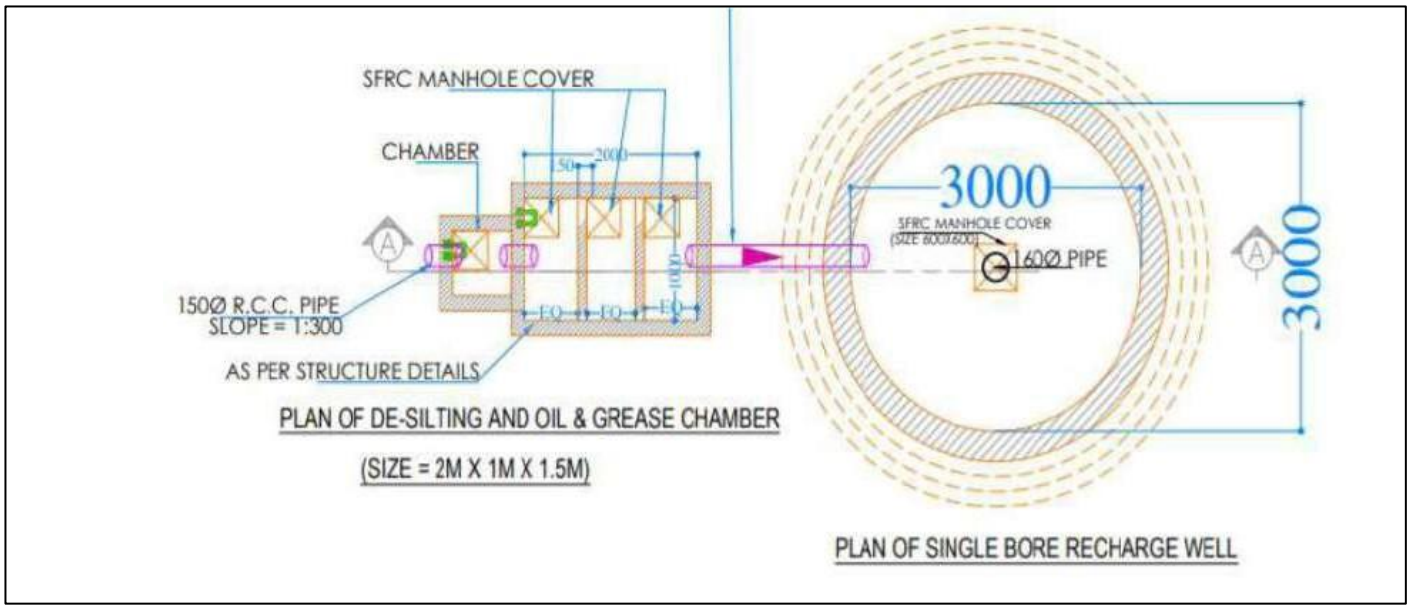

FIGURE-2.8(A)-TYPICAL HORIZONTAL SECTION OF RAIN WATER HARVESTING PIT

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

Project Address: **M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.**

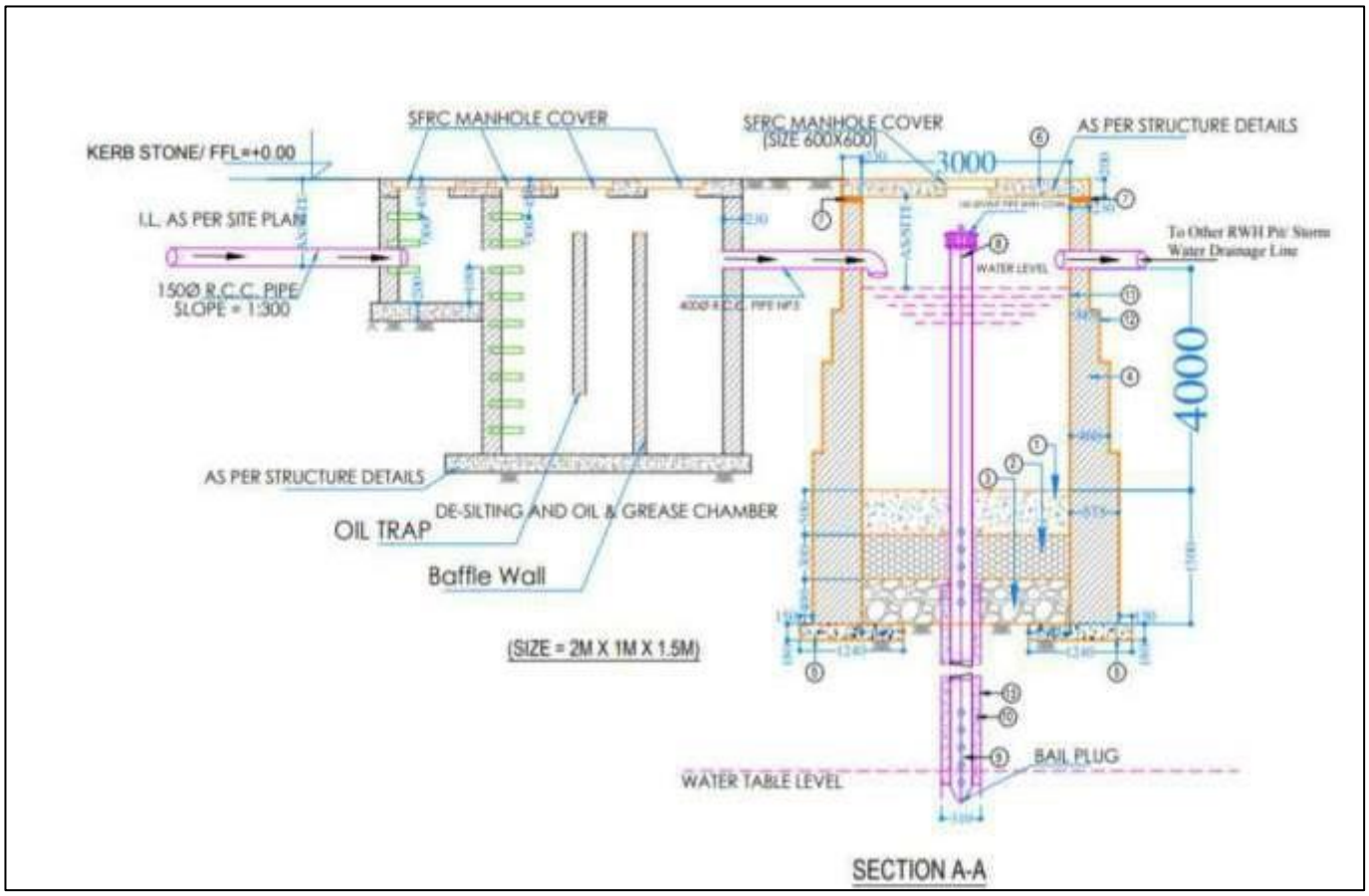

FIGURE-2.8(B)-TYPICAL VERTICAL SECTION OF RAIN WATER HARVESTING PIT

2.7 GREENBELT

Currently there are approx. 870 no of grown up trees at the site & 2270 saplings and are evergreen type species and fast growing and help in climate amelioration.

The list of trees & shrubs for plantation is given in **Table 2.8**

S. No.	Shrubs/ Trees	Number
1.	Grown Up trees	870
2.	Saplings	2270

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

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2.8 SOLID WASTE MANAGEMENT

Commissioning Phase

Solid waste will be generated both during the commissioning as well as during the operation phase. The solid waste generated during the commissioning phase will comprise of used bags, bricks, concrete, MS rods, tiles, wood etc. The following steps are proposed to be followed for the management solid waste:

- Dedicated Storage yards have been developed for the storage of commissioning materials.

The commissioning waste generated from the site is being disposed through recyclers.

Operation Phase

During the operation phase, waste will comprise domestic as well as horticulture waste. The solid waste generated from the project shall be mainly industrial waste and estimated quantity of the waste

shall be approx. xx kg per day. Following arrangements will be made at the site in accordance to Solid Wastes Management Rules, 2016.

TABLE-2.9-SOLID WASTE GENERATION

S. No.	Type of Waste	Source of Generation	Quantity	Disposal
1.	Paper/ Wood			
2.	Plastics			
3.	Food Waste			
4.	Corrugated Boxes			
7.	E-Waste			
8.	Hazardous Waste			
9.	Batteries			
10.	Bio-Medical Waste			

2.8.1 Collection and Segregation of Solid Wastes

- A collection system has been established for collection of waste in colored bins.
- Dry recyclables and bio-degradable waste is converted into compost within the factory.
- Adequate number of colored bins (Green and Blue & dark grey bins– separate for biodegradable, non-bio-degradable& inert waste) have been provided at the suitable locations within the factory.

2.8.2 Treatment of Solid Wastes

2.8.2.1 Bio-Degradable wastes

- Bio-degradable wastes is being treated in organic waste convertor and compost is used as manure for plants.
- Horticultural waste is composted and used for gardening

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

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Organic Waste Converter

The Organic Waste Composter (OWC) is being designed to make composting easy and convenient. It is fully automatic and features a compact and aesthetic design. The machine is maintaining the right temperature, air flow, and moisture levels. A special bacterium, which is heat, salt, and acid-resistant, is being used. Once the bacteria are introduced into the machine, they are reproducing rapidly under ideal internal conditions. When organic waste is being filled into the converter, the increase in moisture level is detected by a sensor, which subsequently starts the heating system. As the temperature rises, it is activating the bacteria, which break down the organic waste into fertile compost. Meanwhile, the moisture in the waste is being converted into water vapor, which is vented through a blower into the drain. This process is not only resulting in nearly 85% volume reduction in the compost formed but also converting organic (food) waste into 80-85% mature compost within 24 hours. The constant temperature and air flow are preventing odor and pest problems.

2.8.2.2 Other wastes

Recyclable wastes like paper, plastic, metals etc will be sold off to recyclers:

- The E-wastes generated from the project would be done through E-waste recycler, authorized by the SPCB for The E-waste generated will be managed as per the E-waste (Management) Rules 2016

Hazardous Waste:

The project generates following categories of hazardous wastes:

- Used Oil (Category 5.1, as per Schedule-1 of the Rules) - from DG sets
- Oil Contaminated Wastes (Category 5.2, Schedule-1) - from cleaning of DG sets, maintenance operations, etc.
- Empty chemical Drums (Category 33.1, Schedule-1).
- Sludge from ETP (Category 34.2, Schedule-1).
- Contaminated cotton rags or other cleaning materials (Category 33.2, Schedule-1)..

The Hazardous waste generated will be managed as per the Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules, 2016.

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Bio-Medical Waste:

There is a OHC facility in the project to cater first aid facilities for the workers and staff. The bio-medical wastes will be pre-treated as per NACO/WHO guidelines and handed over to CBWTF (Common Bio-Medical Waste Treatment and Disposal Facility) through an authorized agency. All the requirements of the Bio-medical Waste Management Rules, 2018 are being followed.

Proper collection and segregation of wastes is done with the help of color coded bins as per SWM Rules 2016, Bio-Medical Waste Management Rules 2016, Hazardous Waste Management Rules, 2016 and Plastic Waste Management Rules 2018.

2.8.3 Disposal

The municipal solid waste management will be treated as per the guidelines of Solid Waste Management Rules, 2016. While biodegradable wastes will be composted and used as manure, recyclable and non-recyclable wastes will be disposed through Govt. approved agency.

A solid waste management scheme is depicted in the following figure for the project:-

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

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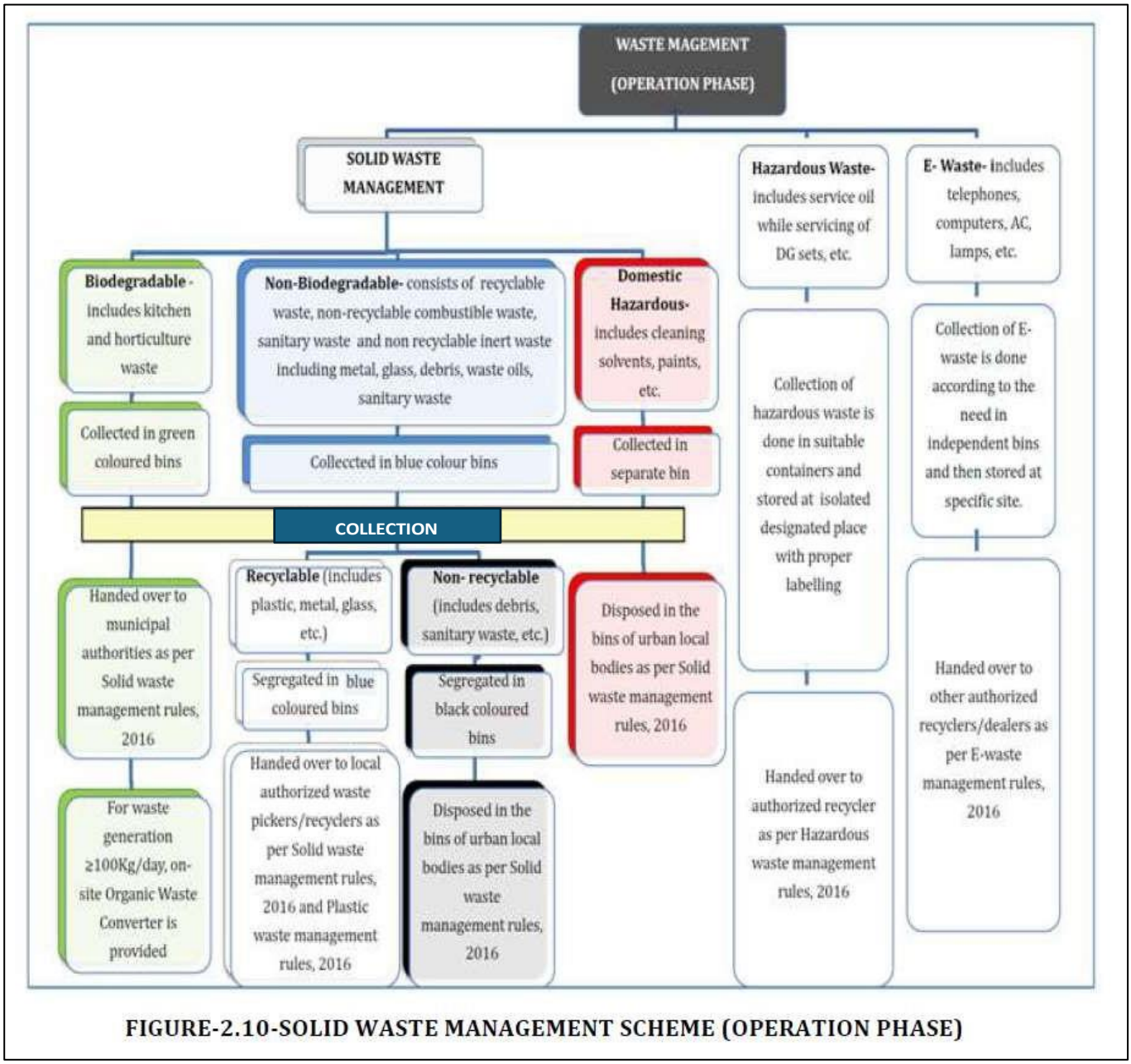

FIGURE-2.10-SOLID WASTE MANAGEMENT SCHEME (OPERATION PHASE)

FIGURE-2.10-SOLID WASTE MANAGEMENT SCHEME (OPERATION PHASE)

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

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E-Wastes

Electrical and Electronic Waste collection and segregation will lie with the staff allocated by the EHS Department. Awareness will be created for the staff for proper collection of the waste from the source level.

Management of E-Waste includes following steps:

- Collection: Collection of E-waste like CDs, electronic equipment, CFL, Tube lights is being done in separate bins. Other E-wastes like Computers, Laptops, Computer parts, server related accessories etc is being collected separately and record for the same needs is maintained. These wastes is being collected and sent to the Storage facility as per the requirement of the generator of waste.
- Storage: Separate space have been provided for storage of E-waste on the site.
- Disposal: Disposal of the waste is being done through recycler authorized by the State Pollution control board. While handing over the waste Manifest copy (Form-VI) is being given by the transporter and the same is kept in records. Return to UPPCB is filed before 30th June every year for the financial year in form III and interna records is being made in Form II for the waste collected and disposed by the project.

2.9 POWER SUPPLY

The total Energy requirement for the factory is 3500 KVA/ Annum. There are 3 Nos transformers 33KV, 1.6 MVA. There are 3 Nos. DG sets 2 X 1250 KVA and 1 X 1000 KVA are installed to be used for power failure. Total connected Renewable energy through wind/Solar and other sources is 13237695 KWH. The DG sets equipped with acoustic enclosure will be used to minimize noise generation and adequate stack height for proper dispersion will be provided.

The DG sets will be equipped with acoustic enclosure to minimize noise generation and adequate stack height of 7.2 m for proper dispersion.

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

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TABLE-2.11-POWER REQUIREMENT IN OPERATION PHASE

Parameters	Installed
Energy Requirement in kVA/ Annum	3500 KVA
Renewable energy in kVA for annual	13237695 Kwh
Back-up power supply	2 Nos. 1250 KVA and 1000 KVA
Transformer	3 Nos. and 33KV, 1.6MVA

PARKING REQUIREMENTS

Space for Car Parking	15 Nos.
Space for Bike Parking	100 Nos.

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

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2.10 FIRE FIGHTING SYSTEM

The design and planning of Fire Protection System shall be done keeping in view the following criteria:

- National Building Codes of India,2016 – Part IV
- National Fire Protection Association (NFPA), etc.

System Description

Fire water storage

Static fire water storage tank for Fire Protection System has been provided.

Fire hydrant system

Hydrant stations in the factory has been located in the staircase lobby, periphery and also near fire exits.

Sprinkler system

Sprinkler system shall be provided for all areas except electrical rooms. Standard response pendant sprinklers shall be provided, and each sprinkler will be provided to cover a maximum area of app 9-12 M2. Upright pendent sprinklers shall also be provided for the concealed spaces of more than 800mm. The sprinklers system shall be designed as per IS:15105.

CO2 Extinguishing system

Trolley mounted carbon-di-oxide extinguishing system shall be provided in accordance with local Bye-Laws for transformer room, LT panel room and other critical areas.

Hand held fire extinguishers

Portable fire extinguishers of water (gas pressure), Carbon dioxide and foam type has been provided as first aid fire extinguishing appliances. These extinguishers has been suitably distributed in the entire public as well as service areas.

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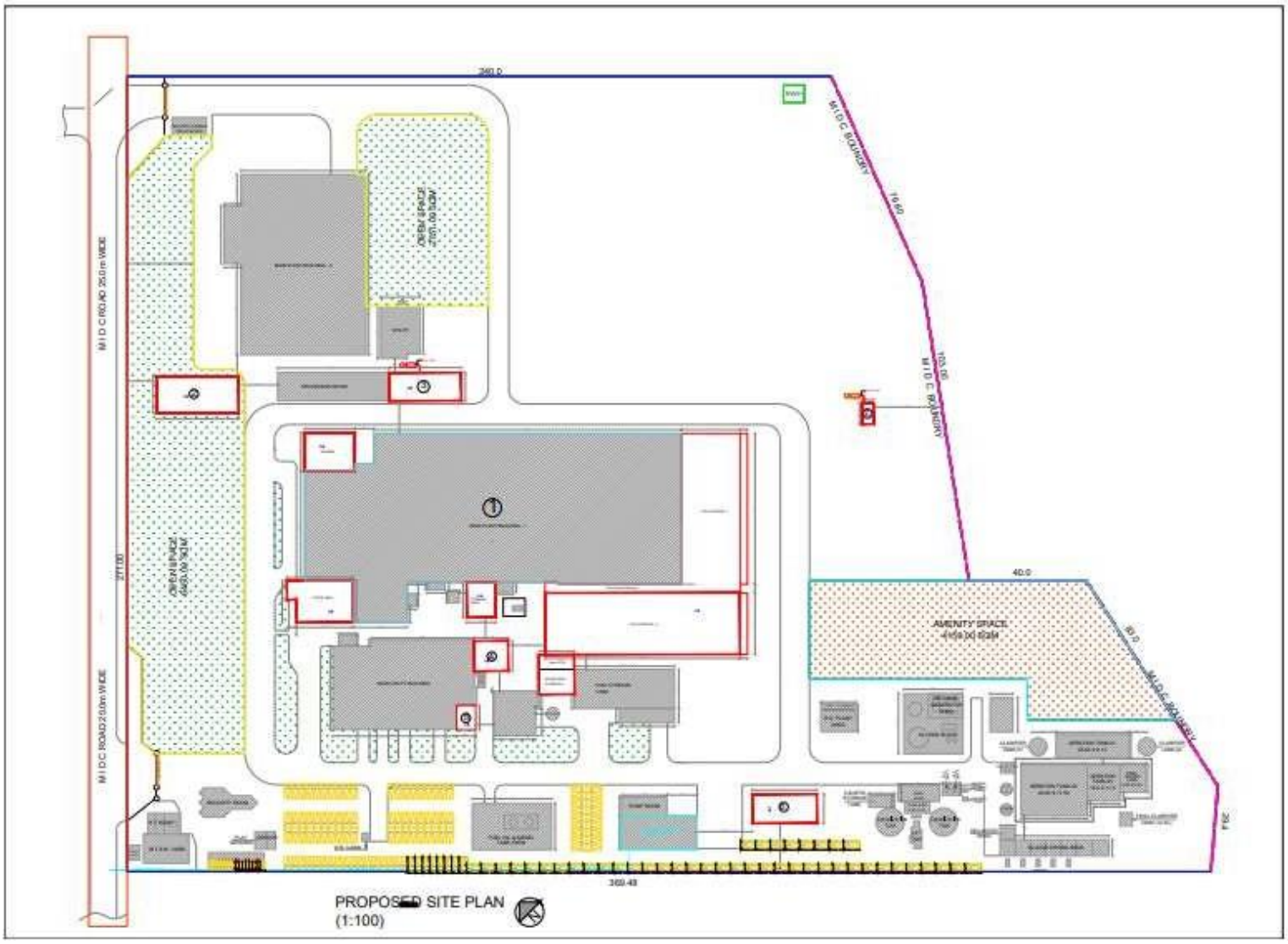

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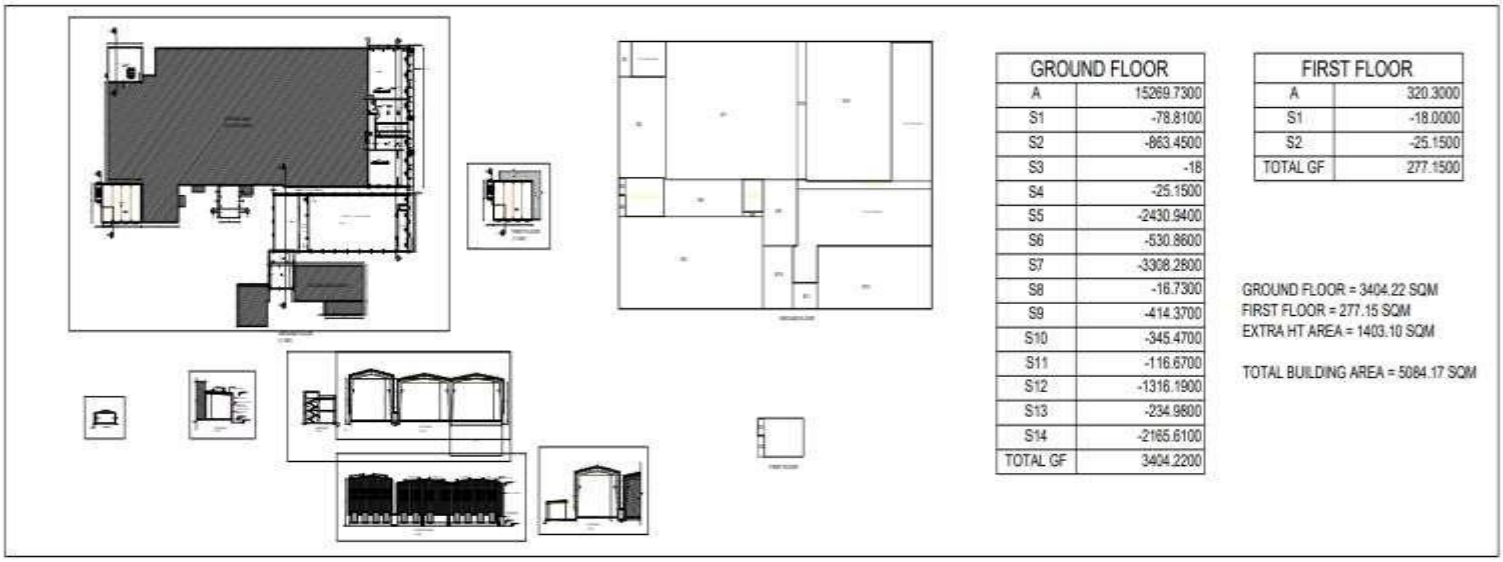
Project Address: **M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.**

GROUND FLOOR	
A	15269.7300
S1	-78.8100
S2	-863.4500
S3	-18
S4	-25.1500
S5	-2430.9400
S6	-530.8600
S7	-3308.2800
S8	-16.7300
S9	-414.3700
S10	-345.4700
S11	-116.6700
S12	-1316.1900
S13	-234.9800
S14	-2165.6100
TOTAL GF	3404.2200

FIRST FLOOR	
A	320.3000
S1	-18.0000
S2	-25.1500
TOTAL GF	277.1500

GROUND FLOOR = 3404.22 SQM
FIRST FLOOR = 277.15 SQM
EXTRA HT AREA = 1403.10 SQM

TOTAL BUILDING AREA = 5084.17 SQM



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S10	-345.4700
S11	-116.6700
S12	-1316.1900
S13	-234.9800
S14	-2165.6100
TOTAL GF	3404.2200

FIRST FLOOR	
A	320.3000
S1	-18.0000
S2	-25.1500
TOTAL GF	277.1500

GROUND FLOOR = 3404.22 SQM
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EXTRA HT AREA = 1403.10 SQM

TOTAL BUILDING AREA = 5084.17 SQM

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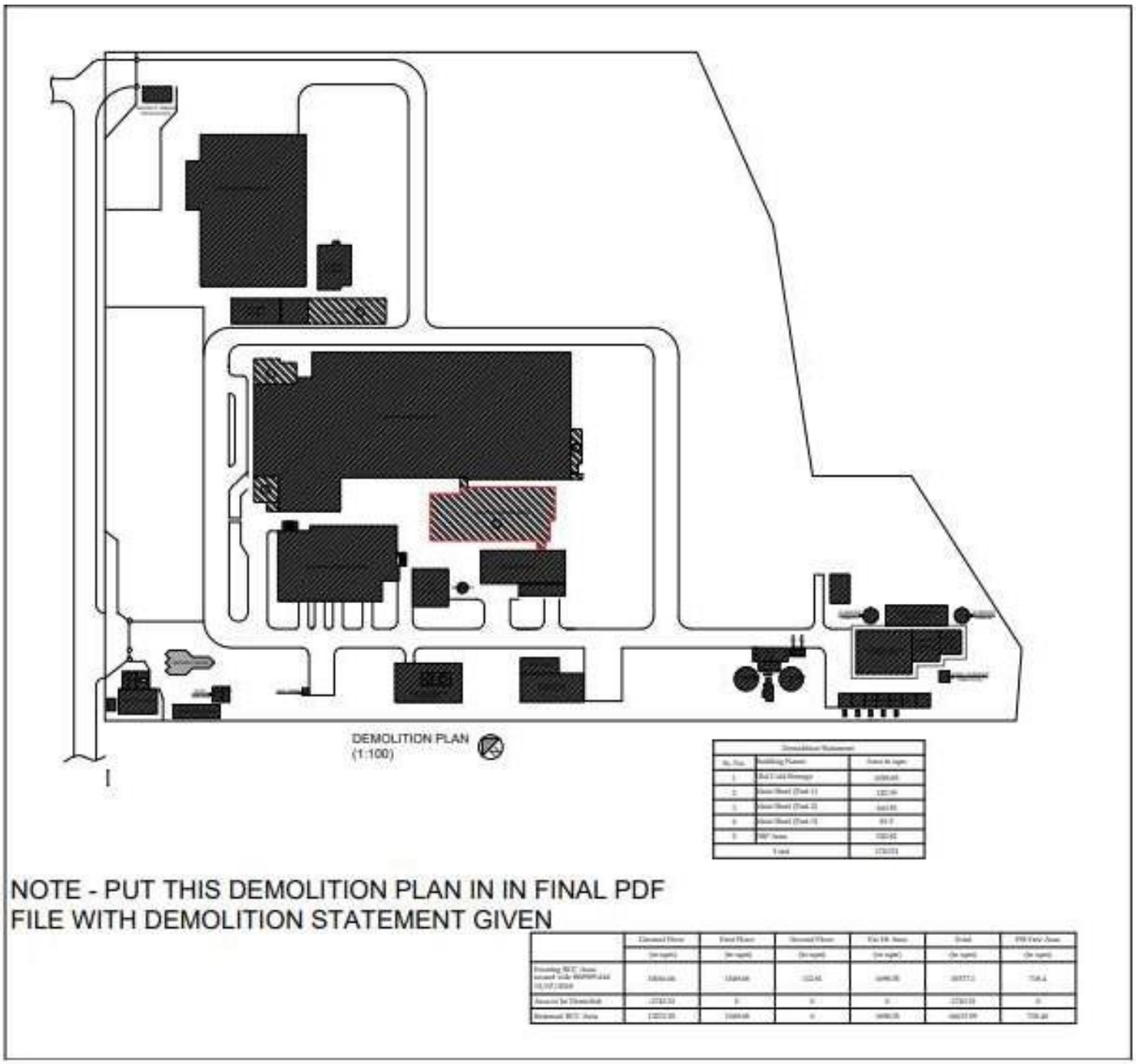

NOTE - PUT THIS DEMOLITION PLAN IN IN FINAL PDF FILE WITH DEMOLITION STATEMENT GIVEN

CHAPTER 3

METEOROLOGY

3.0. INTRODUCTION:

The meteorological conditions of a region significantly influence the distribution of pollutants in the atmosphere. These local conditions dictate how pollutants are diffused, transported, and dispersed once they are released, whether into the air or a water body, by any industrial facility. The spread and concentration of these pollutants are affected by various meteorological factors.

Air pollution refers to the undesirable introduction of foreign substances or excess amounts of gases and particulate matter into the natural atmosphere. The levels of these pollutants can fluctuate based on the prevailing weather conditions. The transportation and dispersion of pollutants in the air are influenced by factors such as wind speed and direction, atmospheric turbulence, storms, and atmospheric depressions.

Turbulence is dependent on atmospheric stability, which is determined by the vertical temperature distribution, known as the lapse rate. This lapse rate varies throughout the day. During the daytime, stronger lapse rates lead to the rapid dispersal of pollutants, while at night, temperature inversions occur, where the temperature increases with height, creating stable atmospheric conditions that cause pollutants to accumulate. During the transitional periods between day and night, neutral stability occurs. The stability of the atmosphere at a particular location determines the shape of the effluent plume from an industrial stack. The ground-level concentration (GLC) of suspended particulate matter is calculated using various mathematical methods.

Local weather is also influenced by geographical features such as valleys, hills, buildings, and the presence of sea and land breezes. These factors can sometimes create adverse atmospheric conditions, leading to the stagnation of pollutants. Operating an industrial unit during such conditions can result in localized high concentrations of pollutants. Therefore, meteorological factors are crucial in selecting a site for an industry, designing its infrastructure, and managing its day-to-day operations.

The development of industrial areas, identification of factors contributing to existing pollution problems, and the establishment of air quality standards are all influenced by weather and climate. These factors must be thoroughly understood before setting up any industrial facility.

Key meteorological parameters include wind speed, wind direction, turbulence, temperature, and humidity. Wind speed directly affects the rate at which air pollutants are diluted and transported, while wind direction determines their path. Air turbulence impacts the dispersion and dilution of pollutants in suspension. Horizontal distribution of particulate matter is driven by non-thermal turbulence, while vertical distribution is influenced by thermal turbulence. Water vapor content and fog can exacerbate air pollution; for example, low humidity can dry soil surfaces, leading to dust generation, while high humidity can delay the evaporation of water droplets in stack effluents.

The meteorological conditions of the Sinnar block are detailed in the following section, with data collected by the staff of Life First Solution from the Indian Meteorological Department (IMD) office in Lucknow.

3.1. CLIMATE OF SINNAR:

Sinnar's hottest month is April, with temperatures reaching 38°C, while the coldest and most humid month is August. The rainiest month is July, with 195mm of precipitation, while January and February are completely dry.

The year may be divided into following seasons.

- The month of April, characterized by an average high of 38°C (100.4°F) and a low of 22.3°C (72.1°F), is recognized as the warmest in Sinnar, India.
- March through December are months with rainfall in Sinnar, India.
- With its average high temperature of 26.5°C (79.7°F) and a low of 21.8°C (71.2°F), August is regarded as the coldest month in Sinnar, India.

3.2. RAINFALL:

The rainfall data for Sinnar in 2024 has been obtained by the LFS staff from the Indian Meteorology Department. Details are provided in Annexure 3.2, and the Climatological Table, based on data from 2010 to 2024, presents the district's rainfall statistics in Table 3.2.

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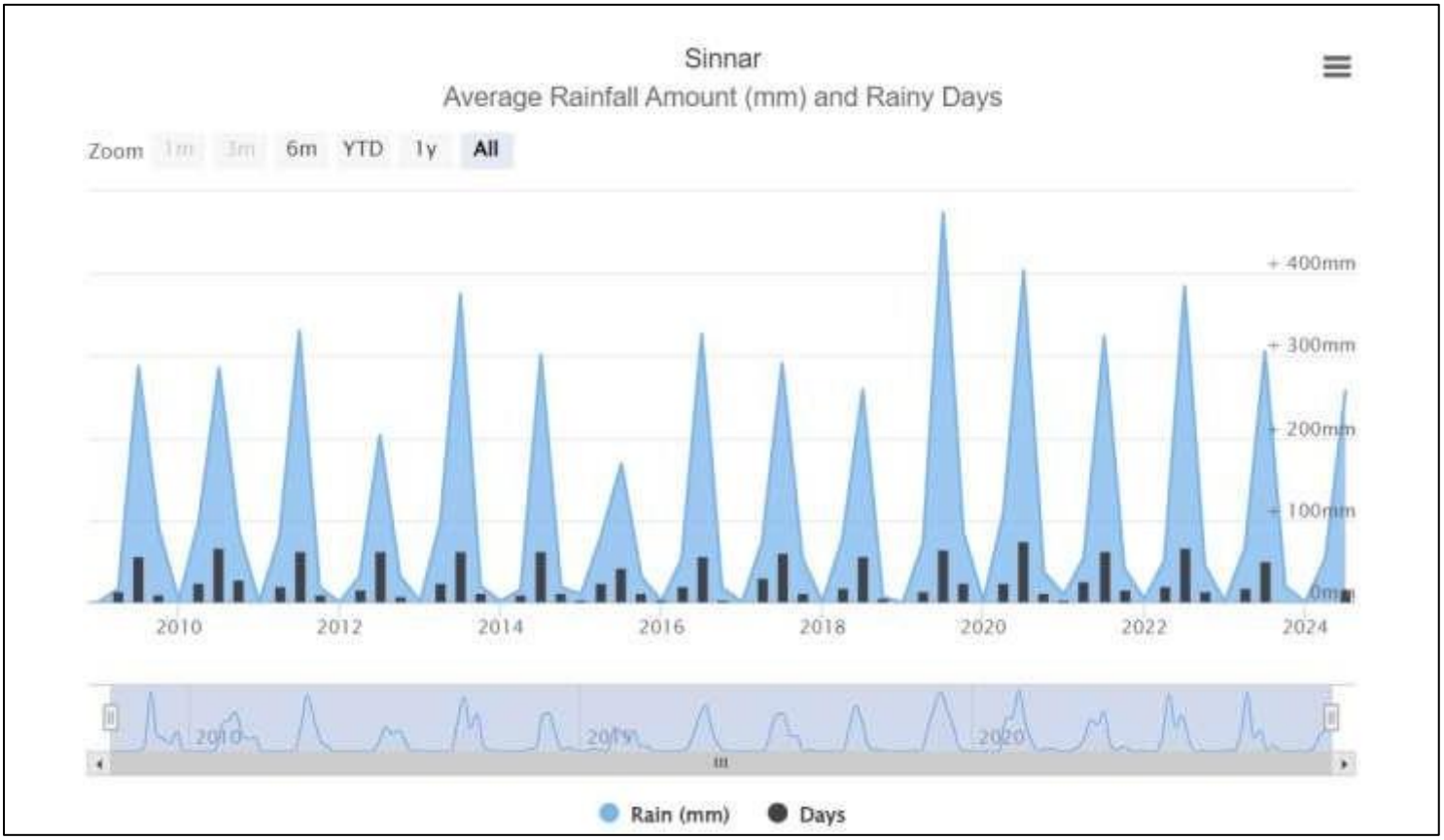
In Sinnar, during the entire year, the rain falls for 135.7 days and collects up to 704 mm (27.72") of precipitation. The month with the most rainfall is July, when the rain falls for 30.3 days and typically aggregates up to 195mm (7.68") of precipitation.



Rainfall and Rain Days

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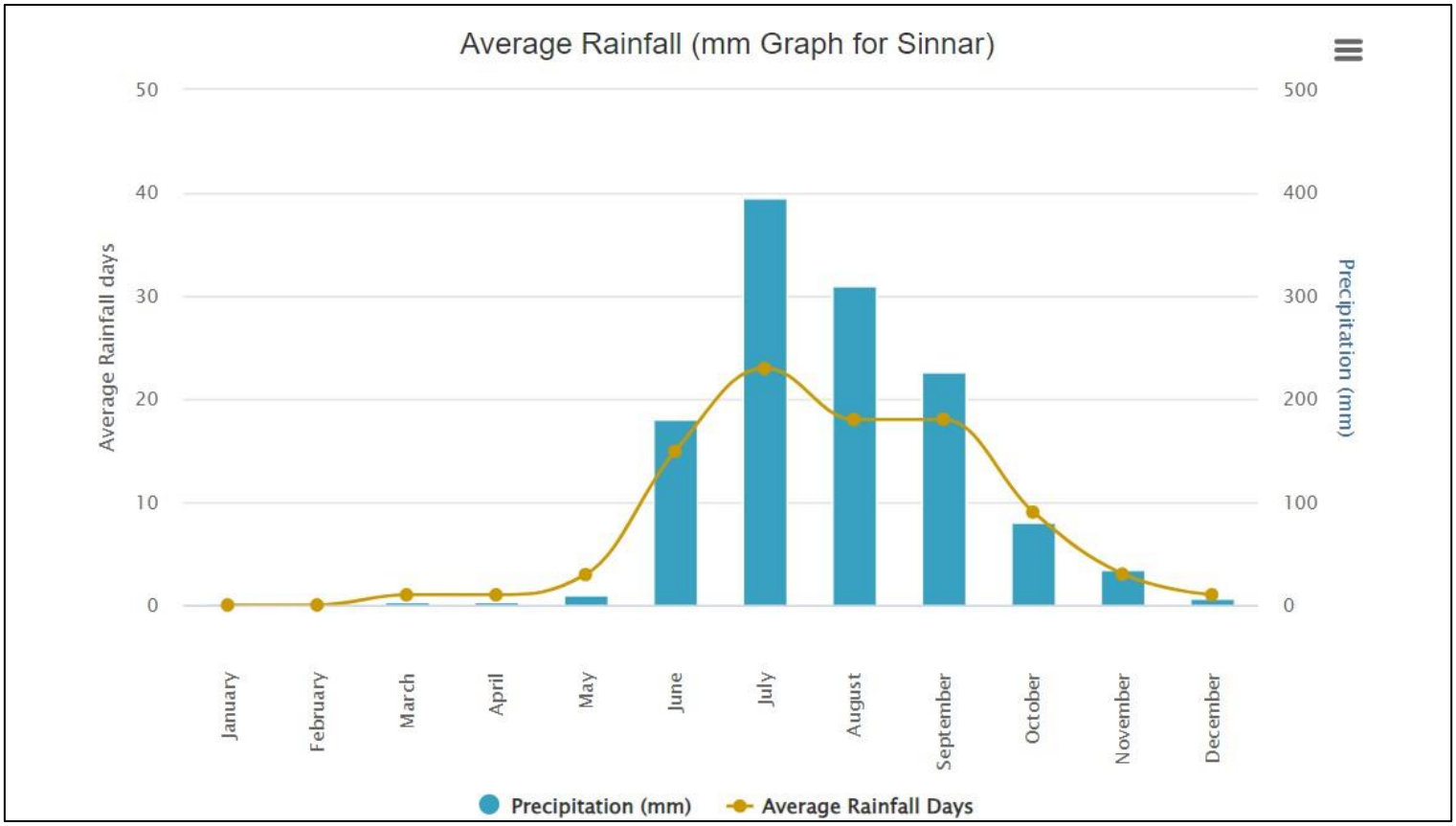

3.3. TEMPERATURE:

Sinnar experiences a wide range of temperatures throughout the year. January is a warm winter month, with highs around 29.4°C and lows near 15°C. By February, temperatures rise to 32.1°C during the day, with nighttime lows of about 16.9°C. March sees further warming, reaching 35.3°C during the day. April is the hottest month, with temperatures peaking at 38°C. The pre-monsoon heat continues into May, with highs near 37.7°C. During the monsoon season, from June to September, temperatures drop, with July and August being the coolest months, with highs around 26.5°C to 28°C. Post-monsoon months like October and November see a return to warmer conditions, with highs around 30°C. December marks the beginning of winter, with temperatures dropping to around 29.1°C during the day and 15.9°C at night.

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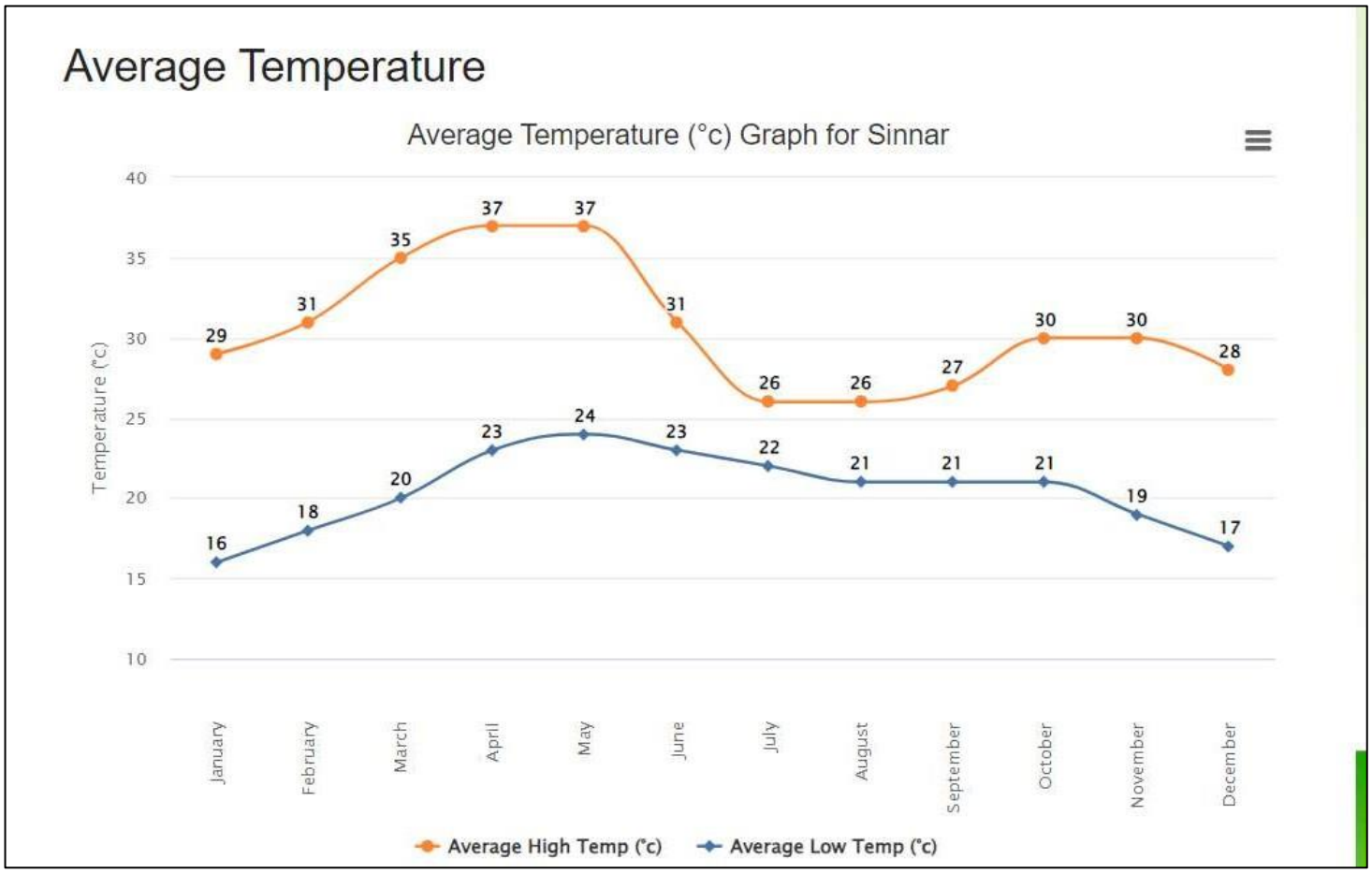

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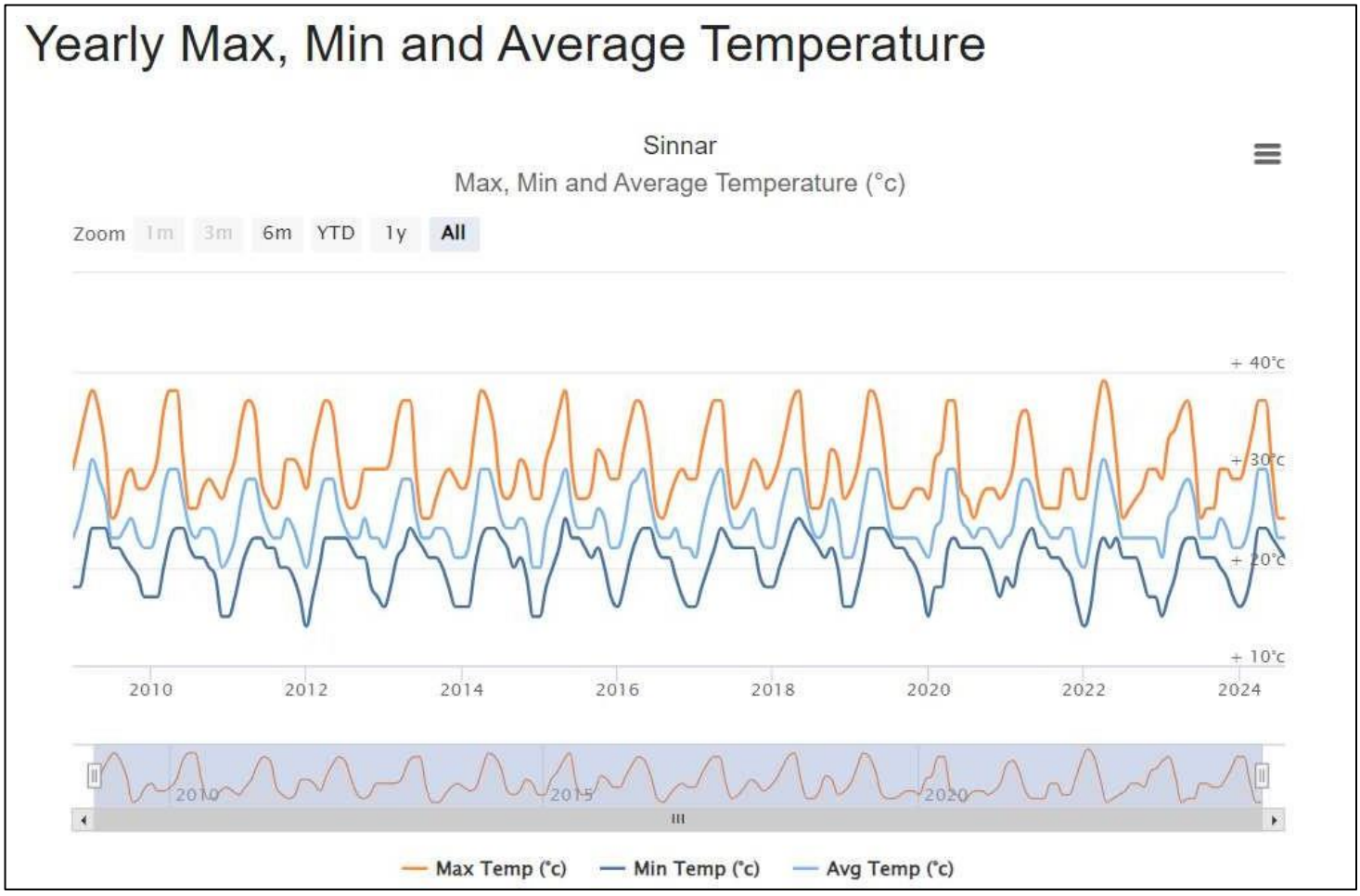


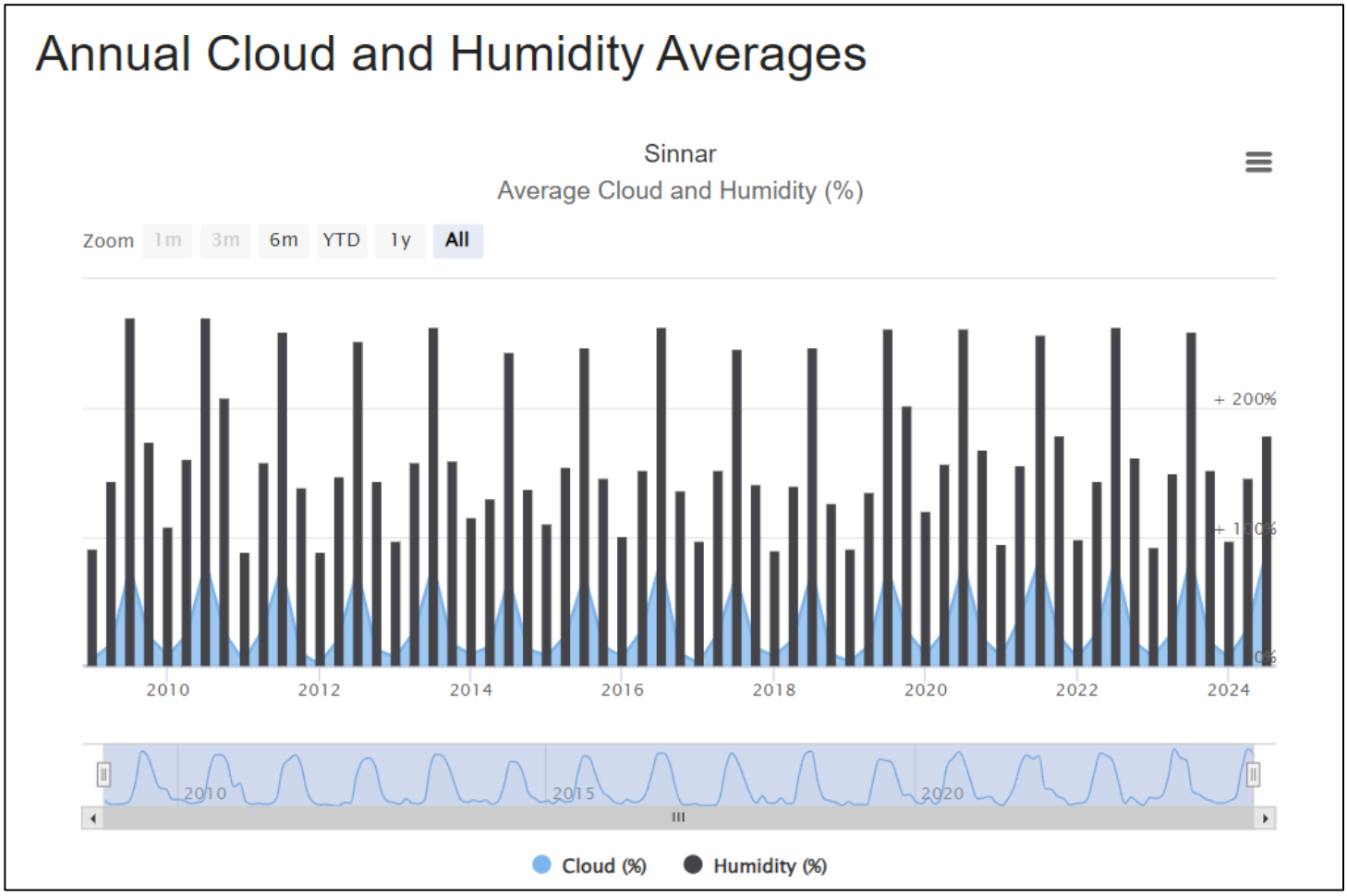
3.4. HUMIDITY:

Sinnar's humidity varies significantly throughout the year. March is the least humid month, with an average relative humidity of just 28%. As the year progresses, humidity increases, particularly during the monsoon season. August is the most humid month, with an average relative humidity of 88%. This high humidity persists through the monsoon months, gradually decreasing as the post-monsoon season begins.

3.5. CLOUDINESS:

Cloudiness in Sinnar fluctuates with the seasons. During the dry months of January and February, the skies are mostly clear, resulting in minimal cloud cover. As the year progresses, particularly from June through September during the monsoon season, cloudiness increases significantly, with July experiencing the most overcast conditions. This period is marked by frequent clouds and reduced sunshine. After the monsoon, in October and

November, cloud cover decreases, leading to clearer skies again as the region transitions into the cooler winter months**.**



3.6. WINDS:

Winds in Sinnar vary with the seasons, playing a significant role in the area's weather patterns. During the dry winter months, winds are generally light and steady, contributing to the clear skies and mild temperatures. As temperatures rise from March to May, wind speeds increase, often bringing warm, dry air that intensifies the summer heat. With the onset of the monsoon in June, winds shift and become more variable, carrying moisture-laden air that contributes to rainfall. These monsoon winds are typically stronger, especially during stormy periods. After the monsoon, wind speeds gradually decrease as Sinnar transitions into the calmer post-monsoon and winter months.

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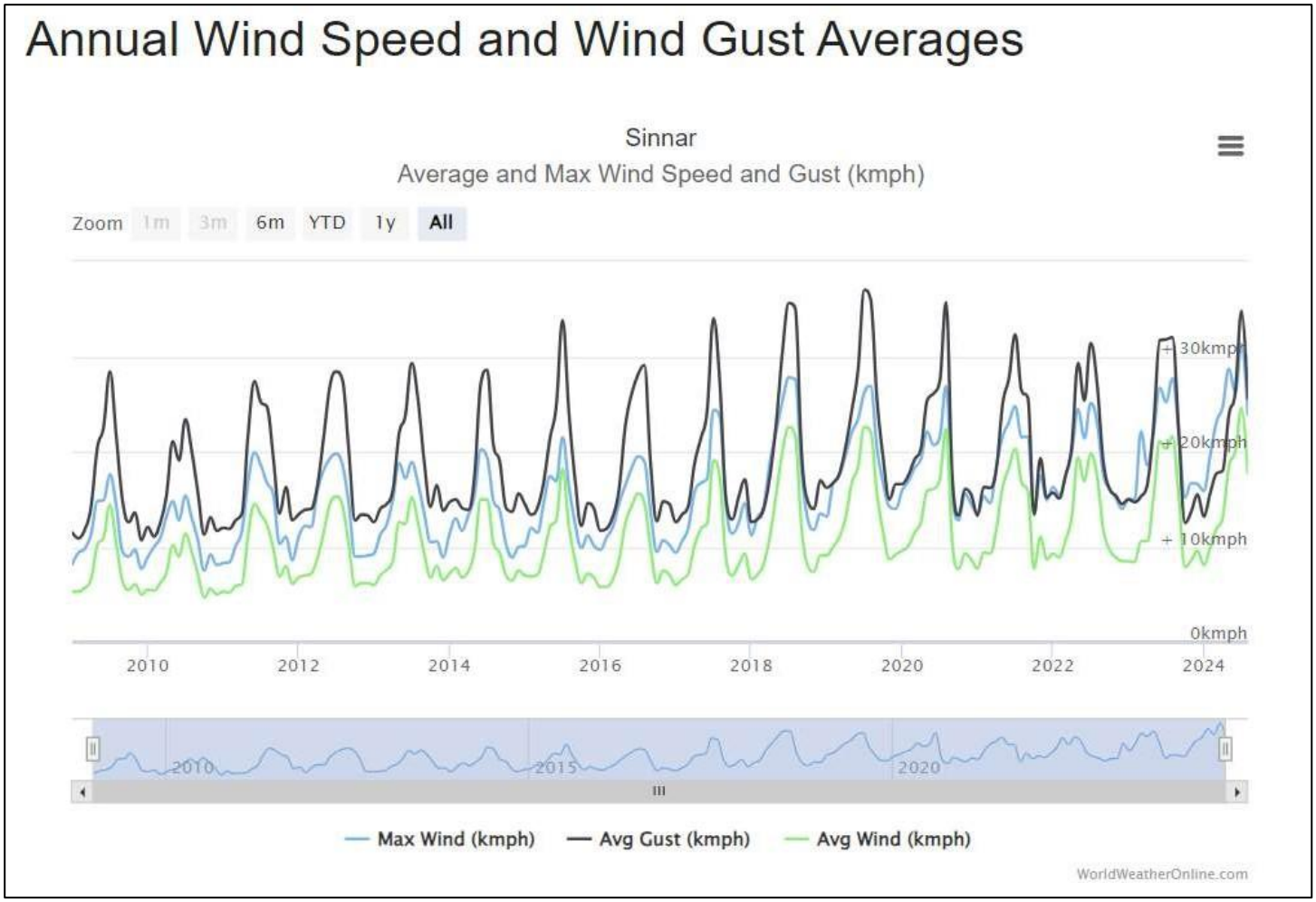

3.7. SPECIAL WEATHER PHENOMENON:

In Sinnar, notable weather phenomena include intense monsoon rains from June to September, which often bring heavy downpours and thunderstorms. The region also experiences heat waves during the pre-monsoon months of April and May, with temperatures occasionally exceeding 45°C, resulting in extreme heat conditions. Dust storms can occur during the dry pre-monsoon period, reducing visibility and dispersing fine particulate matter. Additionally, in rare instances during the cold season, temperatures may drop close to freezing, leading to frost formation on clear, cold nights. These phenomena contribute to the region's varied and dynamic weather patterns.

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Table -3.1: Mean during maximum and minimum temperature (ºC)

Months	Day (ºC)	Night (ºC)	Average Low Temperature in the Month (ºC)	Average High Temperature in the Month (ºC)	Rain Days
January	29	16	15	29.4	0
February	31	18	16.9	32.1	0
March	35	20	19.4	35.3	1
April	37	23	22.3	38	1
May	37	24	23.5	37.7	3
June	31	23	23.4	31.7	15
July	26	22	22.3	26.8	23
August	26	21	21.8	26.5	18
September	27	21	20.7	28	18
October	30	21	20.2	30.6	9
November	30	19	18.5	30	3
December	28	17	15.9	29.1	1

Table-3.2: Normal values of Relative Humidity, Rainfall &Average Pressure

Months	Humidity close (%)	Average Pressure (mb)	Rainfall Monthly Total Rainfall in mm	Wind Speed km/h
January	40	1014.1	0	6.6
February	33	1012.8	0	7
March	28	1011.1	2	7.6
April	32	1008.7	1	9.1
May	46	1006.8	4	12.6
June	72	1004.1	141	14.3
July	85	1003.6	195	16.3
August	88	1005.1	158	14.8
September	84	1007.5	122	9.4
October	62	1010.3	57	7
November	51	1012.3	23	7.2
December	44	1013.4	1	7.2

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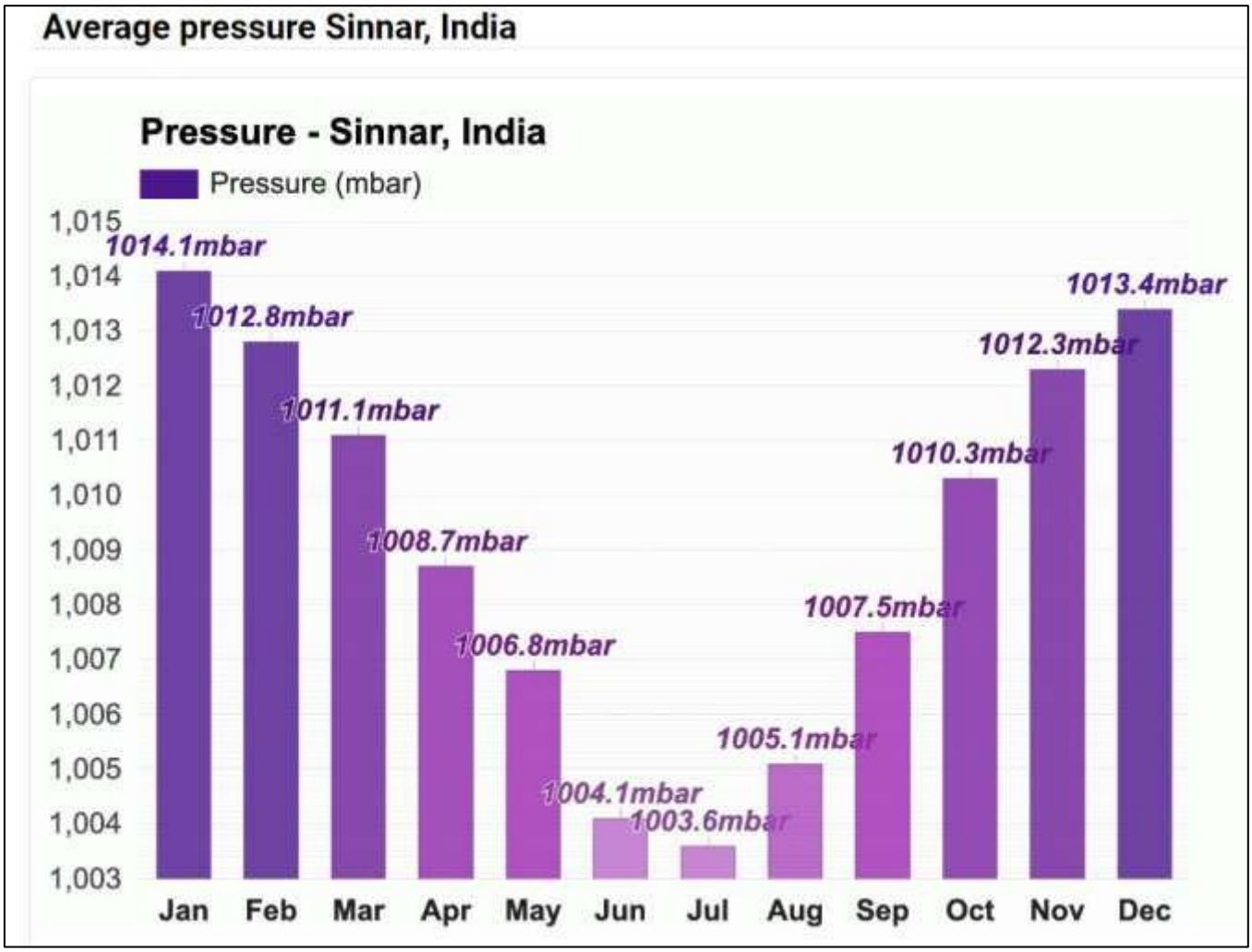

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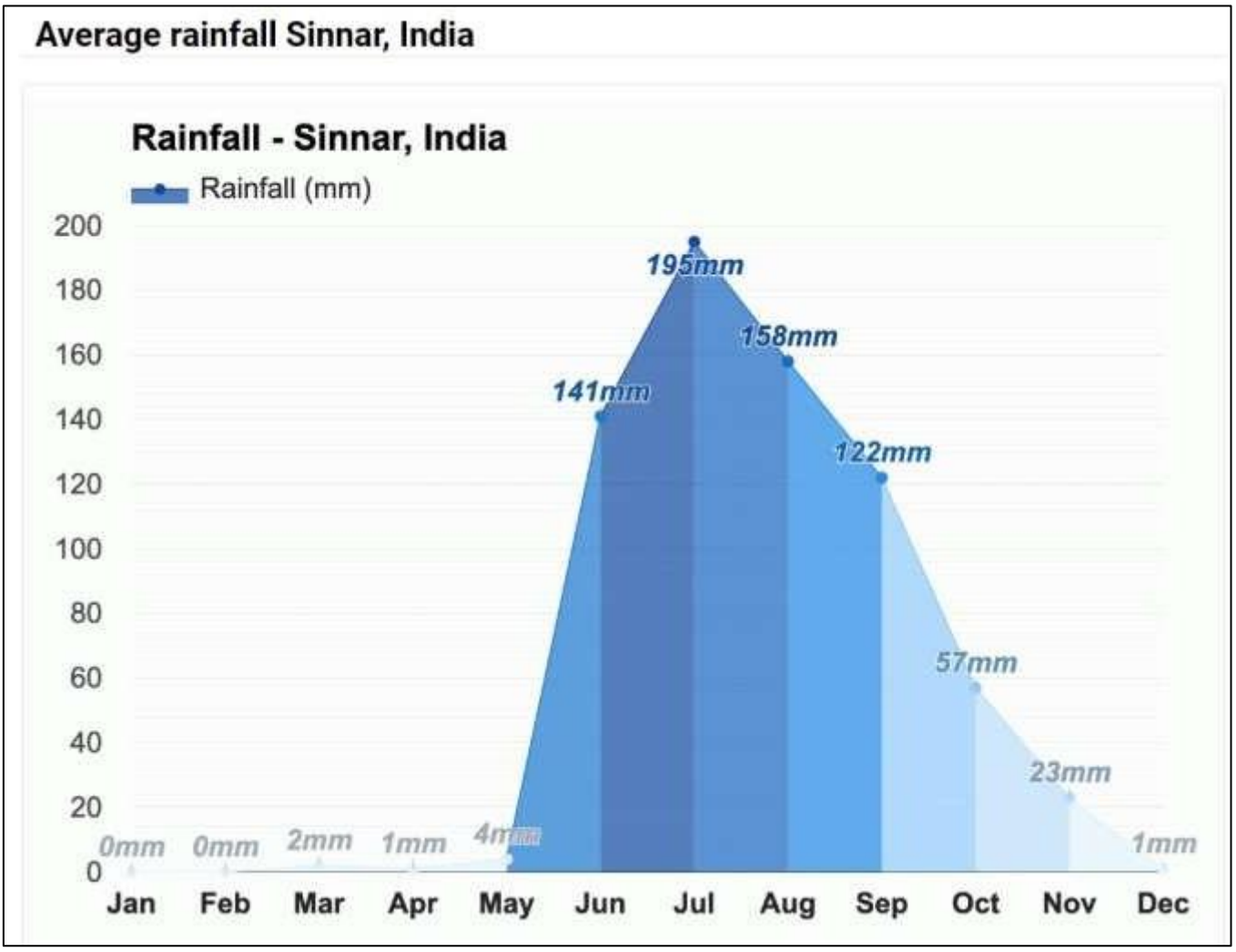

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

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Table:3.3: Normal Value of Cloud Amount

Clouds Amount		
S. No	**Month**	**Average Cloud Cover %**
1.	January	6
2.	February	6
3.	March	6
4.	April	5
5.	May	9
6.	June	50
7.	July	82
8.	August	81
9.	September	57
10.	October	26
11.	November	14
12.	December	8

WEEKLY: 2024

Date	Tem (ºF)			Humidity (%)			Wind (mph)			Pressure (in)			Rain (mm)	Wind Speed km/hr
	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min		
4/1/2024	61	53.1	43	89	68.9	51	21	11.8	0	30.2	30.1	30	0	10-20
11/1/2024	77	64.6	55	100	86.3	60	24	10.8	0	29.8	29.7	29.6	0	10-20
18/1/2024	64	52.6	43	100	89.6	78	12	4	0	30.1	30	29.9	0	10-20
25/1/2024	73	63.5	58	93	80.2	53	23	9.5	3	30	30	29.9	0	10-20
4/2/2024	70	60.4	53	90	58.4	35	24	13.6	3	29.7	29.6	29.5	0	10-20
11/2/2024	79	69.1	55	96	82.8	48	22	12.2	6	29.8	29.7	29.6	0	10-20
18/2/2024	42	42	42	62	62	62	13	13	13	30.2	30.2	30.2	0	10-20
25/2/2024	80	67.1	53	90	65.7	30	22	12.7	5	30.1	30	29.9	0	10-20
4/3/2024	82	72.3	67	100	87.2	65	15	7.9	3	29.9	29.8	29.7	0	10-20
11/3/2024	71	62.4	55	78	62.4	47	14	6	0	30.2	30.2	30.1	0	10-20
18/3/2024	71	64.9	60	87	50.9	24	22	15.5	8	30.2	30.1	29.9	0.15	10-20
25/3/2024	78	70.7	61	90	74.3	37	16	9.9	0	29.6	29.5	29.4	0	10-20

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4/4/2024	84	69.9	57	75	46.2	22	10	5.5	0	30	29.9	29.9	0	10-20
11/4/2024	82	70.3	59	67	42	24	18	10.9	0	30.1	29.9	29.8	0	10-20
18/4/2024	85	77.7	75	90	79.5	58	17	10.5	5	29.9	29.9	29.9	0	10-20
25/4/2024	81	75.3	68	93	81	65	20	11.8	6	30	29.9	29.9	0	10-20
4/5/2024	85	77.7	70	93	78.2	59	18	12	3	29.9	29.9	29.8	0.26	10-20
11/5/2024	82	77.6	73	68	58.5	47	18	11	3	29.9	29.9	29.8	0	10-20
18/5/2024	90	77.7	69	100	82	55	10	4.3	0	29.9	29.8	29.8	0.24	10-20
25/5/2024	93	84.1	79	94	78	56	16	9.9	3	29.8	29.7	29.7	0	10-20
4/6/2024	91	85.4	82	89	77.4	63	17	13.4	7	29.7	29.7	29.6	0	10-20
11/6/2024	93	83.5	77	94	73.1	47	18	6.2	0	29.9	29.8	29.8	0.19	10-20
18/6/2024	91	82.9	77	90	71.9	57	25	15.4	7	29.8	29.8	29.7	0.03	10-20
25/6/2024	94	86.7	81	88	72.4	52	15	9.3	3	29.9	29.9	29.8	0	10-20
4/7/2024	97	88.1	81	88	66.8	46	16	9	3	29.9	29.9	29.8	0	20-30
11/7/2024	91	82.3	78	94	80.8	57	16	4.7	0	30	30	29.9	0.01	20-30
18/7/2024	90	82.6	76	90	74.2	51	21	7	3	30	29.9	29.9	0	20-30
25/7/2024	78	75.2	73	97	90.4	84	20	5.9	0	30.1	30.1	30	1.13	20-30
4/8/2024	97	86	77	82	68.5	40	16	7.2	0	29.9	29.9	29.8	0	20-30
11/8/2024	96	88.1	80	79	62.9	46	14	6.6	0	30	30	29.9	0	20-30
18/8/2024	99	89.4	81	88	65.1	40	13	5	0	30	29.9	29.9	0	20-30
25/8/2024	96	87.3	79	77	58.5	36	15	7.7	0	30.1	30	30	0	20-30
4/9/2024	89	81.2	77	94	83.9	61	23	10.6	6	30	29.9	29.9	0.01	10-20

CHAPTER 4

AIR AND WATER ENVIRONMENT

4.1. INTRODUCTION:

The ambient air quality of an area is largely influenced by the various activities occurring within it, such as industrial, domestic, and agricultural operations. Additionally, the concentration of pollutants in a region is shaped by meteorological conditions, topography, and natural features like vegetation and forests. These factors collectively determine how pollutants are dispersed, diffused, transported, and assimilated in the atmosphere.

4.2 AIR ENVIRONMENT

The baseline status is assessed though a scientifically designed ambient air quality

monitoring network based on the following considerations:-

i. Meteorological conditions including wind direction;

ii. Topography of the study area;

iii. Existing Ambient Air Quality for obtaining baseline;

4.3 Frequency and Parameters of Monitoring

Ambient air quality monitoring has been carried out with a frequency of one sample per month at four locations for the month of Mar'24 & June'24. The monitoring of ambient air has been carried out for the following parameters as mentioned below:

- Particulate Matter10 (PM10)
- Particulate Matter2.5 (PM2.5)
- Sulphur dioxide (SO2)
- Nitrogen Oxide(NOX)
- Ammonia (NH3)
- Lead (Pb)
- Ozone (O3)
- Arsenic (Ar)
- Nickel (Ni)

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4.4 Instrument used for Sampling

In order to assess the Ambient Air Quality (AAQ), samples of ambient air were collected by installation of Respirable Dust Sampler and Fine Particulate Sampler at different locations within the study area and analyzed to find out the existing status of air quality.

4.5 Sampling and Analytical Technique

With a view to collecting the samples, Envirotech made Fine Particulate Sampler and Respirable Dust Samplers along with Gaseous attachment have been used. Filter papers were used for the collection of PM10 & PM2.5. SO2 was collected by drawing air at a flow-rate of 0.5 liters per minute (lpm) through an absorbing solution (TCM). The NOX was collected by drawing air at a flow rate of 0.5 liters per minute (lpm) through the mixture of absorbing solutions. Carbon monoxide was collected 8 hourly and analyzed by Non-Dispersive Infra- Red Spectroscopy (NDIR).

4.6 Air Quality Index

The emission of the gaseous pollutant from the stationary/mobile sources has an adverse effect on the air quality of the atmosphere. The measure of how much the air has become polluted is measured by Air Quality Index (AQI). It serves as calculator ranging from 0 to 500 against the rising level of air pollution which is usually expressed in the concentration (microgram/cubic meter).

4.7 Significance of Air Quality Index

Based upon the values of the Air Quality Index at any given period, the impact on the human health can be estimated. The color coding of the different levels of the AQI and levels of health concern on the human health is shown in **Table below:**

TABLE-4.7 SIGNIFICANCE OF AIR QUALITY INDEX

Air Quality Index (AQI) Values	Levels of Health Concern	Colors
0-50	Good	Green
51-100	Satisfactory	Light Green
101-200	Moderate	Yellow
201-300	Poor	Orange
301-400	Very Poor	Red
>401	Severe	Maroon

Good (0–50)	Minimal Impact	**Poor (201–300)**	Breathing discomfort to people on prolonged expo
Satisfactory (51–100)	Minor breathing discomfort To sensitive people	**Very Poor (301–400)**	Respiratory illness to the people on prolonged expo
Moderate (101–200)	Breathing discomfort to the people with lung,	**Severe (>401)**	Respiratory effects even on healthy people

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4.8 SECONDARY STUDY FOR AIR ENVIRONMENT

Ambient Air Quality Monitored at SRO Office Nashik	Type : Residential
Location : Udyog Bhavan	**Program Name :** SAMP
Frequency: Six days in a week	

Source: AirQuality | Maharashtra Pollution Control Board (mpcb.gov.in)

March					
1	11-03-2024	4	24	68	68
2	12-03-2024	7	37	94	94
3	13-03-2024	5	40	82	82
4	14-03-2024	4	37	79	79
5	15-03-2024	11	30	81	81
6	16-03-2024	7	36	62	62
7	18-03-2024	7	27	86	86
8	19-03-2024	4	40	88	88
9	20-03-2024	6	31	100	100
10	21-03-2024	10	40	88	88
11	22-03-2024	4	25	62	62
12	23-03-2024	11	27	57	57
13	25-03-2024	8	45	56	56
14	26-03-2024	4	24	49	49
15	27-03-2024	4	33	57	57
16	28-03-2024	4	42	66	66
17	29-03-2024	7	28	77	77
18	30-03-2024	9	40	49	50

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4.9 Selection of Sampling Locations

Four monitoring locations have been selected on the basis of predominant wind direction. All probable directions, which may be affected due to the project, have been considered. Also effort was made to collect the baseline conditions of the entire project affecting villages & sensitive areas and receptors**.**

The monitoring stations have been setup in order to locate the locations as close as feasible to the anticipated maximum pollutant concentration areas. Logistic considerations such as accessibility, security, and availability of reliable power supply etc. were also examined while finalizing the stations. The monitoring locations are depicted in 4.9 Table below.

Table 4.9 AMBIENT AIR QUALITY MONITORING LOCATIONS

S. No.	Code	Location	Dist. from the project site
1.	AAQS 1	Near Utility Water Softener Tank	Within the project site
2.	AAQS 2	Main Scrap Yard	Within the project site
3.	AAQS 3	Near Gate No.2	Within the project site
4.	AAQS 4	Near Savory Utility Entrance	Within the project site

4.10 Ambient Air Quality: Results & Discussion

The Ambient Air Quality (AAQ) was monitored by the Horizon Services during the month of June 2024 at four locations inside the project site.

The quality of ambient air was monitored at the above locations as stipulated by CPCB vide Notification No. B-29016/20/90/PCI-I. National Ambient Air Quality Standards (NAAQS) dated 18th November, 2009. The monitoring results of ambient air quality are provided in Table 4.10 below:

4.10 AIR QUALITY MONITORING RESULTS

	PM_{10}	$PM_{2.5}$	SO_2	NO_X	$CO(mg/m^3)$
NAAQS, For March'24 for 24 Hourly monitoring (except for CO i.e. 8 hours)	**100(µg/m³)**	**60(µg/m3)**	**80(µg/m3)**	**80(µg/m3)**	**2.0(mg/m³)**
Near Utility Water Softener Tank					
PROJECT SITE(AAQS-1)	50.29	23.19	12.80	25.31	0.137
Main Scrap Yard					
PROJECT SITE(AAQS-2	41.09	22.83	12.64	15.19	0.080
Near Gate No.2					
PROJECT SITE(AAQS-3	43.19	22.80	12.17	23.65	0.081
Near Savory Utility Entrance					
PROJECT SITE(AAQS-4	41.39	20.85	12.16	22.60	0.076

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Note-(i) No B-29016/20/90/PCI-I, National Ambient Air Quality Standards National Ambient Air Quality Standards Notification, Central Pollution Control Board, Delhi, 18th November, 2009.

(ii) *****SO. 384(E), National Ambient Air Quality Standards Notification, Central Pollution Control Board, Delhi, 11th April, 1994

(iii) **24 hourly or 08 hourly or 01 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring

(iv) ***Industrial, Residential, Rural and Other Areas Standards (CPCB).

4.11 Result Interpretation

As per National Ambient Air Quality Standards (revised on 16th November 2009) the quality of air is found to be within the prescribed standard for all monitoring location.

4.12 Ambient Air Quality in the Study Area

	PM_{10}	$PM_{2.5}$	SO_2	NO_X	$CO(mg/m^3)$
NAAQS, For June'24 for 24 Hourly monitoring (except for CO i.e. 8 hours)	**100(µg/m³)**	**60(µg/m3)**	**80(µg/m3)**	**80(µg/m3)**	**2.0(mg/m³)**
Near Utility Water Softener Tank					
PROJECT SITE(AAQS-1)	50.29	23.19	12.80	25.31	0.137
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Near Savory Utility Entrance					
PROJECT SITE(AAQS-4	41.39	20.85	12.16	22.60	0.076

(A) Respirable Suspended Particulate Matter(PM10)

The Ambient Air Quality Monitoring reveals the minimum and maximum concentrations of PM10 Station wise variation of PM10 is graphically shown in **Figure below 4.12.**

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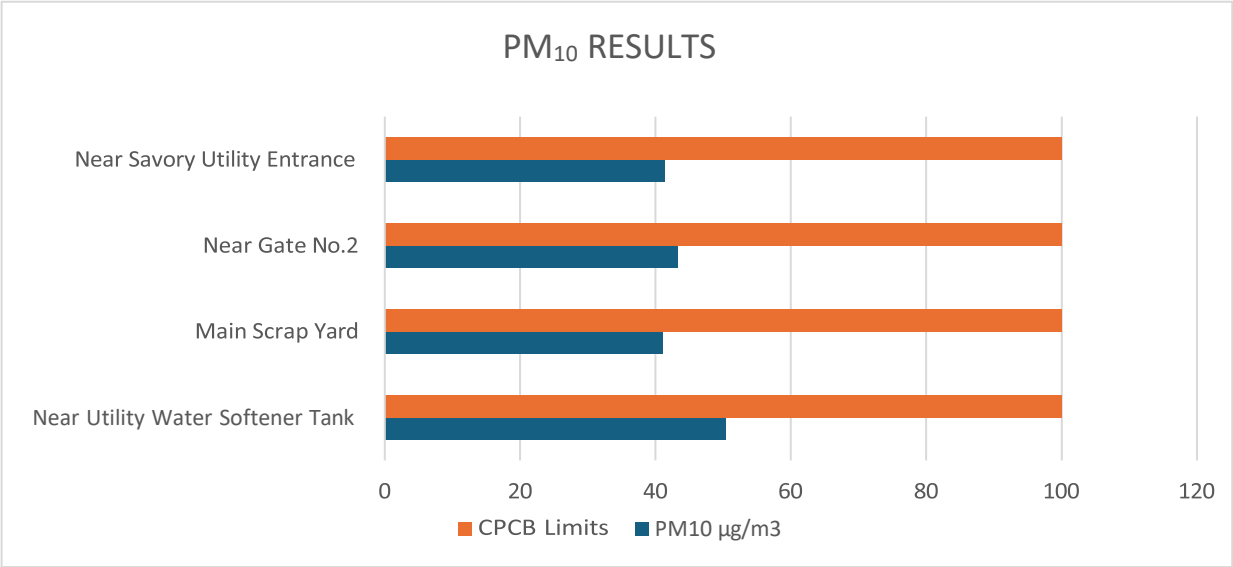

Figure 4.12

(B) Fine Particulate Matter ($PM_{2.5}$)

The Ambient Air Quality Monitoring reveals the minimum and maximum concentrations of PM2.5 Station wise variation of PM2.5 is graphically shown in **Figure below 4.13.**

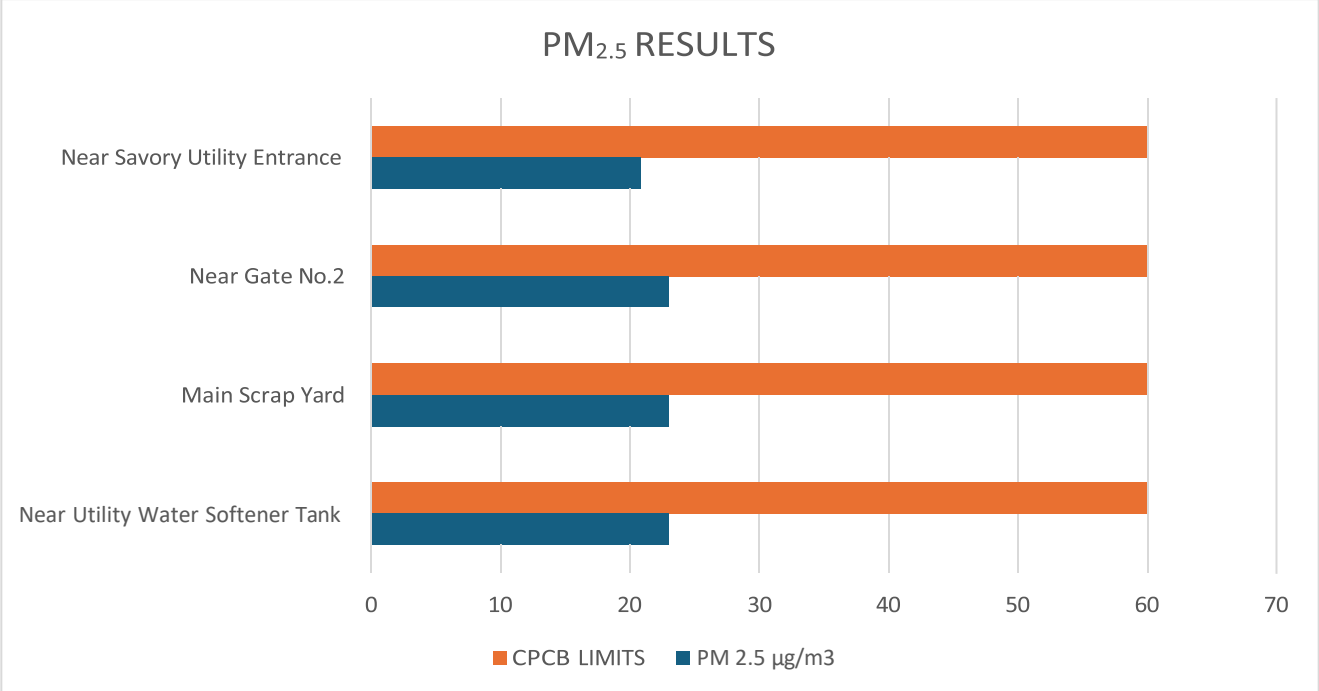

Figure 4.13

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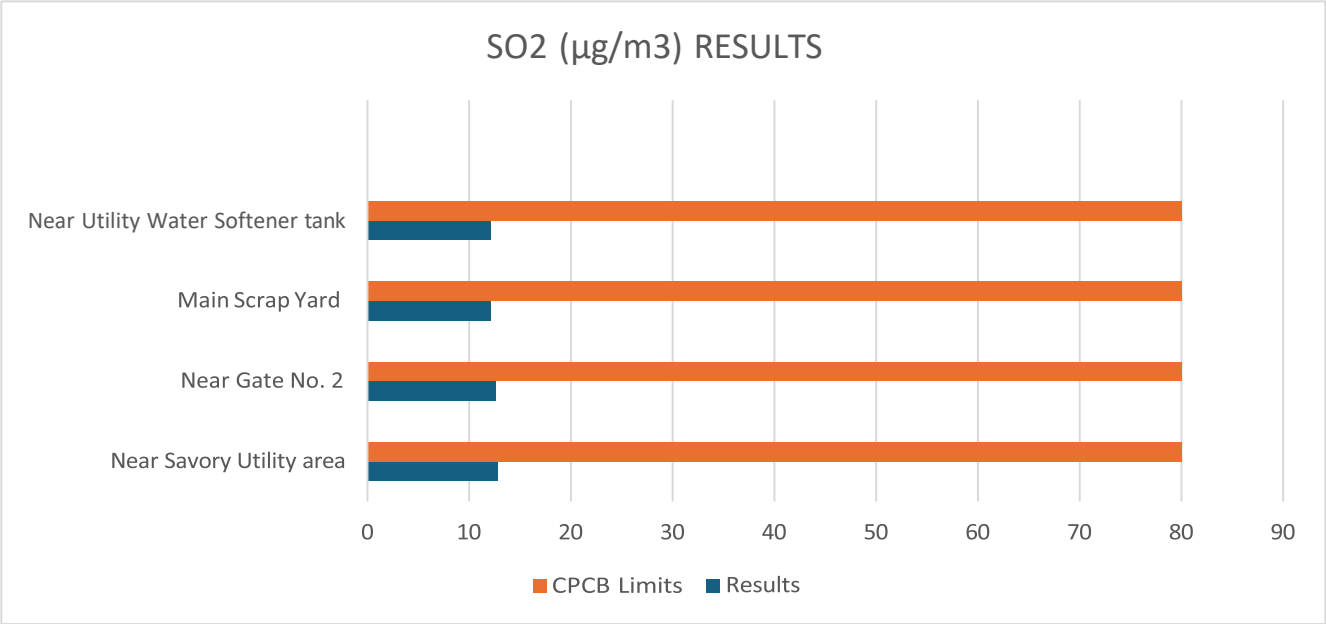


Figure 4.14

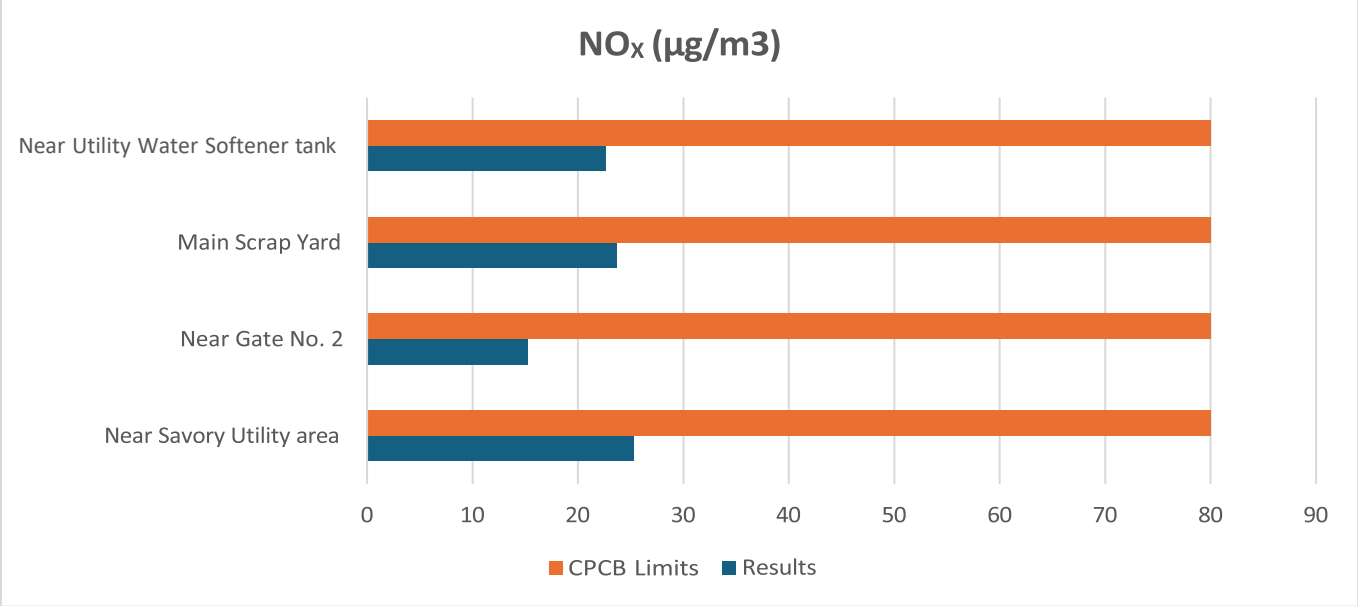


Figure 4.15

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

Project Address: M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.

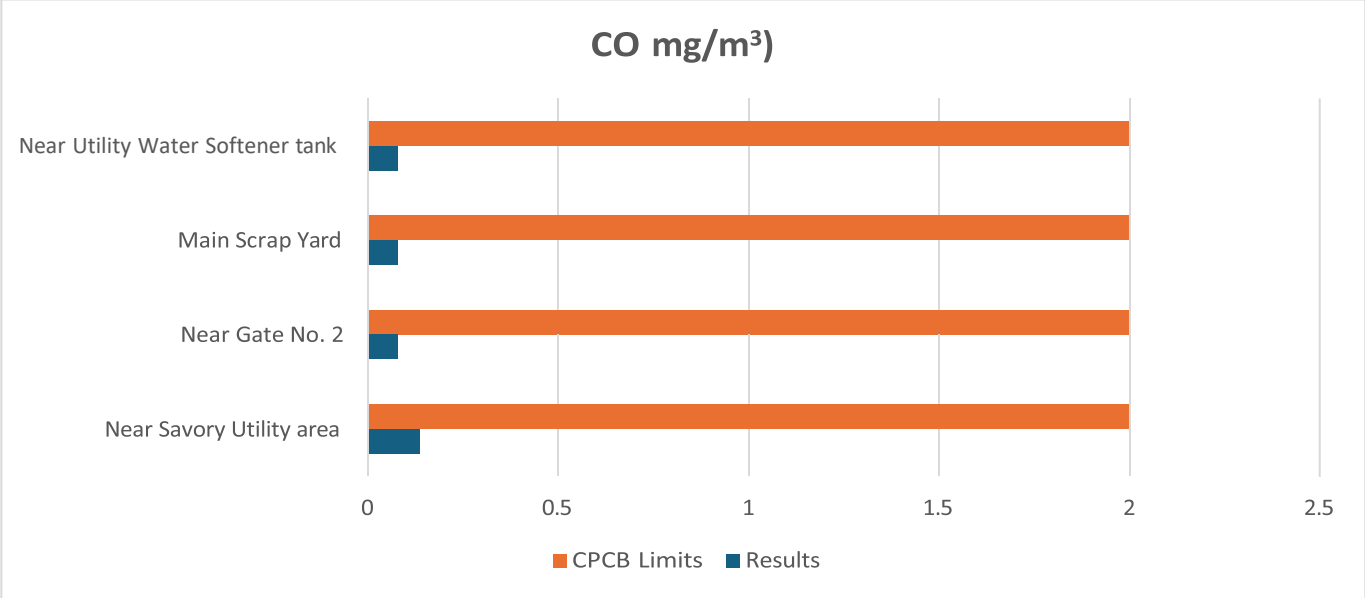


Figure 4.16

	PM_{10}	$PM_{2.5}$	SO_2	NO_X	$CO(mg/m^3)$
NAAQS, For March'24 for 24 Hourly monitoring (except for CO i.e. 8 hours)	**100(µg/m³)**	**60(µg/m3)**	**80(µg/m3)**	**80(µg/m3)**	**2.0(mg/m³)**
Near Utility Water Softener Tank					
PROJECT SITE(AAQS-1)	66.29	33.71	11.28	18.29	0.109
Main Scrap Yard					
PROJECT SITE(AAQS-2	47.39	24.80	11.65	12.10	0.091
Near Gate No.2					
PROJECT SITE(AAQS-3	64.37	33.20	11.29	19.61	0.099
Near Savory Utility Entrance					
PROJECT SITE(AAQS-4	53.19	26.67	11.20	19.85	0.109

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

Project Address: M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.

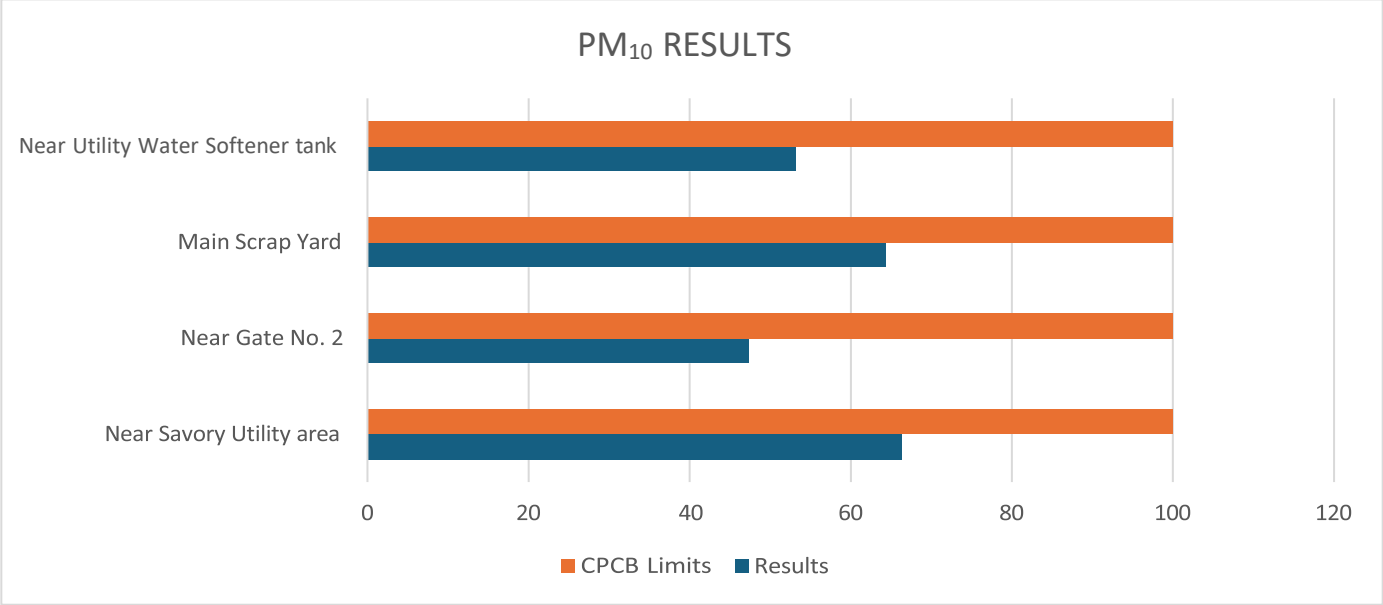


Figure 4.17

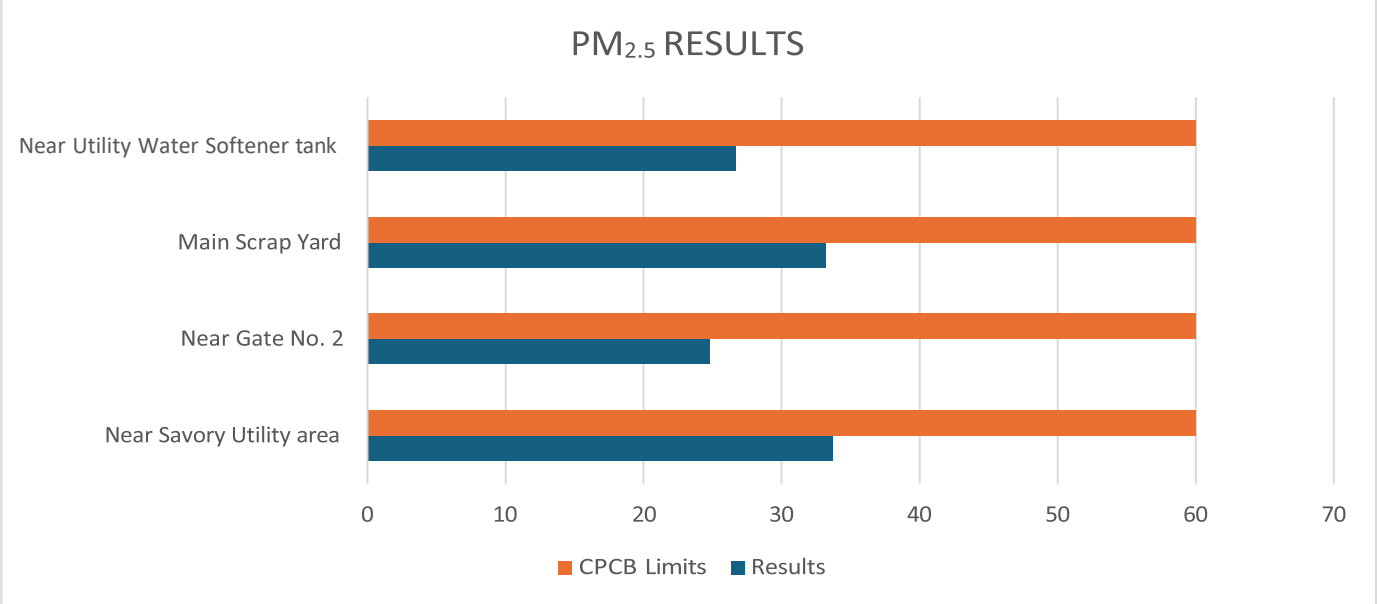


Figure 4.18

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

Project Address: M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.

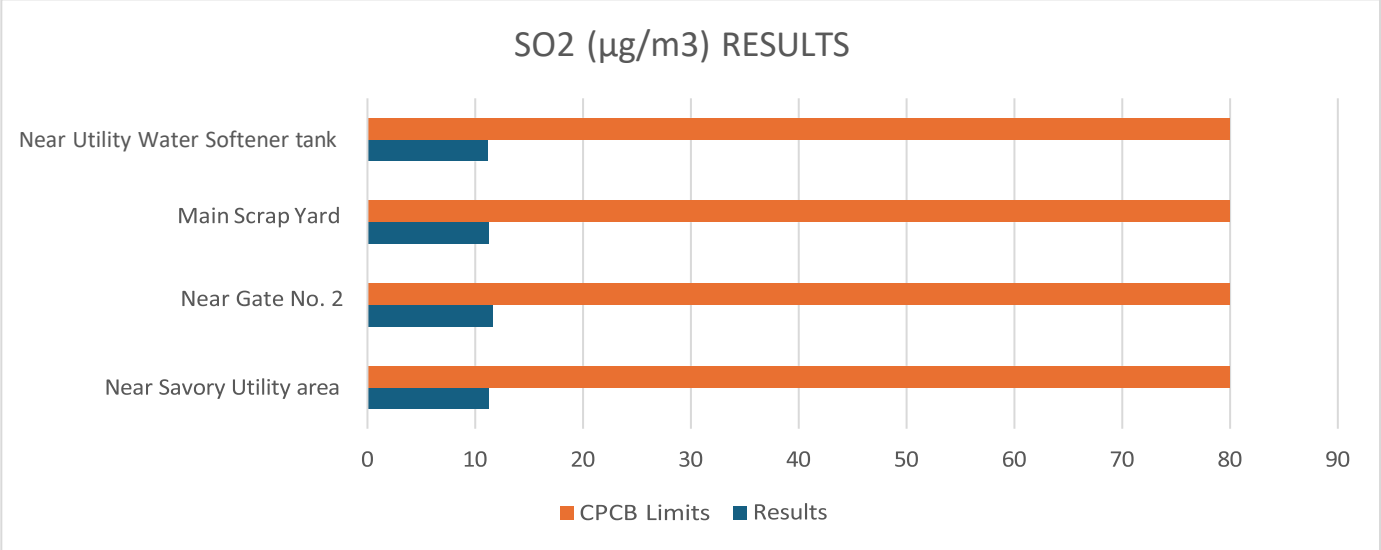


Figure 4.19

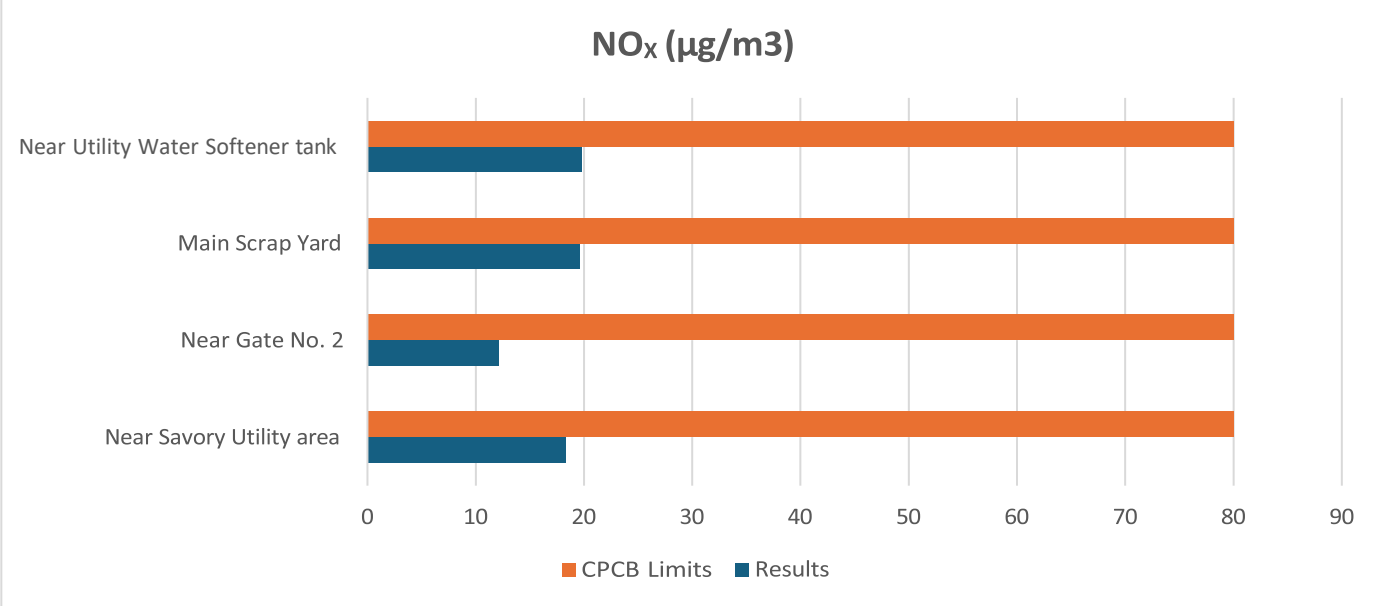


Figure 4.20

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

Project Address: M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.

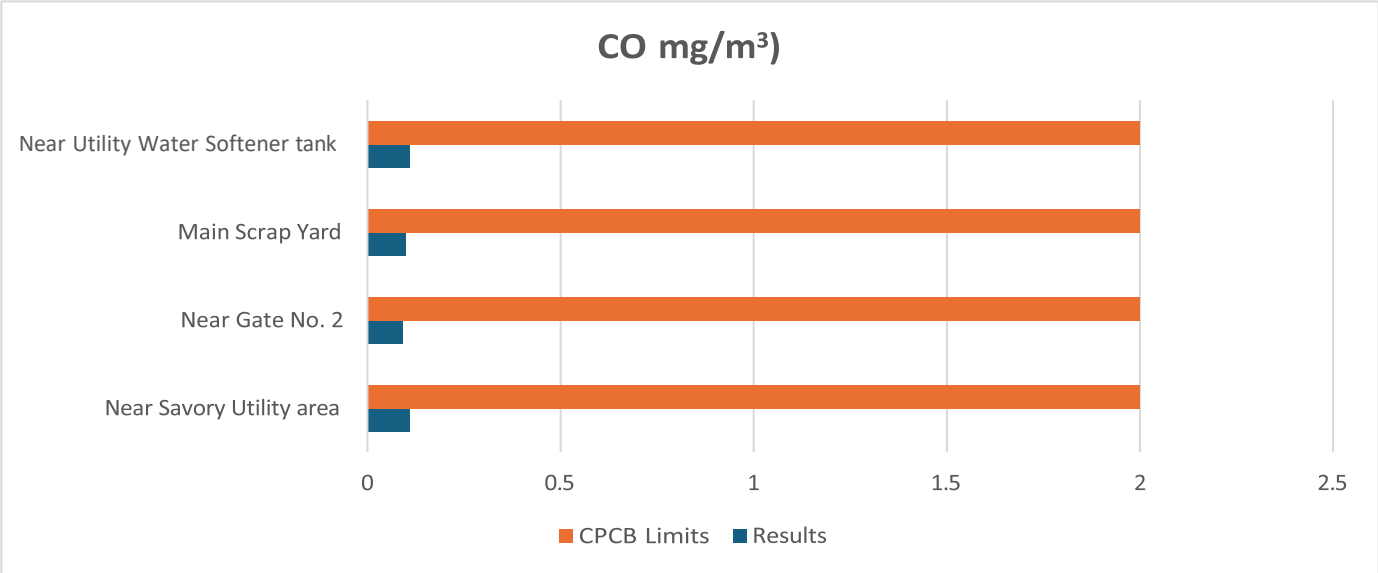


Figure 4.21

WATER ENVIRONMENT

Water requirement

Hindustan Unilever Limited having facilities to produce Ice Cream, Soup etc. The total manpower on campus is around 850 working for three shifts a day maximum an industrial canteen caters to the employees.

Water for both industrial and domestic use is extracted from the bore wells dug on campus. The average daily consumption of water from these borewells in the factory is Fresh Water Consumption 313 KL/day, Process Water Consumption 45 KL/ Day, Treated Water Consumption 220 KL/ Day.

A water balance estimate in the factory indicates a total quantum of waste water generated from the campus including from primary manufacturing activities, utilities such as canteen, toilets etc. is around 340 KL/day.

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

Project Address: **M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.**

Waste water analysis report (ETP-Inlet/Outlet)

Parameter	Inlet (ppm)	Outlet (ppm)	CPCB Limits
BOD	295	10	<30
COD	1030	29	<250
Chloride	132	96	Not Specified
Oil & Grease	1	<1	<10
TDS	2810	1397	<2100
Sulphate	28.5	7.21	Not Specified
TSS	77	13	<100

TEST REPORT

Test Report No.	01/ETHEN2315255	Issue Date	29 Mar 2024	ULR No.	TC082843400001685IF
Customer Name	HINDUSTAN UNILEVER LIMITED				
Customer Address	Plot No.A-8/9, MIDC Ind. Area,Malegaon-Sinnar,Nashik422103 PO Box : 422103				
Order/Reference	PO15339516 Dated 12.01.2024				
Specification	As Per MPCB Consent Copy of Customer				
Information as provided by customer:					
Sample Name	ETP After Treatment Water Sample				
Sample Nature	Waste water				
Sampling Details :					
Sample Drawn	By Envirocare				
Date of Sampling	19 Mar 2024	Sampling Method		As Per IS 17614 Part 1:2021	
Sample Details :					
Sample Received On	19 Mar 2024	Start of Analysis		20 Mar 2024	
End of Analysis	28 Mar 2024	Sample Condition on receipt		Satisfactory	
Sample Packaging	Plastic Can + Glass Bottle	Sample Quantity		2 lit	

Sr. No.	Parameters	Limit	Results	LOQ	Unit	Method
Chemical Parameters						
1	Biochemical Oxygen Demand (BOD) (3 days at 27°C)	Max.30	10	1.0	mg/l	IS 3025 (Part 44): 1993, RA 2019
2	Chemical Oxygen Demand (COD)	Max.250	29	4.0	mg/l	APHA 5220 B, 23rd Edition: 2017
3	Chloride as Cl	N.S.	96	1.0	mg/l	APHA 4500 Cl B, 23rd Edition: 2017
4	Oil and Grease	Max.10	<1.0	1.0	mg/l	IS 3025 (Part 39): 1991, RA 2019
5	pH	6.0-8.5	7.56	1.0	-	APHA 4500 H+ B, 23rd Edition: 2017
6	Sulphate as SO_4	N.S.	7.21	0.5	mg/L	APHA 4500 SO_4^{-2} E, 24th Edition: 2022
7	Total Dissolved Solids	Max.2100	1397	1.0	mg/l	APHA 2540 C, 23rd Edition: 2017
8	Total Suspended Solids	Max.100	13	5.0	mg/l	APHA 2540 D, 23rd Edition: 2017

TEST REPORT

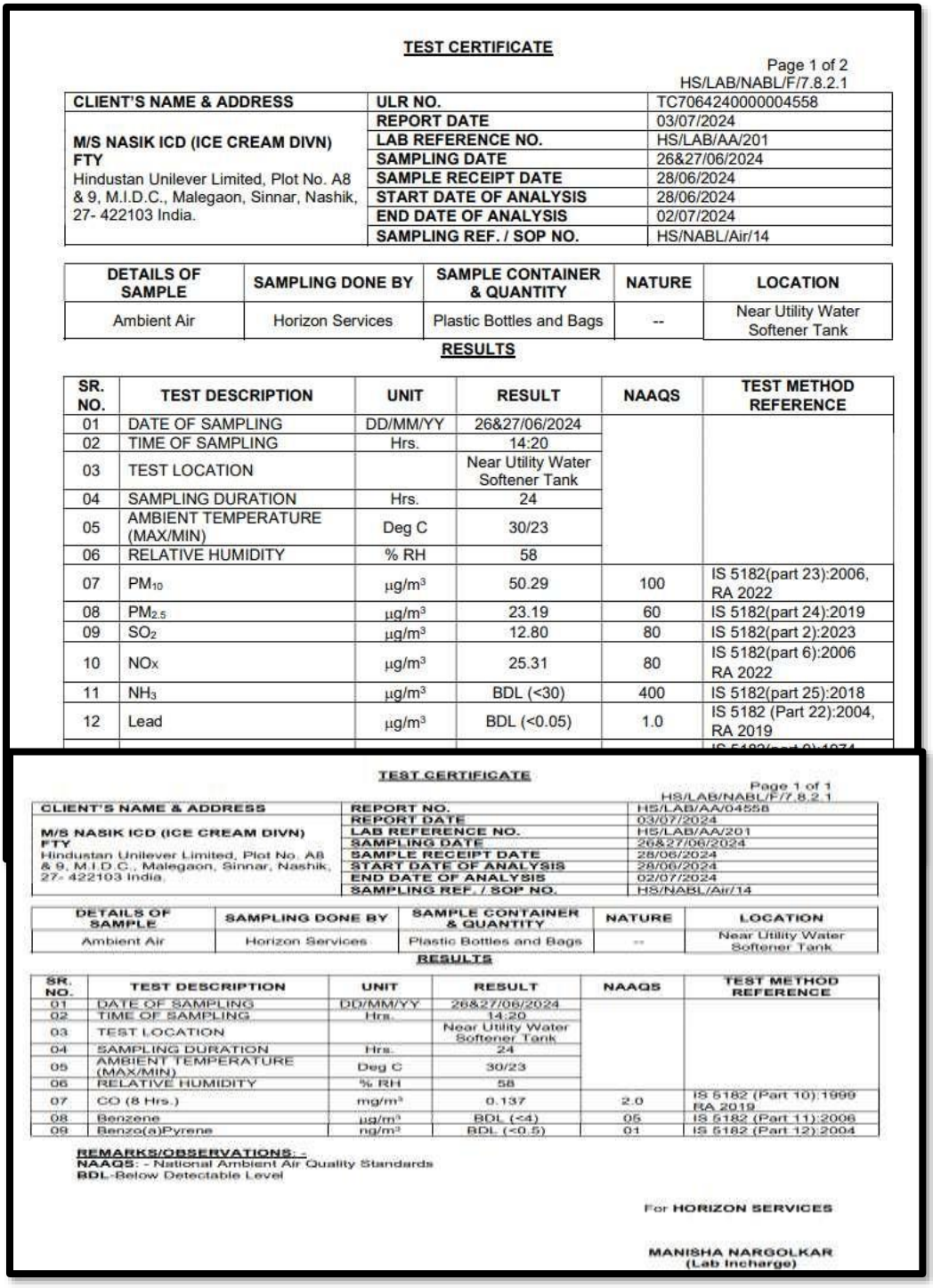
Test Report No.	01/ETHEN2310294	Issue Date	26 Mar 2024	ULR No.	TC082843400001684IF
Customer Name	HINDUSTAN UNILEVER LIMITED				
Customer Address	Plot No.A-8/9, MIDC Ind. Area,Malegaon-Sinnar,Nashik422103 PO Box : 422103				
Order/Reference	PO15339516 Dated 12.01.2024				
Specification	NA				
Information as provided by customer:					
Sample Name	ETP Before Treatment Water Sample				
Sample Nature	Waste water				
Sampling Details :					
Sample Drawn	By Envirocare				
Date of Sampling	19 Mar 2024	Sampling Method		As Per IS 17614 Part 1:2021	
Sample Details :					
Sample Received On	19 Mar 2024	Start of Analysis		20 Mar 2024	
End of Analysis	26 Mar 2024	Sample Condition on receipt		Satisfactory	
Sample Packaging	Plastic Can	Sample Quantity		2 lit	

Sr. No.	Parameters	Results	LOQ	Unit	Method
Chemical Parameters					
1	Biochemical Oxygen Demand (BOD) (3 days at 27°C)	295	1.0	mg/l	IS 3025 (Part 44): 1993, RA 2019
2	Chemical Oxygen Demand (COD)	1030	4.0	mg/l	APHA 5220 B, 23rd Edition: 2017
3	Chloride as Cl	132	1.0	mg/l	APHA 4500 Cl B, 23rd Edition: 2017
4	Oil and Grease	1.0	1.0	mg/l	IS 3025 (Part 39): 1991, RA 2019
5	Sulphate as SO_4	28.5	0.5	mg/L	APHA 4500 SO_4^{-2} E, 24th Edition: 2022
6	Total Dissolved Solids	2810	1.0	mg/l	APHA 2540 C, 23rd Edition: 2017
7	Total Suspended Solids	77	5.0	mg/l	APHA 2540 D, 23rd Edition: 2017

Authorised signatory
Shweta Malvankar

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

Project Address: **M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.**



TEST CERTIFICATE

Page 1 of 2
HS/LAB/NABL/F/7.8.2.1

CLIENT'S NAME & ADDRESS		
M/S NASIK ICD (ICE CREAM DIVN) FTY Hindustan Unilever Limited, Plot No. A8 & 9, M.I.D.C., Malegaon, Sinnar, Nashik, 27- 422103 India.	**ULR NO.**	TC7064240000004558
	REPORT DATE	03/07/2024
	LAB REFERENCE NO.	HS/LAB/AA/201
	SAMPLING DATE	26&27/06/2024
	SAMPLE RECEIPT DATE	28/06/2024
	START DATE OF ANALYSIS	28/06/2024
	END DATE OF ANALYSIS	02/07/2024
	SAMPLING REF. / SOP NO.	HS/NABL/Air/14

DETAILS OF SAMPLE	SAMPLING DONE BY	SAMPLE CONTAINER & QUANTITY	NATURE	LOCATION
Ambient Air	Horizon Services	Plastic Bottles and Bags	--	Near Utility Water Softener Tank

RESULTS

SR. NO.	TEST DESCRIPTION	UNIT	RESULT	NAAQS	TEST METHOD REFERENCE
01	DATE OF SAMPLING	DD/MM/YY	26&27/06/2024		
02	TIME OF SAMPLING	Hrs.	14:20		
03	TEST LOCATION		Near Utility Water Softener Tank		
04	SAMPLING DURATION	Hrs.	24		
05	AMBIENT TEMPERATURE (MAX/MIN)	Deg C	30/23		
06	RELATIVE HUMIDITY	% RH	58		
07	PM_{10}	µg/m³	50.29	100	IS 5182(part 23):2006, RA 2022
08	$PM_{2.5}$	µg/m³	23.19	60	IS 5182(part 24):2019
09	SO_2	µg/m³	12.80	80	IS 5182(part 2):2023
10	NOx	µg/m³	25.31	80	IS 5182(part 6):2006 RA 2022
11	NH_3	µg/m³	BDL (<30)	400	IS 5182(part 25):2018
12	Lead	µg/m³	BDL (<0.05)	1.0	IS 5182 (Part 22):2004, RA 2019

TEST CERTIFICATE

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HS/LAB/NABL/F/7.8.2.1

CLIENT'S NAME & ADDRESS		
M/S NASIK ICD (ICE CREAM DIVN) FTY Hindustan Unilever Limited, Plot No. A8 & 9, M.I.D.C., Malegaon, Sinnar, Nashik, 27- 422103 India.	**REPORT NO.**	HS/LAB/AA/04558
	REPORT DATE	03/07/2024
	LAB REFERENCE NO.	HS/LAB/AA/201
	SAMPLING DATE	26&27/06/2024
	SAMPLE RECEIPT DATE	28/06/2024
	START DATE OF ANALYSIS	28/06/2024
	END DATE OF ANALYSIS	02/07/2024
	SAMPLING REF. / SOP NO.	HS/NABL/Air/14

DETAILS OF SAMPLE	SAMPLING DONE BY	SAMPLE CONTAINER & QUANTITY	NATURE	LOCATION
Ambient Air	Horizon Services	Plastic Bottles and Bags	--	Near Utility Water Softener Tank

RESULTS

SR. NO.	TEST DESCRIPTION	UNIT	RESULT	NAAQS	TEST METHOD REFERENCE
01	DATE OF SAMPLING	DD/MM/YY	26&27/06/2024		
02	TIME OF SAMPLING	Hrs.	14:20		
03	TEST LOCATION		Near Utility Water Softener Tank		
04	SAMPLING DURATION	Hrs.	24		
05	AMBIENT TEMPERATURE (MAX/MIN)	Deg C	30/23		
06	RELATIVE HUMIDITY	% RH	58		
07	CO (8 Hrs.)	mg/m³	0.137	2.0	IS 5182 (Part 10):1999 RA 2019
08	Benzene	µg/m³	BDL (<4)	05	IS 5182 (Part 11):2006
09	Benzo(a)Pyrene	ng/m³	BDL (<0.5)	01	IS 5182 (Part 12):2004

REMARKS/OBSERVATIONS: -
NAAQS: - National Ambient Air Quality Standards
BDL-Below Detectable Level

For **HORIZON SERVICES**

MANISHA NARGOLKAR
(Lab Incharge)

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

Project Address: **M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.**

TEST CERTIFICATE

HS/LAB/NABL/F/7.8.2.1

CLIENT'S NAME & ADDRESS		
M/S NASIK ICD (ICE CREAM DIVN) FTY Hindustan Unilever Limited, Plot No. A8 & 9, M.I.D.C., Malegaon, Sinnar, Nashik, 27- 422103 India.	**ULR NO.**	TC7064240000004559
	REPORT DATE	03/07/2024
	LAB REFERENCE NO.	HS/LAB/AA/201
	SAMPLING DATE	26&27/06/2024
	SAMPLE RECEIPT DATE	28/06/2024
	START DATE OF ANALYSIS	28/06/2024
	END DATE OF ANALYSIS	02/07/2024
	SAMPLING REF. / SOP NO.	HS/NABL/Air/14

DETAILS OF SAMPLE	SAMPLING DONE BY	SAMPLE CONTAINER & QUANTITY	NATURE	LOCATION
Ambient Air	Horizon Services	Plastic Bottles and Bags	--	Main Scrap Yard

RESULTS

SR. NO.	TEST DESCRIPTION	UNIT	RESULT	NAAQS	TEST METHOD REFERENCE
01	DATE OF SAMPLING	DD/MM/YY	26&27/06/2024		
02	TIME OF SAMPLING	Hrs.	14:30		
03	TEST LOCATION		Main Scrap Yard		
04	SAMPLING DURATION	Hrs.	24		
05	AMBIENT TEMPERATURE (MAX/MIN)	Deg C	30/23		
06	RELATIVE HUMIDITY	% RH	58		
07	PM_{10}	µg/m³	41.09	100	IS 5182(part 23):2006, RA 2022
08	$PM_{2.5}$	µg/m³	22.83	60	IS 5182(part 24):2019
09	SO_2	µg/m³	12.64	80	IS 5182(part 2):2023
10	NO_x	µg/m³	15.19	80	IS 5182(part 6):2006 RA 2022
11	NH_3	µg/m³	BDL (<30)	400	IS 5182(part 25):2018
12	Lead	µg/m³	BDL (<0.05)	1.0	IS 5182 (Part 22):2004, RA 2019
13	Ozone	µg/m³	BDL (<5)	100	IS 5182(part 9):1974, RA 2019
14	Arsenic	ng/m³	BDL (<3)	06	HS/NABL/AIR/22
15	Nickel	ng/m³	BDL (<7)	20	IS 5182(part 26):2020

TEST CERTIFICATE

HS/LAB/NABL/F/7.8.2.1

CLIENT'S NAME & ADDRESS		
M/S NASIK ICD (ICE CREAM DIVN) FTY Hindustan Unilever Limited, Plot No. A8 & 9, M.I.D.C., Malegaon, Sinnar, Nashik, 27- 422103 India.	**REPORT NO.**	HS/LAB/AA/04559
	REPORT DATE	03/07/2024
	LAB REFERENCE NO.	HS/LAB/AA/201
	SAMPLING DATE	26&27/06/2024
	SAMPLE RECEIPT DATE	28/06/2024
	START DATE OF ANALYSIS	28/06/2024
	END DATE OF ANALYSIS	02/07/2024
	SAMPLING REF. / SOP NO.	HS/NABL/Air/14

DETAILS OF SAMPLE	SAMPLING DONE BY	SAMPLE CONTAINER & QUANTITY	NATURE	LOCATION
Ambient Air	Horizon Services	Plastic Bottles and Bags	--	Main Scrap Yard

RESULTS

SR. NO.	TEST DESCRIPTION	UNIT	RESULT	NAAQS	TEST METHOD REFERENCE
01	DATE OF SAMPLING	DD/MM/YY	26&27/06/2024		
02	TIME OF SAMPLING	Hrs.	14:30		
03	TEST LOCATION		Main Scrap Yard		
04	SAMPLING DURATION	Hrs.	24		
05	AMBIENT TEMPERATURE (MAX/MIN)	Deg C	30/23		
06	RELATIVE HUMIDITY	% RH	58		
07	CO (8 Hrs.)	mg/m³	0.080	2.0	IS 5182 (Part 10):1999 RA 2019
08	Benzene	µg/m³	BDL (<4)	05	IS 5182 (Part 11):2006
09	Benzo(a)Pyrene	ng/m³	BDL (<0.5)	01	IS 5182 (Part 12):2004

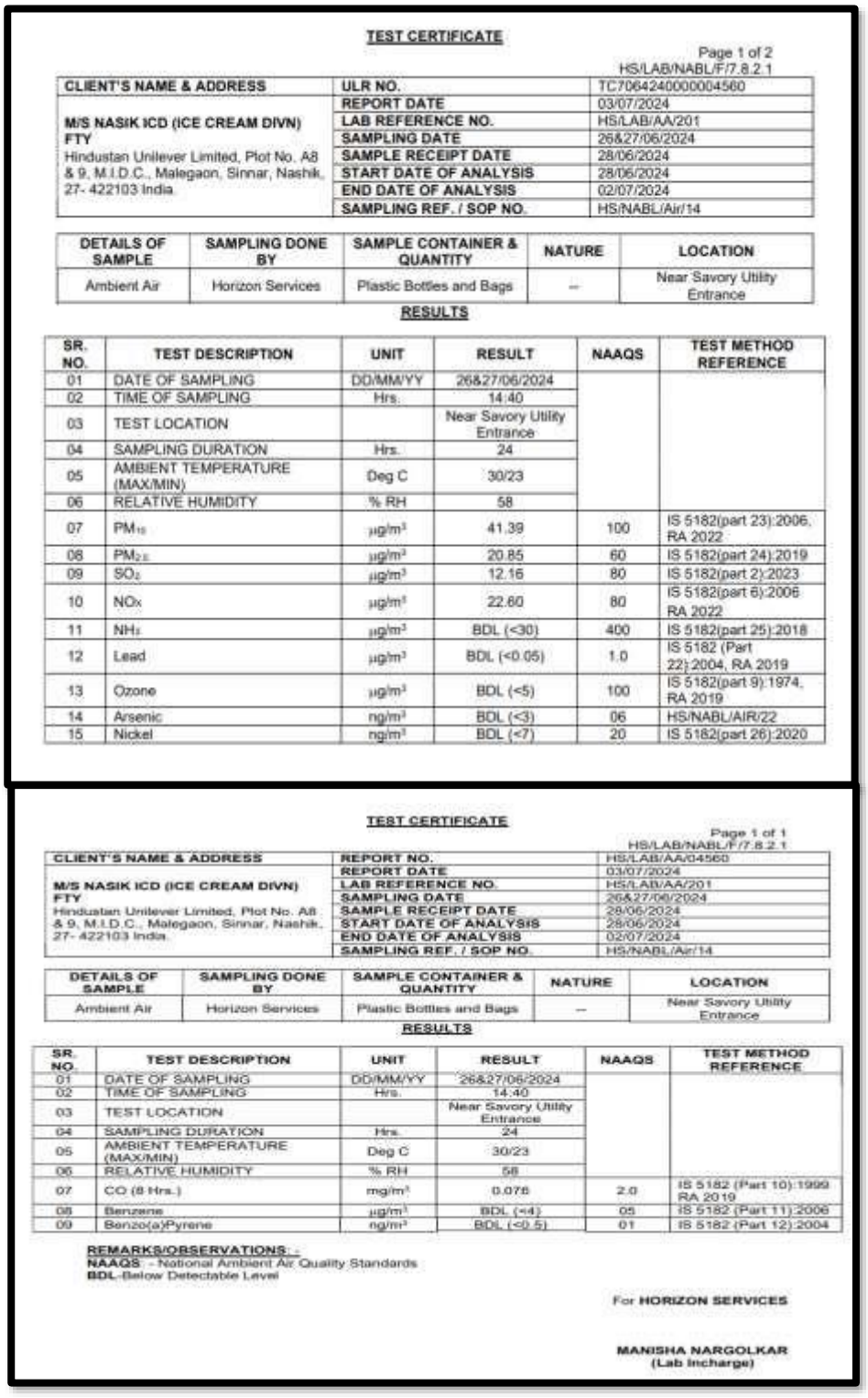
REMARKS/OBSERVATIONS :-
NAAQS: - National Ambient Air Quality Standards
BDL-Below Detectable Level

For **HORIZON SERVICES**

MANISHA NARGOLKAR
(Lab Incharge)

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

Project Address: **M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.**



TEST CERTIFICATE

Page 1 of 2
HS/LAB/NABL/F/7.8.2.1

CLIENT'S NAME & ADDRESS		
M/S NASIK ICD (ICE CREAM DIVN) FTY Hindustan Unilever Limited, Plot No. A8 & 9, M.I.D.C., Malegaon, Sinnar, Nashik, 27- 422103 India	ULR NO.	TC706424000004560
	REPORT DATE	03/07/2024
	LAB REFERENCE NO.	HS/LAB/AA/201
	SAMPLING DATE	26&27/06/2024
	SAMPLE RECEIPT DATE	28/06/2024
	START DATE OF ANALYSIS	28/06/2024
	END DATE OF ANALYSIS	02/07/2024
	SAMPLING REF. / SOP NO.	HS/NABL/Air/14

DETAILS OF SAMPLE	SAMPLING DONE BY	SAMPLE CONTAINER & QUANTITY	NATURE	LOCATION
Ambient Air	Horizon Services	Plastic Bottles and Bags	--	Near Savory Utility Entrance

RESULTS

SR. NO.	TEST DESCRIPTION	UNIT	RESULT	NAAQS	TEST METHOD REFERENCE
01	DATE OF SAMPLING	DD/MM/YY	26&27/06/2024		
02	TIME OF SAMPLING	Hrs.	14:40		
03	TEST LOCATION		Near Savory Utility Entrance		
04	SAMPLING DURATION	Hrs.	24		
05	AMBIENT TEMPERATURE (MAX/MIN)	Deg C	30/23		
06	RELATIVE HUMIDITY	% RH	58		
07	PM_{10}	µg/m³	41.39	100	IS 5182(part 23):2006, RA 2022
08	$PM_{2.5}$	µg/m³	20.85	60	IS 5182(part 24):2019
09	SO_2	µg/m³	12.16	80	IS 5182(part 2):2023
10	NOx	µg/m³	22.60	80	IS 5182(part 6):2006 RA 2022
11	NH_3	µg/m³	BDL (<30)	400	IS 5182(part 25):2018
12	Lead	µg/m³	BDL (<0.05)	1.0	IS 5182 (Part 22):2004, RA 2019
13	Ozone	µg/m³	BDL (<5)	100	IS 5182(part 9):1974, RA 2019
14	Arsenic	ng/m³	BDL (<3)	06	HS/NABL/AIR/22
15	Nickel	ng/m³	BDL (<7)	20	IS 5182(part 26):2020

TEST CERTIFICATE

Page 1 of 1
HS/LAB/NABL/F/7.8.2.1

CLIENT'S NAME & ADDRESS		
M/S NASIK ICD (ICE CREAM DIVN) FTY Hindustan Unilever Limited, Plot No. A8 & 9, M.I.D.C., Malegaon, Sinnar, Nashik, 27- 422103 India	REPORT NO.	HS/LAB/AA/04560
	REPORT DATE	03/07/2024
	LAB REFERENCE NO.	HS/LAB/AA/201
	SAMPLING DATE	26&27/06/2024
	SAMPLE RECEIPT DATE	28/06/2024
	START DATE OF ANALYSIS	28/06/2024
	END DATE OF ANALYSIS	02/07/2024
	SAMPLING REF. / SOP NO.	HS/NABL/Air/14

DETAILS OF SAMPLE	SAMPLING DONE BY	SAMPLE CONTAINER & QUANTITY	NATURE	LOCATION
Ambient Air	Horizon Services	Plastic Bottles and Bags	--	Near Savory Utility Entrance

RESULTS

SR. NO.	TEST DESCRIPTION	UNIT	RESULT	NAAQS	TEST METHOD REFERENCE
01	DATE OF SAMPLING	DD/MM/YY	26&27/06/2024		
02	TIME OF SAMPLING	Hrs.	14:40		
03	TEST LOCATION		Near Savory Utility Entrance		
04	SAMPLING DURATION	Hrs.	24		
05	AMBIENT TEMPERATURE (MAX/MIN)	Deg C	30/23		
06	RELATIVE HUMIDITY	% RH	58		
07	CO (8 Hrs.)	mg/m³	0.078	2.0	IS 5182 (Part 10):1999 RA 2019
08	Benzene	µg/m³	BDL (<4)	05	IS 5182 (Part 11):2006
09	Benzo(a)Pyrene	ng/m³	BDL (<0.5)	01	IS 5182 (Part 12):2004

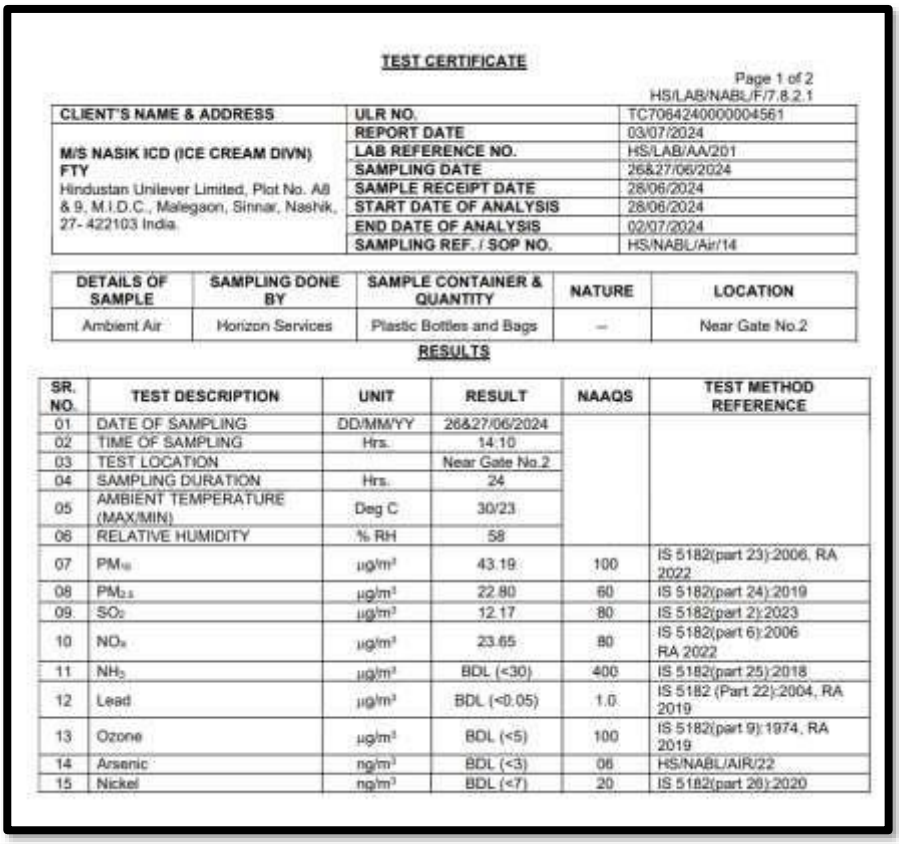
REMARKS/OBSERVATIONS :-
NAAQS - National Ambient Air Quality Standards
BDL-Below Detectable Level

For **HORIZON SERVICES**

MANISHA NARGOLKAR
(Lab Incharge)

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

Project Address: **M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.**



TEST CERTIFICATE

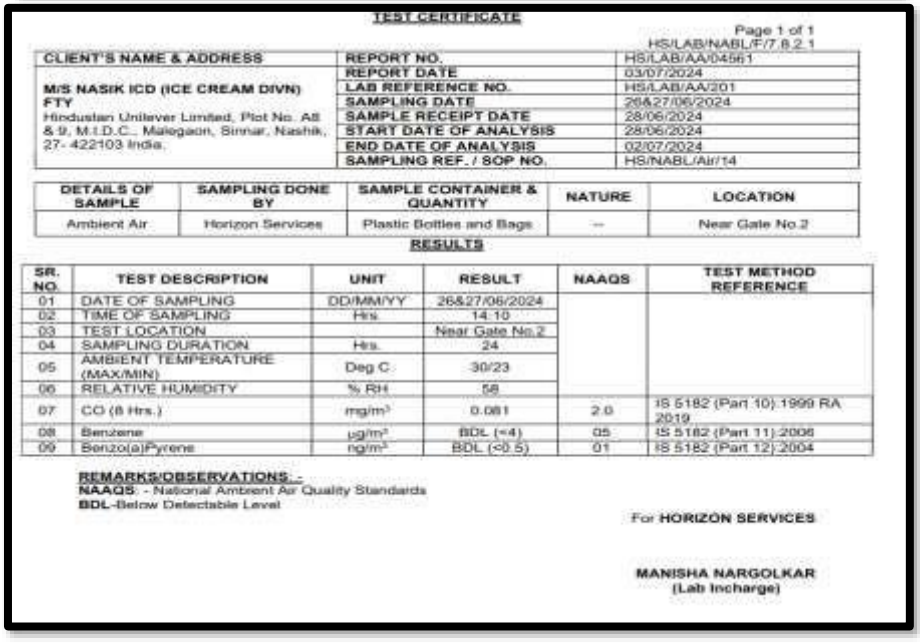
Page 1 of 2
HS/LAB/NABL/F/7.8.2.1

CLIENT'S NAME & ADDRESS		
M/S NASIK ICD (ICE CREAM DIVN) FTY Hindustan Unilever Limited, Plot No. A8 & 9, M.I.D.C., Malegaon, Sinnar, Nashik, 27- 422103 India.	ULR NO.	TC706424000004561
	REPORT DATE	03/07/2024
	LAB REFERENCE NO.	HS/LAB/AA/201
	SAMPLING DATE	26&27/06/2024
	SAMPLE RECEIPT DATE	28/06/2024
	START DATE OF ANALYSIS	28/06/2024
	END DATE OF ANALYSIS	02/07/2024
	SAMPLING REF. / SOP NO.	HS/NABL/Air/14

DETAILS OF SAMPLE	SAMPLING DONE BY	SAMPLE CONTAINER & QUANTITY	NATURE	LOCATION
Ambient Air	Horizon Services	Plastic Bottles and Bags	--	Near Gate No.2

RESULTS

SR. NO.	TEST DESCRIPTION	UNIT	RESULT	NAAQS	TEST METHOD REFERENCE
01	DATE OF SAMPLING	DD/MM/YY	26&27/06/2024		
02	TIME OF SAMPLING	Hrs.	14:10		
03	TEST LOCATION		Near Gate No.2		
04	SAMPLING DURATION	Hrs.	24		
05	AMBIENT TEMPERATURE (MAX/MIN)	Deg C	30/23		
06	RELATIVE HUMIDITY	% RH	58		
07	PM_{10}	µg/m³	43.19	100	IS 5182(part 23):2006, RA 2022
08	$PM_{2.5}$	µg/m³	22.80	60	IS 5182(part 24):2019
09	SO_2	µg/m³	12.17	80	IS 5182(part 2):2023
10	NO_x	µg/m³	23.65	80	IS 5182(part 6):2006 RA 2022
11	NH_3	µg/m³	BDL (<30)	400	IS 5182(part 25):2018
12	Lead	µg/m³	BDL (<0.05)	1.0	IS 5182 (Part 22):2004, RA 2019
13	Ozone	µg/m³	BDL (<5)	100	IS 5182(part 9):1974, RA 2019
14	Arsenic	ng/m³	BDL (<3)	06	HS/NABL/AIR/22
15	Nickel	ng/m³	BDL (<7)	20	IS 5182(part 26):2020



TEST CERTIFICATE

Page 1 of 1
HS/LAB/NABL/F/7.8.2.1

CLIENT'S NAME & ADDRESS		
M/S NASIK ICD (ICE CREAM DIVN) FTY Hindustan Unilever Limited, Plot No. A8 & 9, M.I.D.C., Malegaon, Sinnar, Nashik, 27- 422103 India.	REPORT NO.	HS/LAB/AA/04561
	REPORT DATE	03/07/2024
	LAB REFERENCE NO.	HS/LAB/AA/201
	SAMPLING DATE	26&27/06/2024
	SAMPLE RECEIPT DATE	28/06/2024
	START DATE OF ANALYSIS	28/06/2024
	END DATE OF ANALYSIS	02/07/2024
	SAMPLING REF. / SOP NO.	HS/NABL/Air/14

DETAILS OF SAMPLE	SAMPLING DONE BY	SAMPLE CONTAINER & QUANTITY	NATURE	LOCATION
Ambient Air	Horizon Services	Plastic Bottles and Bags	--	Near Gate No.2

RESULTS

SR. NO.	TEST DESCRIPTION	UNIT	RESULT	NAAQS	TEST METHOD REFERENCE
01	DATE OF SAMPLING	DD/MM/YY	26&27/06/2024		
02	TIME OF SAMPLING	Hrs.	14:10		
03	TEST LOCATION		Near Gate No.2		
04	SAMPLING DURATION	Hrs.	24		
05	AMBIENT TEMPERATURE (MAX/MIN)	Deg C	30/23		
06	RELATIVE HUMIDITY	% RH	58		
07	CO (8 Hrs.)	mg/m³	0.081	2.0	IS 5182 (Part 10):1999 RA 2019
08	Benzene	µg/m³	BDL (<4)	05	IS 5182 (Part 11):2006
09	Benzo(a)Pyrene	ng/m³	BDL (<0.5)	01	IS 5182 (Part 12):2004

REMARKS/OBSERVATIONS :-
NAAQS - National Ambient Air Quality Standards
BDL-Below Detectable Level

For **HORIZON SERVICES**

MANISHA NARGOLKAR
(Lab Incharge)

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

Project Address: **M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.**

NATIONAL AMBIENT AIR QUALITY STANDARDS
CENTRAL POLLUTION CONTROL BOARD
NOTIFICATION

New Delhi, the 18th November, 2009

No. B-29016/20/90/PCI-I.—In exercise of the powers conferred by Sub-section (2) (h) of section 16 of the Air (Prevention and Control of Pollution) Act, 1981 (Act No.14 of 1981), and in supersession of the Notification No(s). S.O. 384(E), dated 11th April, 1994 and S.O. 935(E), dated 14th October, 1998, the Central Pollution Control Board hereby notify the National Ambient Air Quality Standards with immediate effect, namely:-

NATIONAL AMBIENT AIR QUALITY STANDARDS

S. No.	Pollutant	Time Weighted Average	Concentration in Ambient Air		
			Industrial, Residential, Rural and Other Area	Ecologically Sensitive Area (notified by Central Government)	Methods of Measurement
(1)	(2)	(3)	(4)	(5)	(6)
1	Sulphur Dioxide (SO_2), µg/m³	Annual*	50	20	- Improved West and Gaeke -Ultraviolet fluorescence
		24 hours**	80	80	
2	Nitrogen Dioxide (NO_2), µg/m³	Annual*	40	30	- Modified Jacob & Hochheiser (Na-Arsenite) - Chemiluminescence
		24 hours**	80	80	
3	Particulate Matter (size less than 10µm) or PM_{10} µg/m³	Annual*	60	60	- Gravimetric - TOEM - Beta attenuation
		24 hours**	100	100	
4	Particulate Matter (size less than 2.5µm) or $PM_{2.5}$ µg/m³	Annual*	40	40	- Gravimetric - TOEM - Beta attenuation
		24 hours**	60	60	
5	Ozone (O_3) µg/m³	8 hours**	100	100	- UV photometric - Chemiluminescence - Chemical Method
		1 hour**	180	180	
6	Lead (Pb) µg/m³	Annual*	0.50	0.50	- AAS /ICP method after sampling on EPM 2000 or equivalent filter paper - ED-XRF using Teflon filter
		24 hours**	1.0	1.0	
7	Carbon Monoxide (CO) mg/m³	8 hours**	02	02	- Non Dispersive Infra Red (NDIR) spectroscopy
		1 hour**	04	04	
8	Ammonia (NH_3) µg/m³	Annual*	100	100	-Chemiluminescence -Indophenol blue method
		24 hours**	400	400	

(1)	(2)	(3)	(4)	(5)	(6)
9	Benzene (C_6H_6) µg/m³	Annual*	05	05	- Gas chromatography based continuous analyzer - Adsorption and Desorption followed by GC analysis
10	Benzo(o)Pyrene (BaP) - particulate phase only, ng/m³	Annual*	01	01	- Solvent extraction followed by HPLC/GC analysis
11	Arsenic (As), ng/m³	Annual*	06	06	- AAS /ICP method after sampling on EPM 2000 or equivalent filter paper
12	Nickel (Ni), ng/m³	Annual*	20	20	- AAS /ICP method after sampling on EPM 2000 or equivalent filter paper

* Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.

** 24 hourly or 08 hourly or 01 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

Note. — Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigation.

SANT PRASAD GAUTAM, Chairman
[ADVT-III/4/184/09/Exty.]

Note: The notifications on National Ambient Air Quality Standards were published by the Central Pollution Control Board in the Gazette of India, Extraordinary vide notification No(s). S.O. 384(E), dated 11th April, 1994 and S.O. 935(E), dated 14th October, 1998.

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

Project Address: **M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.**

Table 1 Organoleptic and Physical Parameters
(*Foreword* and *Clause* 4)

Sl No.	Characteristic	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source	Method of Test, Ref to Part of IS 3025	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
i)	Colour, Hazen units, *Max*	5	15	Part 4	Extended to 15 only, if toxic substances are not suspected in absence of alternate sources
ii)	Odour	Agreeable	Agreeable	Part 5	a) Test cold and when heated b) Test at several dilutions
iii)	*p*H value	6.5-8.5	No relaxation	Part 11	—
iv)	Taste	Agreeable	Agreeable	Parts 7 and 8	Test to be conducted only after safety has been established
v)	Turbidity, NTU, *Max*	1	5	Part 10	—
vi)	Total dissolved solids, mg/l, *Max*	500	2 000	Part 16	—

NOTE — It is recommended that the acceptable limit is to be implemented. Values in excess of those mentioned under 'acceptable' render the water not suitable, but still may be tolerated in the absence of an alternative source but up to the limits indicated under 'permissible limit in the absence of alternate source' in col 4, above which the sources will have to be rejected.

Table 2 General Parameters Concerning Substances Undesirable in Excessive Amounts
(*Foreword* and *Clause* 4)

Sl No.	Characteristic	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source	Method of Test, Ref to	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
i)	Aluminium (as Al), mg/l, *Max*	0.03	0.2	IS 3025 (Part 55)	—
ii)	Ammonia (as total ammonia-N), mg/l, *Max*	0.5	No relaxation	IS 3025 (Part 34)	—
iii)	Anionic detergents (as MBAS) mg/l, *Max*	0.2	1.0	Annex K of IS 13428	—
iv)	Barium (as Ba), mg/l, *Max*	0.7	No relaxation	Annex F of IS 13428* or IS 15302	—
v)	Boron (as B), mg/l, *Max*	0.5	1.0	IS 3025 (Part 57)	—
vi)	Calcium (as Ca), mg/l, *Max*	75	200	IS 3025 (Part 40)	—
vii)	Chloramines (as Cl_2), mg/l, *Max*	4.0	No relaxation	IS 3025 (Part 26)* or APHA 4500-Cl G	—
viii)	Chloride (as Cl), mg/l, *Max*	250	1 000	IS 3025 (Part 32)	—
ix)	Copper (as Cu), mg/l, *Max*	0.05	1.5	IS 3025 (Part 42)	—
x)	Fluoride (as F) mg/l, *Max*	1.0	1.5	IS 3025 (Part 60)	—
xi)	Free residual chlorine, mg/l, *Min*	0.2	1	IS 3025 (Part 26)	To be applicable only when water is chlorinated. Tested at consumer end. When protection against viral infection is required, it should be minimum 0.5 mg/l
xii)	Iron (as Fe), mg/l, *Max*	0.3	No relaxation	IS 3025 (Part 53)	Total concentration of manganese (as Mn) and iron (as Fe) shall not exceed 0.3 mg/l
xiii)	Magnesium (as Mg), mg/l, *Max*	30	100	IS 3025 (Part 46)	—
xiv)	Manganese (as Mn), mg/l, *Max*	0.1	0.3	IS 3025 (Part 59)	Total concentration of manganese (as Mn) and iron (as Fe) shall not exceed 0.3 mg/l
xv)	Mineral oil, mg/l, *Max*	0.5	No relaxation	Clause **6** of IS 3025 (Part 39) Infrared partition method	—
xvi)	Nitrate (as NO_3), mg/l, *Max*	45	No relaxation	IS 3025 (Part 34)	—
xvii)	Phenolic compounds (as C_6H_5OH), mg/l, *Max*	0.001	0.002	IS 3025 (Part 43)	—
xviii)	Selenium (as Se), mg/l, *Max*	0.01	No relaxation	IS 3025 (Part 56) or IS 15303*	—
xix)	Silver (as Ag), mg/l, *Max*	0.1	No relaxation	Annex J of IS 13428	—
xx)	Sulphate (as SO_4) mg/l, *Max*	200	400	IS 3025 (Part 24)	May be extended to 400 provided that Magnesium does not exceed 30
xxi)	Sulphide (as H_2S), mg/l, *Max*	0.05	No relaxation	IS 3025 (Part 29)	—
xxii)	Total alkalinity as calcium carbonate, mg/l, *Max*	200	600	IS 3025 (Part 23)	—
xxiii)	Total hardness (as $CaCO_3$), mg/l, *Max*	200	600	IS 3025 (Part 21)	—
xxiv)	Zinc (as Zn), mg/l, *Max*	5	15	IS 3025 (Part 49)	—

NOTES

1 In case of dispute, the method indicated by '*' shall be the referee method.

2 It is recommended that the acceptable limit is to be implemented. Values in excess of those mentioned under 'acceptable' render the water not suitable, but still may be tolerated in the absence of an alternative source but up to the limits indicated under 'permissible limit in the absence of alternate source' in col 4, above which the sources will have to be rejected.

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

Project Address: **M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.**

Table 3 Parameters Concerning Toxic Substances
(*Foreword* and *Clause* 4)

Sl No.	Characteristic	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source	Method of Test, Ref to	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
i)	Cadmium (as Cd), mg/l, *Max*	0.003	No relaxation	IS 3025 (Part 41)	—
ii)	Cyanide (as CN), mg/l, *Max*	0.05	No relaxation	IS 3025 (Part 27)	—
iii)	Lead (as Pb), mg/l, *Max*	0.01	No relaxation	IS 3025 (Part 47)	—
iv)	Mercury (as Hg), mg/l, *Max*	0.001	No relaxation	IS 3025 (Part 48)/ Mercury analyser	—
v)	Molybdenum (as Mo), mg/l, *Max*	0.07	No relaxation	IS 3025 (Part 2)	—
vi)	Nickel (as Ni), mg/l, *Max*	0.02	No relaxation	IS 3025 (Part 54)	—
vii)	Pesticides, µg/l, *Max*	See Table 5	No relaxation	See Table 5	—
viii)	Polychlorinated biphenyls, mg/l, *Max*	0.000 5	No relaxation	ASTM 5175* or APHA 6630	—
ix)	Polynuclear aromatic hydrocarbons (as PAH), mg/l, *Max*	0.000 1	No relaxation	APHA 6440	—
x)	Total arsenic (as As), mg/l, *Max*	0.01	0.05	IS 3025 (Part 37)	—
xi)	Total chromium (as Cr), mg/l, *Max*	0.05	No relaxation	IS 3025 (Part 52)	—
xii)	Trihalomethanes:				
	a) Bromoform, mg/l, *Max*	0.1	No relaxation	ASTM D 3973-85* or APHA 6232	—
	b) Dibromochloromethane, mg/l, *Max*	0.1	No relaxation	ASTM D 3973-85* or APHA 6232	—
	c) Bromodichloromethane, mg/l, *Max*	0.06	No relaxation	ASTM D 3973-85* or APHA 6232	—
	d) Chloroform, mg/l, *Max*	0.2	No relaxation	ASTM D 3973-85* or APHA 6232	—

NOTES

1 In case of dispute, the method indicated by '*' shall be the referee method.

2 It is recommended that the acceptable limit is to be implemented. Values in excess of those mentioned under 'acceptable' render the water not suitable, but still may be tolerated in the absence of an alternative source but up to the limits indicated under 'permissible limit in the absence of alternate source' in col 4, above which the sources will have to be rejected.

Table 4 Parameters Concerning Radioactive Substances
(*Foreword* and *Clause* 4)

Sl No.	Characteristic	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source	Method of Test, Ref to Part of IS 14194	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
i)	Radioactive materials:				
	a) Alpha emitters Bq/l, *Max*	0.1	No relaxation	Part 2	—
	b) Beta emitters Bq/l, *Max*	1.0	No relaxation	Part 1	—

NOTE — It is recommended that the acceptable limit is to be implemented. Values in excess of those mentioned under 'acceptable' render the water not suitable, but still may be tolerated in the absence of an alternative source but up to the limits indicated under 'permissible limit in the absence of alternate source' in col 4, above which the sources will have to be rejected.

Table 5 Pesticide Residues Limits and Test Method
(*Foreword* and *Table* 3)

Sl No.	Pesticide	Limit µg/l	Method of Test, Ref to	
			USEPA	AOAC/ ISO
(1)	(2)	(3)	(4)	(5)
i)	Alachlor	20	525.2, 507	—
ii)	Atrazine	2	525.2, 8141 A	—
iii)	Aldrin/ Dieldrin	0.03	508	—
iv)	Alpha HCH	0.01	508	—
v)	Beta HCH	0.04	508	—
vi)	Butachlor	125	525.2, 8141 A	—
vii)	Chlorpyriphos	30	525.2, 8141 A	—
viii)	Delta HCH	0.04	508	—
ix)	2,4- Dichlorophenoxyacetic acid	30	515.1	—
x)	DDT (*o, p* and *p, p* – Isomers of DDT, DDE and DDD)	1	508	AOAC 990.06
xi)	Endosulfan (alpha, beta, and sulphate)	0.4	508	AOAC 990.06
xii)	Ethion	3	1657 A	—
xiii)	Gamma — HCH (Lindane)	2	508	AOAC 990.06
xiv)	Isoproturon	9	532	—
xv)	Malathion	190	8141 A	—
xvi)	Methyl parathion	0.3	8141 A	ISO 10695
xvii)	Monocrotophos	1	8141 A	—
xviii)	Phorate	2	8141 A	—

NOTE — Test methods are for guidance and reference for testing laboratory. In case of two methods, USEPA method shall be the reference method.

Table 6 Bacteriological Quality of Drinking Water[1)]
(*Clause* 4.1.1)

Sl No.	Organisms	Requirements
(1)	(2)	(3)
i)	*All water intended for drinking:*	
	a) *E. coli* or thermotolerant coliform bacteria[2), 3)]	Shall not be detectable in any 100 ml sample
ii)	*Treated water entering the distribution system:*	
	a) *E. coli* or thermotolerant coliform bacteria[2)]	Shall not be detectable in any 100 ml sample
	b) Total coliform bacteria	Shall not be detectable in any 100 ml sample
iii)	*Treated water in the distribution system:*	
	a) *E. coli* or thermotolerant coliform bacteria	Shall not be detectable in any 100 ml sample
	b) Total coliform bacteria	Shall not be detectable in any 100 ml sample

[1)]Immediate investigative action shall be taken if either *E.coli* or total coliform bacteria are detected. The minimum action in the case of total coliform bacteria is repeat sampling; if these bacteria are detected in the repeat sample, the cause shall be determined by immediate further investigation.

[2)]Although, *E. coli* is the more precise indicator of faecal pollution, the count of thermotolerant coliform bacteria is an acceptable alternative. If necessary, proper confirmatory tests shall be carried out. Total coliform bacteria are not acceptable indicators of the sanitary quality of rural water supplies, particularly in tropical areas where many bacteria of no sanitary significance occur in almost all untreated supplies.

[3)]It is recognized that, in the great majority of rural water supplies in developing countries, faecal contamination is widespread. Under these conditions, the national surveillance agency should set medium-term targets for progressive improvement of water supplies.

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[1][SCHEDULE – VI]

(See rule 5A)

GENERAL STANDARDS FOR DISCHARGE OF ENVIRONMENTAL POLLUTANTS PART-A : EFFLUENTS

S. No.	Parameter	Standards			
		Inland surface water	Public Sewers	Land for irrigation	Marine coastal areas
1	2	3			
		(a)	(b)	(c)	(d)
1.	Colour and odour	See 6 of Annexure-I	--	See 6 of Annexure-I	See 6 of Annexure-I
2.	Suspended solids mg/l, Max.	100	600	200	(a)For process waste water-100 (b)For cooling water effluent 10 percent above total suspended matter of influent.
3.	Particulate size of suspended solids	Shall pass 850 micron IS Sieve	--	--	(a)Floatable solids, max. 3 mm. (b)Settleable solids, max. 850 microns.
4.	---	-	--	---	--
5.	pH Value	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0
6.	Temperature	shall not exceed 5°C above the receiving water temperature	--	--	shall not exceed 5°C above the receiving water temperature

[1] Schedule VI inserted by Rule 2(d) of the Environment (Protection) Second Amendment Rules, 1993 notified vide G.S.R. 422(E) dated 19.05.1993, published in the Gazette No. 174 dated 19.05.1993.

[2] Omitted by Rule 2(d)(i) of the Environment (Protection) Third Amendment Rules, 1993 vide Notification No.G.S.R. 801(E), dated 31.12.1993.

S. No.	Parameter	Standards			
		Inland surface water	Public Sewers	Land for irrigation	Marine coastal areas
1	2	3			
		(a)	(b)	(c)	(d)
7.	Oil and grease mg/l Max.	10	20	10	20
8.	Total residual chlorin mg/l Max.	1.0	--	--	1.0
9.	Ammonical nitrogen (as N), mg/l Max.	50	50	--	50
10.	Total Kjeldahl Nitrogen (as NH_3) mg/l, Max.	100	--	--	100
11.	Free ammonia (as NH_3) mg/l, Max.	5.0	--	--	5.0
12.	Biochemical Oxygen demand [3 days at 27°C] mg/l max.	30	350	100	100
13.	Chemical Oxygen Demand, mg/l, max.	250	--	--	250
14.	Arsenic (as As), mg/l, max.	0.2	0.2	0.2	0.2
15.	Mercury (as Hg), mg/l, Max.	0.01	0.01	--	0.01
16.	Lead (as Pb) mg/l Max.	0.1	1.0	--	2.0
17.	Cadmium (as Cd) mg/l, Max.	2.0	1.0	--	2.0
18.	Hexavalent Chromium (as Cr+6), mg/l max.	0.1	2.0	--	1.0

[1] Substituted by Rule3 of the Environment (Protection) Amendment Rules, 1996 notified by G.S.R 176, dated 2.4.1996 may be read as BOD (3 days at 27°C) shown as BOD 3 days 20°C assumed.

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Project Address: **M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.**

S. No.	Parameter	Standards			
		Inland surface water	Public Sewers	Land for irrigation	Marine coastal areas
1	2	3			
		(a)	(b)	(c)	(d)
19.	Total chromium (as Cr.) mg/l, Max.	2.0	2.0	–	2.0
20.	Copper (as Cu) mg/l, Max.	3.0	3.0	–	3.0
21.	Zinc (As Zn.) mg/l, Max.	5.0	15	–	15
22.	Selenium (as Se.) mg/l, Max.	0.05	0.05	–	0.05
23.	Nickel (as Ni) mg/l, Max.	3.0	3.0	–	5.0
[1]24.	* * *	*	*	*	*
[1]25.	* * *	*	*	*	*
[1]26.	* * *	*	*	*	*
27.	Cyanide (as CN) mg/l Max.	0.2	2.0	0.2	0.2
[1]28.	* * *	*	*	*	*
29.	Fluoride (as F) mg/l Max.	2.0	15	–	15
30.	Dissolved Phosphates (as P), mg/l Max.	5.0	–	–	–
[1]31.	* * *	*	*	*	*
32.	Sulphide (as S) mg/l Max.	2.0	–	–	5.0
33.	Phenolic compounds (as C_6H_5OH) mg/l, Max.	1.0	5.0	–	5.0

[1] Omitted by Rule 3(a)(i) of the Environment (Protection) Third Amendment Rules, 1997 vide Notification No.(S.O. 823(E)), dated 11.11.1997.

S. No.	Parameter	Standards			
		Inland surface water	Public Sewers	Land for irrigation	Marine coastal areas
1	2	3			
		(a)	(b)	(c)	(d)
34.	Radioactive materials :				
	(a) Alpha emitter micro curie/ml.	10^{-7}	10^{-7}	10^{-8}	10^{-7}
	(b) Beta emitter micro curie/ml.	10^{-6}	10^{-6}	10^{-7}	10^{-6}
35.	Bio-assay test	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent
36.	Manganese (as Mn)	2 mg/l	2 mg/l	–	2 mg/l
37.	Iron (as Fe)	3 mg/l	3 mg/l	–	3 mg/l
38.	Vanadium (as V)	0.2 mg/l	0.2 mg/l	–	0.2 mg/l
39.	Nitrate Nitrogen	10 mg/l	–	–	20 mg/l
[1]40.	* * *	*	*	*	*

CHAPTER 5

NOISE ENVIRONMENT

5 .1 INTRODUCTION:

Noise is an environmental hazard generated by various sources, including industries. It is commonly defined as unwanted sound or sound that occurs in the wrong place at the wrong time. Noise is undesirable because it interferes with speech and hearing or is intense enough to damage hearing or cause annoyance. When noise exceeds certain limits, it becomes a pollutant, creating a nuisance that adversely affects human health, daily activities, and mental stability. Additionally, noise can disrupt wildlife and ecological systems. In industrial sectors, noise levels from machinery can be dangerously high, exposing workers to harmful levels of sound that may impair hearing, lead to psychological disorders, and reduce job performance.

Noise is measured in terms of the number of compressions and rarefactions of air molecules per unit of time, known as frequency, and is expressed in hertz (Hz), representing cycles per second. The human ear can detect sound frequencies ranging from 20 to 20,000 Hz. Since loudness significantly affects people, the relationship between loudness and frequency must be considered in environmental noise assessments.

5.2. OBJECTIVES OF NOISE ENVIRONMENT:

The basic objectives of the noise environment are:

A. Identification of noise level for the existing unit:

Determination of noise level of different units at Hindustan Unilever Limited, identification of unique noise source, if any, and its effects on environment and identify the sources of which a noise effect has to be mitigated.

B. Obtained applicable noise standard for the factory are

Determination of micro scale impact by predicting anticipated noise level with applicable standards as criteria in order to assess impact.

If the standards are exceeded, consider noise abatement methods.

5.3. NOISE REGULATION:

Indian guidelines with respect to noise laid down by environment protection amendment rules 1989, are shown in Table 5.1

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

Project Address: **M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.**

Permissible noise exposure limits, as per OSHA, are given in Table 5.2. The noise level in the sensitive area will always be kept within the permissible limits and the persons working there will be provided with earmuffs and ear plugs etc.

Table- 5.1: Ambient Air Quality Standards in respect of Noise

Area Code	Category of Area	Limit in dB(A)	
		Day Time	Night Time
a.	Industrial Area	75	70
b.	Commercial Area	65	55
c.	Residential Area	55	45
d.	Silence Zone	50	40

Note: 1. Day time is reckoned in between 6 AM and 10 PM.

1. Night time is reckoned in between 10 PM and 6 AM.
2. Silence zone is defined as area up to 100 m around such premises as hospitals, educational institutions and courts. The silence zones are to be declared by the competent authority. Use of vehicular, loudspeakers and bursting of crackers shall be banned in these zones.
3. Mixed categories of areas should be declared, as one of the four above corresponding standards shall apply.

Results of the Ambient Noise Monitoring

Results Day Time in March'24 & June'24

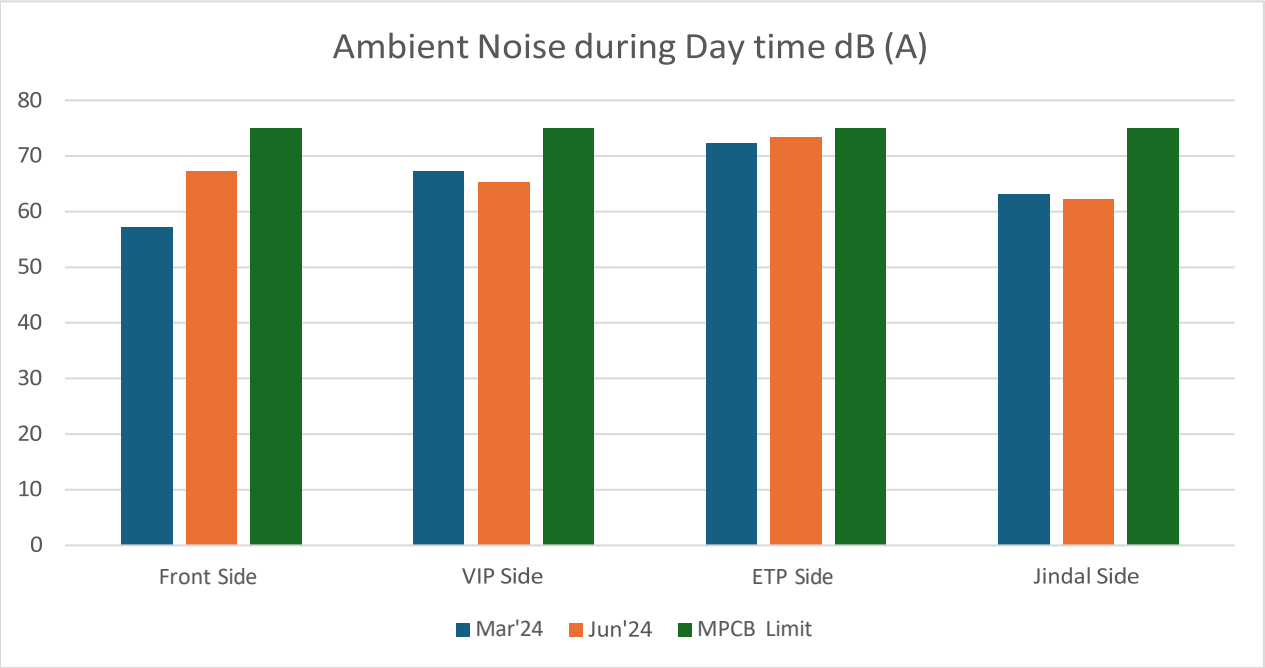
S. No.	DESCRIPTION	UNIT	RESULTS		MPCB Limits
			Mar'24	June'24	Day
1.	FRONT SIDE	dB(A)	57.3	67.3	75
2.	VIP SIDE	dB(A)	67.3	65.2	75
3.	ETP	dB(A)	72.3	73.3	75
4.	JINDAL SIDE	dB(A)	63.2	62.3	75

Results Night Time in March'24 & June'24

S. No.	DESCRIPTION	UNIT	RESULTS		MPCB LIMITS
			Mar'24	Jun'24	Night
1.	FRONT SIDE	dB(A)	51.4	56.8	70
2.	VIP SIDE	dB(A)	62.8	54.1	70
3.	ETP	dB(A)	67.9	62.5	70
4.	JINDAL SIDE	dB(A)	61.5	58.3	70

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

Project Address: M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.



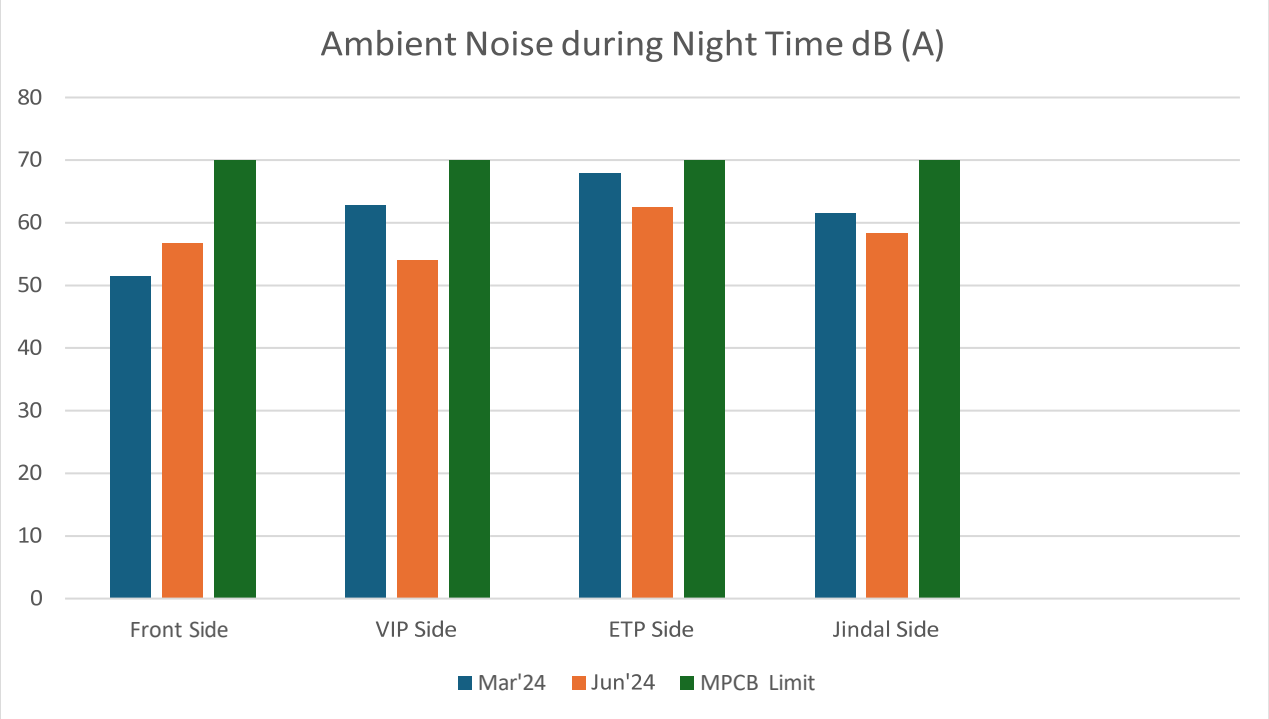


Table -5.2: Permissible noise exposure for Industrial Workers.

Exposure Time (in hr/day)	Limit in dB(A)
8	90 (threshold limit)
6	92
4	95
3	97
2	100
1.5	102
1	105
0.5	110
0.25 or less	115

5.4. METHODOLOGY:

Sound waves consist of a series of compressions and rarefactions in an elastic medium. The rate at which sound energy passes through a unit area perpendicular to the direction of its propagation is referred to as sound intensity. This intensity is related to the sound pressure level (SPL), which is expressed as the logarithm of the ratio of the measured sound pressure (root mean square value) to a reference pressure of 20 µPa (2×10^{-5} N/m²). The unit of sound pressure level is the decibel, abbreviated as dB.

$$\text{Pressure level, dB} = \log = \log \frac{\text{Measured sound pressure (rms value) Sound}}{2 \times 10^{-5}\ \text{N/m2}}$$

A noise meter, which primarily consists of a microphone and an electronic circuit (including an attenuator, amplifier, weighting networks, and display unit), measures sound pressure levels within the audible range. The three weighting networks (A, B, and C) adjust the meter's sensitivity to correspond with the frequency and intensity of sound, mimicking the sensitivity of the human ear. The A-weighting network, most commonly used for measuring human response to noise, provides the A-weighted sound level, abbreviated as dB(A).

To assess the existing noise levels in various areas of the plant and surrounding study sites, sound level meters were used to take measurements. The locations of the noise monitoring stations are provided in Tables 5.4 below:

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

Project Address: **M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.**

5.5. Monitoring Duration and Procedure:

Measurements were carried out for 8 hours at HUL. Hourly readings were recorded by operating the instruments for 12-15 minute each hour.

5.6. Identification of Sound Level

a. Status of noise level inside the factory:

Noise levels were measured at various locations within the factory, with particular focus on areas where workers are engaged in 8-hour shifts. The highest recorded noise level during the day was 81.3 dB, with the noisiest location being FO Boiler Room. As shown in Table 5.3, the maximum permissible noise level for an 8-hour exposure is 90 dB(A). Therefore, workers should not be exposed to noise levels exceeding 90 dB(A) during their 8-hour shifts.

b. Noise level in the Hindustan Unilever Limited Study area:

To assess the present noise level in the study area, noise measurements were carried out at various locations in the study area as given in Table 5.3 to 5.6 Indian standards for noise (outside plant premises) are given in Table 5.1

Occasional increase in noise level was recorded due to passing of vehicle and other uncontrolled noise.

5.7. Impact of Noise Environment:

Existing noise level in the factory and nearby areas are slightly high especially in the day time but which is with in the accepted noise levels. Present noise level due to existing unit of HUL is less than 90 dB (A) limit for 8 hours exposure laid down by OSHA/ Factory Act norms. The proposed expansion of Hindustan Unilever Limited Will not increase the background level. Hence it can be deduced that there will be no adverse impact on account of noise from proposed expansion. As is evident, the increased productivity is through improved utilisation of resources and adaptation of state of the art technology which have no adverse impact on the environment or on pollution level.

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

Project Address: **M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.**

Table 5.3: Noise level at Study Area

S. No.	Locations		Observed value in dB (A)		
		Unit	Result June'24	Result March'24	FACTORIES ACT LIMIT
1.	NH3 COMP. ROOM (UTILITY)	dB	73.2	78.1	90
2.	AIR COMP. ROOM (UTILITY)	dB	78.2	79.3	90
3.	NH3 YARD (UTILITY)	dB	70.2	62.3	90
4.	FO BOILER ROOM (UTILITY)	dB	81.3	72.1	90
5.	REFER CONTROL ROOM (UTILITY)	dB	72.1	66.3	90
6.	D.G. ROOM (UTILITY)	dB	70.1	67.2	90
7.	LT ROOM (UTILITY)	dB	69.3	68.1	90
8.	AG BOILER NEAR MEAL FEEDING (UTILITY)	dB	73.2	74.3	90
9.	AG BOILER CONTROL ROOM (UTILITY)	dB	74.3	75.2	90
10.	ETP CONTROL ROOM	dB	68.3	62.1	90
11.	ETP METHAN GENERATOR	dB	72.3	76.2	90
12.	ETP AERATION BLOWER	dB	75.4	79.3	90
13.	ETP LAB	dB	60.2	65.2	90
14.	STP EQUILISATION BLOWER	dB	73.1	73.2	90
15.	MIX PLANT	dB	72.3	73.2	90
16.	CIP ROOM (ICD)	dB	71.4	73.1	90
17.	MST ROOM (ICD)	dB	73.4	70.1	90
18.	CONTROL ROOM (ICD)	dB	68.2	63.1	90
19.	PACKING HALL NEW ROLL (ICD)	dB	67.5	64.3	90
20.	PACKING HALL NEW BIGDRUM (ICD)	dB	67.3	65.2	90

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

Project Address: **M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.**

21.	VACCUM PAN AREA	dB	68.3	67.1	90
22.	RINSER AREA (PD)	dB	71.3	69.3	90
23.	RMG 1 AREA (SAVORY)	dB	69.3	73.1	90
24.	RMG 2 AREA (SAVORY)	dB	73.6	72.1	90
25.	PACKING NEAR STAR PACK SAVORY	dB	73.2	68.2	90
26.	PACKING NEAR OLD PACK SAVORY	dB	79.3	67.3	90
27.	PACKING NEAR NEW PACK SAVORY	dB	73.2	69.3	90
28.	PACKING NEAR MES PACK NEW SAVORY	dB	75.2	63.2	90
29.	OLD MES PACK M/G (FEEDER BM)	dB	72.1	68.3	90
30.	CHARGE ROOM	dB	69.3	67.2	90

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

Project Address: **M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.**

TEST CERTIFICATE

Page 1 of 1
HS/LAB/NABL/F/7.8.2.1

CLIENT'S NAME & ADDRESS		
M/S NASIK ICD (ICE CREAM DIVN) FTY Hindustan Unilever Limited, Plot No. A8 & 9, M.I.D.C., Malegaon, Sinnar, Nashik, 27- 422103 India.	REPORT NO.	HS/LAB/AA/04570
	REPORT DATE	03/07/2024
	LAB REFERENCE NO.	HS/LAB/AA/201
	SAMPLING DATE	26/06/2024
	SAMPLE RECEIPT DATE	28/06/2024
	START DATE OF ANALYSIS	--
	END DATE OF ANALYSIS	--
	SAMPLING REF. / SOP NO.	HS/LAB/NABL/Amb-Noise/01

DETAILS OF SAMPLE	SAMPLING DONE BY	SAMPLE CONTAINER & QUANTITY	NATURE	LOCATION
Ambient Noise	Horizon Services	--	--	--

RESULTS (NIGHT TIME)

SR.NO.	DESCRIPTION	UNIT	RESULT	MPCB LIMITS
	TEST LOCATION (22:00 Hrs.)			
01	FRONT SIDE	dB(A)	51.4	70
02	VIP SIDE	dB(A)	62.8	70
03	ETP	dB(A)	67.9	70
04	JINDAL SIDE	dB(A)	61.5	70

Instrument Used: Digital Sound Level Meter (070845)
Make. HTC Instruments
Calibration Date: 01/07/2023 Next Calibration Due: 30/06/2024

For **HORIZON SERVICES**

TEST CERTIFICATE

Page 1 of 1
HS/LAB/NABL/F/7.8.2.1

CLIENT'S NAME & ADDRESS		
M/S NASIK ICD (ICE CREAM DIVN) FTY Hindustan Unilever Limited, Plot No. A8 & 9, M.I.D.C., Malegaon, Sinnar, Nashik, 27- 422103 India.	REPORT NO.	HS/LAB/AA/04569
	REPORT DATE	03/07/2024
	LAB REFERENCE NO.	HS/LAB/AA/201
	SAMPLING DATE	26/06/2024
	SAMPLE RECEIPT DATE	28/06/2024
	START DATE OF ANALYSIS	--
	END DATE OF ANALYSIS	--
	SAMPLING REF. / SOP NO.	HS/LAB/NABL/Amb-Noise/01

DETAILS OF SAMPLE	SAMPLING DONE BY	SAMPLE CONTAINER & QUANTITY	NATURE	LOCATION
Ambient Noise	Horizon Services	--	--	--

RESULTS (DAY TIME)

SR.NO.	DESCRIPTION	UNIT	RESULT	MPCB LIMITS
	TEST LOCATION (16:00 Hrs.)			
01	FRONT SIDE	dB(A)	57.3	75
02	VIP SIDE	dB(A)	67.3	75
03	ETP	dB(A)	72.3	75
04	JINDAL SIDE	dB(A)	63.2	75

Instrument Used: Digital Sound Level Meter (070845)
Make. HTC Instruments
Calibration Date: 01/07/2023 Next Calibration Due: 30/06/2024

For **HORIZON SERVICES**

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

Project Address: **M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.**

TEST CERTIFICATE

Page 1 of 1
HS/LAB/NABL/F/7.8.2.1

CLIENT'S NAME & ADDRESS	REPORT NO.	HS/LAB/AA/04569
M/S NASIK ICD (ICE CREAM DIVN) FTY Hindustan Unilever Limited, Plot No. A8 & 9, M.I.D.C., Malegaon, Sinnar, Nashik, 27- 422103 India.	REPORT DATE	03/07/2024
	LAB REFERENCE NO.	HS/LAB/AA/201
	SAMPLING DATE	26/06/2024
	SAMPLE RECEIPT DATE	28/06/2024
	START DATE OF ANALYSIS	--
	END DATE OF ANALYSIS	--
	SAMPLING REF. / SOP NO.	HS/LAB/NABL/Amb-Noise/01

DETAILS OF SAMPLE	SAMPLING DONE BY	SAMPLE CONTAINER & QUANTITY	NATURE	LOCATION
Ambient Noise	Horizon Services	--	--	--

RESULTS (DAY TIME)

SR.NO.	DESCRIPTION	UNIT	RESULT	MPCB LIMITS
	TEST LOCATION (16:00 Hrs.)			
01	FRONT SIDE	dB(A)	57.3	75
02	VIP SIDE	dB(A)	67.3	75
03	ETP	dB(A)	72.3	75
04	JINDAL SIDE	dB(A)	63.2	75

Instrument Used: Digital Sound Level Meter (070845)
Make. HTC Instruments
Calibration Date: 01/07/2023 Next Calibration Due: 30/06/2024

For **HORIZON SERVICES**

MANISHA NARGOLKAR
(Lab Incharge)

****End of Test Report****

TEST CERTIFICATE

Page 1 of 1
HS/LAB/NABL/F/7.8.2.1

CLIENT'S NAME & ADDRESS	REPORT NO.	HS/LAB/AA/04570
M/S NASIK ICD (ICE CREAM DIVN) FTY Hindustan Unilever Limited, Plot No. A8 & 9, M.I.D.C., Malegaon, Sinnar, Nashik, 27- 422103 India.	REPORT DATE	03/07/2024
	LAB REFERENCE NO.	HS/LAB/AA/201
	SAMPLING DATE	26/06/2024
	SAMPLE RECEIPT DATE	28/06/2024
	START DATE OF ANALYSIS	--
	END DATE OF ANALYSIS	--
	SAMPLING REF. / SOP NO.	HS/LAB/NABL/Amb-Noise/01

DETAILS OF SAMPLE	SAMPLING DONE BY	SAMPLE CONTAINER & QUANTITY	NATURE	LOCATION
Ambient Noise	Horizon Services	--	--	--

RESULTS (NIGHT TIME)

SR.NO.	DESCRIPTION	UNIT	RESULT	MPCB LIMITS
	TEST LOCATION (22:00 Hrs.)			
01	FRONT SIDE	dB(A)	51.4	70
02	VIP SIDE	dB(A)	62.8	70
03	ETP	dB(A)	67.9	70
04	JINDAL SIDE	dB(A)	61.5	70

Instrument Used: Digital Sound Level Meter (070845)
Make. HTC Instruments
Calibration Date: 01/07/2023 Next Calibration Due: 30/06/2024

For **HORIZON SERVICES**

MANISHA NARGOLKAR
(Lab Incharge)

****End of Test Report****

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

Project Address: **M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.**

TEST CERTIFICATE

HS/LAB/NABL/F/7.8.2.1

CLIENT'S NAME & ADDRESS		
M/S NASIK ICD (ICE CREAM DIVN) FTY Hindustan Unilever Limited, Plot No. A8 & 9, M.I.D.C., Malegaon, Sinnar, Nashik, 27- 422103 India.	REPORT NO.	HS/LAB/AA/04571
	REPORT DATE	03/07/2024
	LAB REFERENCE NO.	HS/LAB/AA/201
	SAMPLING DATE	26/06/2024
	SAMPLE RECEIPT DATE	28/06/2024
	START DATE OF ANALYSIS	--
	END DATE OF ANALYSIS	--
	SAMPLING REF. / SOP NO.	HS/LAB/NABL/WZ-Noise/01

DETAILS OF SAMPLE	SAMPLING DONE BY	SAMPLE CONTAINER & QUANTITY	NATURE	LOCATION
Workzone Noise	Horizon Services	--	--	--

RESULTS

SR. NO.	DESCRIPTION	UNIT	RESULT	FACTORIES ACT LIMIT
	TEST LOCATION (15:30 Hrs.)			
01	NH3 COMP. ROOM (UTILITY)	dB(A)	73.2	90
02	AIR COMP. ROOM (UTILITY)	dB(A)	78.2	90
03	NH3 YARD (UTILITY)	dB(A)	70.2	90
04	FO BOILER ROOM (UTILITY)	dB(A)	81.3	90
05	REFER CONTROL ROOM (UTILITY)	dB(A)	72.1	90
06	D.G. ROOM (UTILITY)	dB(A)	70.1	90
07	LT ROOM (UTILITY)	dB(A)	69.3	90
08	AG BOILER NEAR MEAL FEEDING (UTILITY)	dB(A)	73.2	90
09	AG BOILER CONTROL ROOM (UTILITY)	dB(A)	74.3	90
10	ETP CONTROL ROOM	dB(A)	68.3	90
11	ETP METHAN GENERATOR	dB(A)	72.3	90
12	ETP AERATION BLOWER	dB(A)	75.4	90
13	ETP LAB	dB(A)	60.2	90
14	STP EQUILISATION BLOWER	dB(A)	73.1	90
15	MIX PLANT	dB(A)	72.3	90
16	CIP ROOM (ICD)	dB(A)	71.4	90
17	MST ROOM (ICD)	dB(A)	73.4	90
18	CONTROL ROOM (ICD)	dB(A)	68.2	90
19	PACKING HALL NEW ROLL (ICD)	dB(A)	67.5	90
20	PACKING HALL NEW BIGDRUM (ICD)	dB(A)	67.3	90
21	VACCUM PAN AREA	dB(A)	68.3	90
22	RINSER AREA (PD)	dB(A)	71.3	90

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

Project Address: **M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.**

23	RMG 1 AREA (SAVORY)	dB(A)	69.3	90
24	RMG 2 AREA (SAVORY)	dB(A)	73.6	90
25	PACKING NEAR STAR PACK SAVORY	dB(A)	73.2	90
26	PACKING NEAR OLD PACK SAVORY	dB(A)	79.3	90
27	PACKING NEAR NEW PACK SAVORY	dB(A)	73.2	90
28	PACKING NEAR MES PACK NEW SAVORY	dB(A)	75.2	90
29	OLD MES PACK M/G (FEEDER BM)	dB(A)	72.1	90
30	CHARGE ROOM	dB(A)	69.3	90
31	NEW MCS PACK M/C FEEDER BM	dB(A)	64.3	90
32	LOT ROOM	dB(A)	64.3	90
33	COLD STORE	dB(A)	62.1	90
34	PM STORE	dB(A)	68.4	90
35	RM STORE	dB(A)	69.3	90
36	SECURITY GATE	dB(A)	78.9	90
37	CHANGE ROOM	dB(A)	72.3	90
38	CANTEEN	dB(A)	67.1	90
39	OFFICE BLOCK	dB(A)	57.4	90
40	QUALITY LAB	dB(A)	58.3	90
41	ETP LAB UTILITY	dB(A)	63.7	90
42	MIX PLANT ICD	dB(A)	68.3	90
43	CONTROL ROOM ICD	dB(A)	61.7	90
44	FILLING AREA CPD	dB(A)	51.8	90
45	FG AREA	dB(A)	61.3	90
46	LADDI MC FEEDER BM	dB(A)	64.7	90
47	QUALITY	dB(A)	61.3	90
	UTILITY			
48	FO Boiler Area	dB(A)	72.2	90
49	AG Boiler - Near ID/FD Fan	dB(A)	73.2	90
50	Steam Blow Down	dB(A)	71.4	90
51	Steam Release	dB(A)	71.2	90
52	Ref Compressor	dB(A)	70.4	90
53	ETP – Equalization Blower Area	dB(A)	70.3	90
54	Utility Executive Cabin	dB(A)	71.2	90
55	**ICD**			
56	Packing Hall – Near Ria	dB(A)	70.9	90
	CPD			
57	Cooling Tunnel Area	dB(A)	69.3	90
58	Sleeving Machine Area	dB(A)	68.3	90
59	Cooling Tower Area	dB(A)	76.8	90
60	Change Room	dB(A)	64.7	90
61	Mix Plant CPD	dB(A)	68.0	90

	SAVORY			
62	Packing Near Mespack Old	dB(A)	60.3	90
63	Packing Near Mespack New	dB(A)	71.3	90
64	Laddi M/c. Feeder Bin	dB(A)	63.3	90
65	Old Mespack M/c. Feeder Bin	dB(A)	62.3	90
66	New Mespack M/c. Feeder Bin	dB(A)	67.3	90
67	Change Room	dB(A)	64.7	90
68	Riya Machine	dB(A)	76.4	90
69	Big Drum	dB(A)	53.7	90
70	CT Pack	dB(A)	64.3	90
71	Rollo Machine	dB(A)	61.3	90

Instrument Used: Digital Sound Level Meter (070845)
Make. HTC Instruments
Calibration Date: 01/07/2023 Next Calibration Due: 30/06/2024

REMARKS/OBSERVATION:

Noise Monitoring Results are well within the limits prescribed by the Factories Act.

For **HORIZON SERVICES**

MANISHA NARGOLKAR
(Lab Incharge)

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

Project Address: M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.

TEST CERTIFICATE

HS/LAB/NABL/F/7.8.2.1

CLIENT'S NAME & ADDRESS		
M/S NASIK ICD (ICE CREAM DIVN) FTY Hindustan Unilever Limited, Plot No. A8 & 9, M.I.D.C., Malegaon, Sinnar, Nashik, 27- 422103 India.	REPORT NO.	HS/LAB/AA/04571
	REPORT DATE	03/07/2024
	LAB REFERENCE NO.	HS/LAB/AA/201
	SAMPLING DATE	26/06/2024
	SAMPLE RECEIPT DATE	28/06/2024
	START DATE OF ANALYSIS	--
	END DATE OF ANALYSIS	--
	SAMPLING REF. / SOP NO.	HS/LAB/NABL/WZ-Noise/01

DETAILS OF SAMPLE	SAMPLING DONE BY	SAMPLE CONTAINER & QUANTITY	NATURE	LOCATION
Workzone Noise	Horizon Services	--	--	--

RESULTS

SR. NO.	DESCRIPTION	UNIT	RESULT	FACTORIES ACT LIMIT
	TEST LOCATION (15:30 Hrs.)			
01	NH3 COMP. ROOM (UTILITY)	dB(A)	73.2	90
02	AIR COMP. ROOM (UTILITY)	dB(A)	78.2	90
03	NH3 YARD (UTILITY)	dB(A)	70.2	90
04	FO BOILER ROOM (UTILITY)	dB(A)	81.3	90
05	REFER CONTROL ROOM (UTILITY)	dB(A)	72.1	90
06	D.G. ROOM (UTILITY)	dB(A)	70.1	90
07	LT ROOM (UTILITY)	dB(A)	69.3	90
08	AG BOILER NEAR MEAL FEEDING (UTILITY)	dB(A)	73.2	90
09	AG BOILER CONTROL ROOM (UTILITY)	dB(A)	74.3	90
10	ETP CONTROL ROOM	dB(A)	68.3	90
11	ETP METHAN GENERATOR	dB(A)	72.3	90
12	ETP AERATION BLOWER	dB(A)	75.4	90
13	ETP LAB	dB(A)	60.2	90
14	STP EQUILISATION BLOWER	dB(A)	73.1	90
15	MIX PLANT	dB(A)	72.3	90
16	CIP ROOM (ICD)	dB(A)	71.4	90
17	MST ROOM (ICD)	dB(A)	73.4	90
18	CONTROL ROOM (ICD)	dB(A)	68.2	90
19	PACKING HALL NEW ROLL (ICD)	dB(A)	67.5	90
20	PACKING HALL NEW BIGDRUM (ICD)	dB(A)	67.3	90
21	VACCUM PAN AREA	dB(A)	68.3	90
22	RINSER AREA (PD)	dB(A)	71.3	90

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

Project Address: **M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.**

23	RMG 1 AREA (SAVORY)	dB(A)	69.3	90
24	RMG 2 AREA (SAVORY)	dB(A)	73.6	90
25	PACKING NEAR STAR PACK SAVORY	dB(A)	73.2	90
26	PACKING NEAR OLD PACK SAVORY	dB(A)	79.3	90
27	PACKING NEAR NEW PACK SAVORY	dB(A)	73.2	90
28	PACKING NEAR MES PACK NEW SAVORY	dB(A)	75.2	90
29	OLD MES PACK M/G (FEEDER BM)	dB(A)	72.1	90
30	CHARGE ROOM	dB(A)	69.3	90
31	NEW MCS PACK M/C FEEDER BM	dB(A)	64.3	90
32	LOT ROOM	dB(A)	64.3	90
33	COLD STORE	dB(A)	62.1	90
34	PM STORE	dB(A)	68.4	90
35	RM STORE	dB(A)	69.3	90
36	SECURITY GATE	dB(A)	78.9	90
37	CHANGE ROOM	dB(A)	72.3	90
38	CANTEEN	dB(A)	67.1	90
39	OFFICE BLOCK	dB(A)	57.4	90
40	QUALITY LAB	dB(A)	58.3	90
41	ETP LAB UTILITY	dB(A)	63.7	90
42	MIX PLANT ICD	dB(A)	68.3	90
43	CONTROL ROOM ICD	dB(A)	61.7	90
44	FILLING AREA CPD	dB(A)	51.8	90
45	FG AREA	dB(A)	61.3	90
46	LADDI MC FEEDER BM	dB(A)	64.7	90
47	QUALITY	dB(A)	61.3	90
	UTILITY			
48	FO Boiler Area	dB(A)	72.2	90
49	AG Boiler - Near ID/FD Fan	dB(A)	73.2	90
50	Steam Blow Down	dB(A)	71.4	90
51	Steam Release	dB(A)	71.2	90
52	Ref Compressor	dB(A)	70.4	90
53	ETP – Equalization Blower Area	dB(A)	70.3	90
54	Utility Executive Cabin	dB(A)	71.2	90
55	**ICD**			
56	Packing Hall – Near Ria	dB(A)	70.9	90
	CPD			
57	Cooling Tunnel Area	dB(A)	69.3	90
58	Sleeving Machine Area	dB(A)	68.3	90
59	Cooling Tower Area	dB(A)	76.8	90
60	Change Room	dB(A)	64.7	90
61	Mix Plant CPD	dB(A)	68.0	90

	SAVORY			
62	Packing Near Mespack Old	dB(A)	60.3	90
63	Packing Near Mespack New	dB(A)	71.3	90
64	Laddi M/c. Feeder Bin	dB(A)	63.3	90
65	Old Mespack M/c. Feeder Bin	dB(A)	62.3	90
66	New Mespack M/c. Feeder Bin	dB(A)	67.3	90
67	Change Room	dB(A)	64.7	90
68	Riya Machine	dB(A)	76.4	90
69	Big Drum	dB(A)	53.7	90
70	CT Pack	dB(A)	64.3	90
71	Rollo Machine	dB(A)	61.3	90

Instrument Used: Digital Sound Level Meter (070845)
Make. HTC Instruments
Calibration Date: 01/07/2023 Next Calibration Due: 30/06/2024

REMARKS/OBSERVATION:

Noise Monitoring Results are well within the limits prescribed by the Factories Act.

For **HORIZON SERVICES**

MANISHA NARGOLKAR
(Lab Incharge)

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the Existing HUL Factory

Project Address: M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.

Ambient Noise Standards

SCHEDULE

(see rule 3(1) and 4(1))

Ambient Air Quality Standards in respect of Noise

Area code	Category of Area / Zone	Limits in dB(A) Leq*	
		Day Time	Night Time
(A)	Industrial area	75	70
(B)	Commercial area	65	55
(C)	Residential area	55	45
(D)	Silence Zone	50	40

Note:-

1. Day time shall mean from 6.00 a.m. to 10.00 p.m.
2. Night time shall mean from 10.00 p.m. to 6.00 a.m.
3. Silence zone is an area comprising not less than 100 metres around hospitals, educational institutions, courts, religious places or any other area which is declared as such by the competent authority
4. Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.

* **dB(A) Leq** denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.

CHAPTER 6

SOIL ENVIRONMENT

6.1 INTRODUCTION:

Soil is the most weathered layer of the Earth's crust, composed of rock fragments that have been broken down and chemically altered, along with the remains of plants and animals that live in and on it. The primary components of soil are mineral and organic matter, which provide a habitat for various organisms. The unique characteristics of soil are shaped by the influence of pedogenetic factors.

6.2. SOIL SAMPLING IN THE STUDY AREA:

Representative soil sample was collected from within the factory premises and analyzed in LFS team. The details of soil sampling stations in the study area are given in table 6.4.

6.3. PHYSICAL CHARACTERISTICS OF SOIL:

The physical characteristics of soil significantly affect its suitability for plant growth and its overall behavior. Factors such as plant support, root penetration, drainage, aeration, moisture retention, and nutrient availability are all closely tied to the soil's physical properties. These properties also impact the soil's chemical and biological behavior. Table 6(a) presents the physical characteristics of the soil. The physical properties of soil are determined by factors like particle size and composition, and soil samples were analyzed for the following key physical parameters:

1. **Color**
2. **Texture**
3. **Specific Gravit**
4. **pH**

Colour and texture were observed on the basis of visual observations whereas description of parameters are given in following sections.

6.3.1. Colour of the Soil:

The soil is a combination of dark brown (due to organic matter) and lighter shades (from salts), possibly with reddish hues influenced by iron content. High chloride (518 mg/kg) and sulphate (1009 mg/kg) levels can lead to a lighter soil color, often manifesting as shades of gray, yellow, or even white, depending on the overall mineral composition and organic matter. Saline soils might show white crusts due to salt accumulation on the surface. With a moderate organic content

(6.12%), the soil may exhibit darker shades, such as dark brown or black, especially if the organic matter is well-decomposed. Organic matter contributes to soil darkening, which can indicate fertility and biological activity. The presence of iron (2.0 mg/kg) typically imparts reddish or yellowish hues to the soil, depending on its oxidation state. Well-aerated soils often exhibit reddish tones, while anaerobic conditions can lead to gray or blueish colors due to reduced iron.

6.3.2. Soil Texture:

Given the high water retention and organic matter levels, the soil is likely to have a finer texture, potentially loamy or clayey, rather than sandy.

Soil texture is primarily determined by the relative proportions of sand, silt, and clay, which isn't directly indicated in the chemical parameters. However, we can make some educated guesses based on the characteristics:

Water Retaining Capacity (78.98%):

A high water retention capacity suggests that the soil likely has a higher proportion of clay or organic matter, as these components are effective at holding moisture. Soils with good water retention often have finer textures (silty or clayey) compared to sandy soils, which drain quickly.

Organic Content:

The moderate organic matter content can also influence texture. Soils rich in organic matter tend to have improved structure and can range from loamy to clayey textures.

Calcium and Magnesium Levels:

Low calcium (0.67 mg/kg) and adequate magnesium (4.62 mg/kg) suggest that the soil may not be highly calcareous. Calcareous soils often have a finer texture, while sandy soils generally have low mineral content and higher drainage.

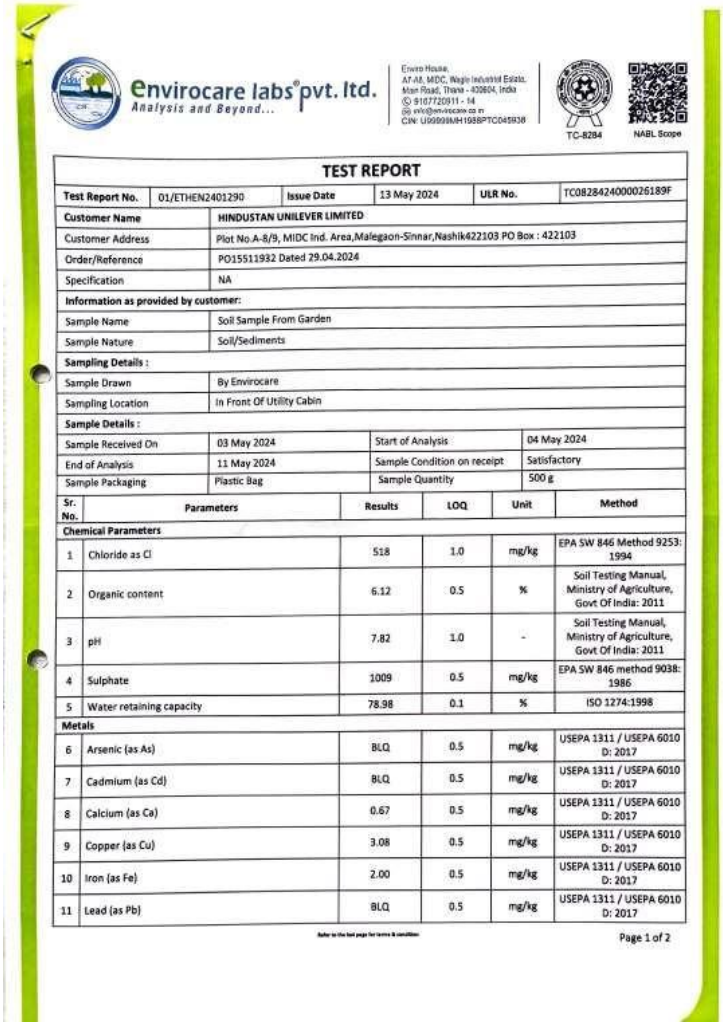
6.4. Chemical characteristics of soil:

S. No.	Description	Results	Unit
1.	Chloride as Cl	518	Mg/kg
2.	Organic content	6.12	%
3.	pH	7.82	-
4.	Sulphate	1009	Mg/kg
5.	Water retaining capacity	78.98	%
6. Metals			
6.	Arsenic (as As)	BLQ	Mg/kg
7.	Cadmium (as Cd)	BLQ	Mg/kg
8.	Calcium (as Ca)	0.67	Mg/kg
9.	Copper (as Cu)	3.08	Mg/kg
10.	Iron (as Fe)	2.0	Mg/kg
11.	Lead (as Pb)	BLQ	Mg/kg

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the existing HUL factory

Project Address: **M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.**

12.	Magnesium (as mg)	4.62	Mg/kg
13.	Potassium (as K)	39.50	Mg/kg
14.	Sodium (as Na)	BLQ	Mg/kg



Envirocare labs pvt. ltd.
Analysis and Beyond...

Enviro House, A7-A8, MDC, Wagle Industrial Estate, Main Road, Thane - 400604, India
9167720911 - 14
info@envirocare.co.in
CIN: U99999MH1988PTC045938

TC-8284 NABL Scope

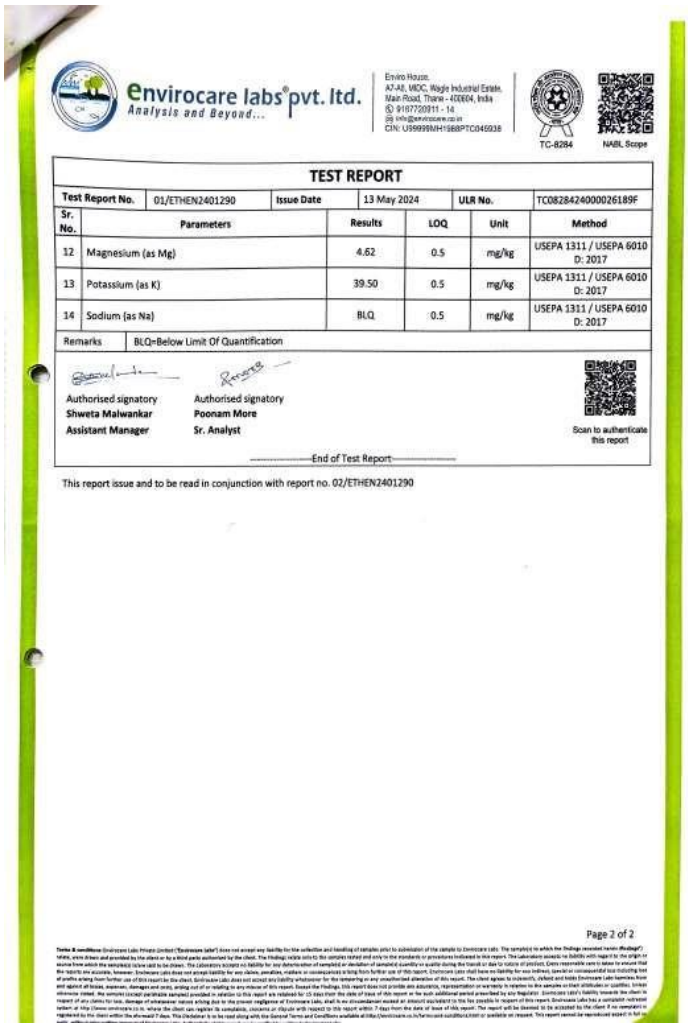
TEST REPORT

Test Report No.	01/ETHEN2401290	Issue Date	13 May 2024	ULR No.	TC082842400002618 9F
Customer Name	HINDUSTAN UNILEVER LIMITED				
Customer Address	Plot No.A-8/9, MIDC Ind. Area,Malegaon-Sinnar,Nashik422103 PO Box : 422103				
Order/Reference	PO15511932 Dated 29.04.2024				
Specification	NA				
Information as provided by customer:					
Sample Name	Soil Sample From Garden				
Sample Nature	Soil/Sediments				
Sampling Details :					
Sample Drawn	By Envirocare				
Sampling Location	In Front Of Utility Cabin				
Sample Details :					
Sample Received On	03 May 2024	Start of Analysis	04 May 2024		
End of Analysis	11 May 2024	Sample Condition on receipt	Satisfactory		
Sample Packaging	Plastic Bag	Sample Quantity	500 g		

Sr. No.	Parameters	Results	LOQ	Unit	Method
Chemical Parameters					
1	Chloride as Cl	518	1.0	mg/kg	EPA SW 846 Method 9253: 1994
2	Organic content	6.12	0.5	%	Soil Testing Manual, Ministry of Agriculture, Govt Of India: 2011
3	pH	7.82	1.0	-	Soil Testing Manual, Ministry of Agriculture, Govt Of India: 2011
4	Sulphate	1009	0.5	mg/kg	EPA SW 846 method 9038: 1986
5	Water retaining capacity	78.98	0.1	%	ISO 1274:1998
Metals					
6	Arsenic (as As)	BLQ	0.5	mg/kg	USEPA 1311 / USEPA 6010 D: 2017
7	Cadmium (as Cd)	BLQ	0.5	mg/kg	USEPA 1311 / USEPA 6010 D: 2017
8	Calcium (as Ca)	0.67	0.5	mg/kg	USEPA 1311 / USEPA 6010 D: 2017
9	Copper (as Cu)	3.08	0.5	mg/kg	USEPA 1311 / USEPA 6010 D: 2017
10	Iron (as Fe)	2.00	0.5	mg/kg	USEPA 1311 / USEPA 6010 D: 2017
11	Lead (as Pb)	BLQ	0.5	mg/kg	USEPA 1311 / USEPA 6010 D: 2017

Refer to the last page for terms & conditions

Page 1 of 2



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TC-8284 NABL Scope

TEST REPORT

Test Report No.	01/ETHEN2401290	Issue Date	13 May 2024	ULR No.	TC082842400002618 9F

Sr. No.	Parameters	Results	LOQ	Unit	Method
12	Magnesium (as Mg)	4.62	0.5	mg/kg	USEPA 1311 / USEPA 6010 D: 2017
13	Potassium (as K)	39.50	0.5	mg/kg	USEPA 1311 / USEPA 6010 D: 2017
14	Sodium (as Na)	BLQ	0.5	mg/kg	USEPA 1311 / USEPA 6010 D: 2017
Remarks	BLQ=Below Limit Of Quantification				

Authorised signatory
Shweta Malwankar
Assistant Manager

Authorised signatory
Poonam More
Sr. Analyst

Scan to authenticate this report

End of Test Report

This report issue and to be read in conjunction with report no. 02/ETHEN2401290

Page 2 of 2

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the existing HUL factory

Project Address: **M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.**

Detailed Soil Characteristics Analysis

6.4.1 Chloride Content (518 mg/kg):

Implications: The high chloride level suggests a risk of salinity, which can adversely affect plant growth by causing physiological stress. Chloride can disrupt water uptake in plants, leading to reduced growth and yield. It is crucial to monitor this parameter, especially in drought-prone areas where evapotranspiration might concentrate salts in the soil.

6.4.2 Organic Content (6.12%):

Significance: Organic matter plays a critical role in soil health. At 6.12%, the organic content is considered moderate, which indicates a reasonable level of nutrient retention and microbial activity. Organic matter improves soil structure, enhances aeration, and increases the soil's ability to retain moisture. It also serves as a reservoir of nutrients, making them available to plants over time. Practices such as cover cropping and adding compost can help maintain or improve this level.

6.4.3 pH Level (7.82):

Interpretation: The pH of 7.82 indicates that the soil is slightly alkaline. This can affect the availability of certain nutrients; for example, micronutrients like iron and manganese can become less available at higher pH levels. While many crops thrive in slightly alkaline conditions, specific plants may struggle, so it's important to choose crops suited for this pH range or amend the soil as necessary.

6.4.4 Sulphate Concentration (1009 mg/kg):

Analysis: The sulphate level is notably high, which can indicate a strong presence of sulphur in the soil. Sulphate is essential for plant growth and is a key component of amino acids and proteins. However, excessive sulphate may lead to imbalances in nutrient uptake, potentially causing issues such as nutrient lockout or toxicity in sensitive plants. Monitoring and management practices should be implemented to mitigate any negative effects.

6.4.5 Water Retaining Capacity (78.98%):

Importance: The high water retention capacity is a significant asset, especially in regions with variable rainfall. This characteristic suggests that the soil can hold moisture effectively, making it favorable for crop production and reducing irrigation frequency. This feature can support plant health during dry spells and improve resilience against drought conditions.

6.4.6 Metal Contaminants:

Heavy Metals: The report indicates that arsenic, cadmium, and lead are below detection limits (BLQ), which is a positive aspect for environmental and agricultural safety. This minimizes risks related to soil contamination and plant uptake of harmful metals.

6.4.7 Calcium (0.67 mg/kg): The calcium level is low, which is concerning, as calcium is vital for cell wall structure in plants and soil aggregate stability. Adding lime or gypsum could help improve calcium levels, thereby enhancing soil structure and nutrient availability.

6.4.8 Copper (3.08 mg/kg): This copper level is generally acceptable; however, excess copper can be toxic to plants, so monitoring is important.

6.4.9 **Iron (2.0 mg/kg):** This level is adequate for most plants, though higher pH can limit its availability, potentially leading to deficiencies in susceptible crops.

6.4.10 Magnesium (4.62 mg/kg): Adequate magnesium levels support chlorophyll production and photosynthesis. This level should be sufficient for most crops, but it should be monitored in high-demand crops.

6.4.11 **Potassium (39.50 mg/kg):** This level is favorable for crop health, as potassium is essential for various physiological processes, including water regulation and enzyme activation.

6.4.12 **Sodium (BLQ):** The absence of detectable sodium is beneficial, as high sodium levels can contribute to soil salinity and affect plant growth negatively.

Summary

In conclusion, the soil at this site has a mix of characteristics that can both support and challenge agricultural practices. The moderate organic content and high water retention capacity provide a solid foundation for plant growth. However, the high chloride and sulphate levels raise concerns about potential salinity and nutrient availability issues. The slightly alkaline pH necessitates careful crop selection and soil management practices. The low presence of harmful heavy metals is reassuring, while low calcium levels may require attention to improve overall soil health.

Effective soil management strategies, including amendments, crop rotation, and regular monitoring, will be crucial in optimizing soil conditions and promoting sustainable agricultural practices in this area.

CHAPTER 7

BIOLOGICAL ENVIRONMENT.

7.1. INTRODUCTION:

The biological environment encompasses the presence of living organisms, including plants and animals, within the study area. Key characteristics of any ecosystem involve both abiotic and biotic components, the interactions among communities, and the exchange of materials (energy and nutrients) between living and non-living elements. Activities ranging from land acquisition to reclamation and post-operation can impact vegetation in both direct and indirect ways, whether in the short or long term. The removal of natural vegetation, regardless of duration, affects the ecosystem. Additionally, biological species that are specific to particular environmental conditions serve as the best indicators of environmental quality.

7.2. OBJECTIVES OF STUDY:

The following objectives are involved in assessing the biological environment of the study area:

- Describe the biological environment of the study area.
- Prepare a description of the flora and fauna surrounding the existing unit.
- Identify any endangered species.
- Evaluate land use patterns and forest management practices concerning flora, fauna, and protective species.
- Discuss natural succession, if necessary.

7.3. FLORA:

The climate conditions of the study area are reasonably suited for natural vegetation cover. Reconnaissance survey of the area shows that the study area is well suited for the growth of various layers of vegetation such as grasses, herbs and layer of trees. A major part of the mountainous district is covered with deciduous forests. Chief species of tree found here include forest range, which

includes trees like Mango (Mangifera Indica), cordia dichotoma (Indian Cherry), Ficus Racemosa (Ficus Racemosa), Calcutta bamboo etc.

Following avenue trees were observed in study area are given in Table 7.1

List of Flora in buffer Zone (Based on the primary Data)

TABLE 7.1

S. No.	Botanical Name	English/ Hindi Name
1.	Albizia lebbeck	Shirish
2.	Ficus Racemosa	Cluster fig
3.	Mangifera Indica	Mango
4.	butea monosperma	bastard teak
5.	terminalia chebula	Black- or chebulic myrobalan
6.	cordia dichotoma	Indian Cherry
7.	erythrina stricta	Prickly Coral Tree
8.	dendrocalamus strictus	Calcutta bamboo
9.	casearia graveolens	Safed-Karai
10.	miliusa tomentosa	Woolly Miliusa
11.	bambusa arundinacea	Bans- lochana
12.	meyna laxiflora	mayan
13.	garuga pinnata	Garuga
14.	Acacia chundra	Red Cutch
15.	Bombax ceiba	Silk cotton tree
16.	bridelia retusa	Spinous Kino Tree
17.	Haldina cordifolia	Karam
18.	terminalia bellirica	Baheda
19.	Anogeissus latifolia	axlewood
20.	pterocarpus marsupium	Indian Kino Tree
Shrubs		
21.	carissa congesta	Bengal currant
22.	helicteres isora	East-Indian screw Tree

23.	Carvia callosa	maruadona
24.	ziziphus glaberrima	Kath Ber

7.4. FAUNA:

As the region in not rich in forest cover the place not rich in types and kinds of animal inhbitants. Near the study area there is National Park having various species of flora and fauna. Various kinds of animals area found here.

These are given in table No.7.2

Table: 7.2

LIST OF AMPHIBIANS, REPTILES, MAMMALS & AVES IN BUFFER ZONE

(Based on the Primary & Secondary Data)

S. No.	Scientific Name	Common Name
1.	Canis aureus	Jackal
2.	Cervus Unicolor	Sambar
3.	Felis Chaus	Jungle Cat
4.	Funambulus	Squirrel
5.	Hyaena hyaena	Hyaena
6.	Panthera Pardus	Panther
7.	Sus Scrofa	Wild Boar
8.	Vulpes bengalensis	Grey Fox
9.	Hystrix Indica	Porcupine
10.	Lepus nigricollis	Common Hare
Birds		
11.	Anas Poecilorhyncha	Spot bill ducks
13.	Coturnix coturnix	Grey Quails
14.	Gallus sonneratii	Grey jungle fowl
15.	Nettapus coromandelianus	Cotton teal
Mammals		

1.	Panthera tigris	Tiger
2.	Acinyox jubatus	Hunting Leopard
3.	Melursus ursinus	India black bear

7.5. GREEN BELTS:

Plant species are found to be good attenuators of gaseous and particulate pollutants. Sequesters of pollution attenuation and providing breathing space. Greenbelt development around the industrial activity is strongly recommended.

• Pollution tolerant species.

• Fast growth rate

• Thick green foliage cover

• Evergreen

• Indigenous or which would be easily growned

• Ecologically compatible

The greenbelt is to be developed using such plant species, as are having the following characteristics.

The trees species found in the region are given in the table 7.1.

Very few species grown higher than 15 meter in this region. During the initial phase of greenbelt development the sampling may not be higher than, say 0-5 to 0.75 meter, with nutritional inputs, watering and protection from cattle, these will grow higher with time. It is expected that the normal height of the tree may be obtained in around 5-10 years time.

Trees reduce noise by absorbing and suppressing it. The laminar structure of trees rather absorbs and transmits sonic waves. Though in the meantime by absorption they also reduce their intensity.

As HUL Ltd. Is an old unit, new habitation has come up around the factory. Outside the factory boundary very less area is available for tree plantation, further land acquisition will not be possible. It has also been found that the amount of fugitive emission is very low and will not cause any pollution

problem. Hence, it is proposed only to cover the vacant area available within the factory boundary and greenbelt modeling cannot be utilized for scientific plan of greenbelt development.

- Tree plantation/greenbelt development in the available space will give a good aesthetic look.

Greenbelt area should be properly fenced in order to avoid damage. The width of the greenbelt around the boundary of the factory may not be more that 10 mtrs. at certain places.

The tree species suggested are:

- Neem

- Mango

- Sal

- Teak

- Sheesham

Ornamental shrubs may be as given below:

- Kaner

- Bougain villea

- Hisbiscus rosa scinencies

CHAPTER 8

DEMOGRAPHY, SOCIO-CONOMIC AND LAND USE PATTERN

8. 1. GENERAL:

The demographic and socio-economic survey provides insight into the status of the people living around the site and captures their views on the project's adaptability in the region. Key aspects such as literacy rates, population density, and means of communication were assessed. A few random sites were selected for the survey, and within these sites, families from various socioeconomic backgrounds were randomly chosen for interviews to obtain an accurate picture of the community. The collected data was then analyzed to present a comprehensive socio-economic overview.

8.2. DEMOGRAPHY AND SOCIO ECONOMIC OF THE DISTRICT:

8.2.1. Nashik (total):

1.A. Total area-

The total area of Hamirpur district is 15,582 Sq.Km.

2.B. Population-

The total population of district is 61,07,187. The total number of males is 3,157,186 and females is 2,950,001 i.e. out of total population 51.69 % are males and 48.30% are females. The total number of households is 336333.

The density of population in Hamirpur district is 393. The sex ratio in the whole area, i.e. number of females 3,157,186 males is 51.69 %

8.2.2. Sinnar (total):

A. Total area-

The total area of Sinnar Tehsil is 1,344 Sq.Km.

B. Population-

The total population of Sinnar is 3,46,390 out of which 77.77% males and 65.42% females are literate. The total number of households is 67,445.

The density of population in Sinnar tehsil is 257.8. When it comes to literacy, 71.84% population of sinnar tehsil is literate, out of which 77.77% males and 65.42% females are literate.

Project Name: Proposed Establishment of "Magnum" Ice Cream Plant in the existing HUL factory

Project Address: **M/S Hindustan Unilever Ltd. is located at A-8/9, MIDC, Malegaon, Sinnar, Nashik, Maharashtra, India - 422001.**

The details mentioned above are shown in Table 8.1.

Table 8.1: Population Density in Sinnar Tehsil

Area in Sq. km	Population			Population Density	Sex Ratio
	Total	Male	Female		
1344	3,46,390	180001	166389	258	924

C. Literacy:

The total population of Sinnar is 3,46,390 out of which 77.77% males and 65.42% females are literate..

In Table 8.2 it is shown that out of total population 71.84% persons are literates. The male literacy rate is 77.77 and female literacy rate is 65.42

Table 8.2 Literacy rate of the Population

Percentage of literacy in total population		
Total %	Male %	Female %
71.84%	77.77	65.42

D. Schedule caste and schedule tribes:

Out of total population of Sinnar, 7.28% are Scheduled Caste (SC) and 13.35% are Scheduled Tribe (ST).

Table-8.3: Percentage of Schedule Caste and Schedule Tribe Population

Percentage of literacy in total population			
	Male	Urban	Rural
Scheduled Caste	25,226	5,593	19,633
Scheduled Tribe	46,249	4,517	41,732

E. Workers

In Sinnar Taluka out of total population, 178,422 were engaged in work activities. 91.7% of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 8.3% were involved in Marginal activity providing livelihood for less than 6 months. Of 178,422 workers engaged in Main Work, 87,813 were cultivators (owner or co-owner) while 33,592 were Agricultural labourers.

	Total	Male	Female
Main Workers	163,557	95,830	67,727
Cultivators	87,813	48,299	39,514
Agriculture Labourer	33,592	15,268	18,324
Household Industries	4,544	1,954	2,590

Other Workers	37,608	30,309	7,299
Marginal Workers	14,865	7,000	7,865
Non Working	167,968	77,171	90,797

8.3. SOCIO-ECONOMIC CONDITIONS:

A town or area is considered developed when it possesses essential infrastructure and services that enhance the quality of life for its residents. These facilities include well-constructed pucca houses, metal roads that provide reliable transportation routes, and access to hospitals staffed with qualified doctors for healthcare needs. The presence of higher secondary schools and degree colleges ensures educational opportunities for the community, while an adequate and consistent supply of water and electricity is vital for daily living and industrial activities.

Additionally, easily accessible public transportation, along with sports and recreational facilities, contribute to the well-being and social development of the population. A favorable industrial climate, supported by robust infrastructural facilities, tends to attract a significant number of entrepreneurs and businesses to the area, further promoting economic growth and development. Overall, these combined factors create a thriving environment for both individuals and industries, fostering sustained development in the region.

A. Living Standards and Infrastructure:

It is not feasible to establish a uniform standard that accounts for the wide variations in cultural norms, traditions, economic structures, natural resources, industrial development, and employment opportunities across different regions. Each area's unique cultural and economic context shapes its overall development, making a one-size-fits-all standard impractical. Additionally, access to essential amenities such as education, healthcare, water supply, communication infrastructure, transportation networks, and electricity plays a critical role in determining the quality of life in any given region. These services and resources are key indicators of an area's standard of living and vary significantly from place to place.

B. House Structure and General Sanity Facilities:

During the study, field visits and personal interviews revealed that the majority of the residential houses in the surveyed area are well-constructed, typically using durable materials. Approximately 93% of these homes are classified as "pucca," meaning they are made from solid, permanent materials such as bricks and cement, including the construction of walls, roofs, and floors. These houses tend to be clustered together in residential patterns. However, a significant issue noted in many of the villages within the study area is the lack of adequate sanitary facilities, with most homes not having access to proper sanitation infrastructure.

C. Economic Activities:

The study area is economically prosperous, with agriculture as the primary economic activity. A majority of the population relies on farming for their livelihood. In the Nashik region, local food crops such as bajra, maize, wheat, and paddy are widely cultivated. The villages in the area are gradually improving in terms of socio-economic conditions and access to educational facilities.

D. Religion in the Study Area:

Most of the population is dominated by Hindus in the whole study area.

E. Castes in the Study Area:

There are so many castes of Hindu religion exıst in the study area. Rajput, Brahmin, OBC and SC etc. are major castes in the study area villages.

8.4. Demography, Socio Economic and Land use Pattern of the Study Area:

8.4.1. Demographic Features:

The demographic features of Sinnar town in the Nashik region, based on the 2011 Census of India, serve as important indicators of the area's environmental health. These features include population density, literacy rates, and means of communication. To assess the current status, demographic data were collected by the LFS team during the study period.

The establishment of an industrial unit, along with land acquisition and subsequent construction, is expected to cause shifts in the socio-economic and demographic profile of the area. A key demographic change often observed is increased migration to the region, as people relocate closer to the industrial site. This migration can have significant socio-economic impacts on the local community, influencing population dynamics, resource distribution, and infrastructure development.

8.4.2. Land use Pattern of the Study Area:

Considering that the land is already designated as an industrial area, the fundamental concept of land use classification in Environmental Impact Assessment (EIA) studies is to categorize the land based on its actual use. Land use serves as a vital indicator of how human activities impact environmental health and highlights the varying degrees of interaction between natural ecosystems and human interventions. Factors like soil quality, water availability, and climate can influence land use to some extent. However, in many cases, human activity has significantly altered the natural environment to make it suitable for industrial or other specific uses, sometimes leading to rapid environmental degradation by utilizing unsuitable land for a particular purpose.

The term "land use" suggests that all land is intended for a specific purpose. The classification system typically identifies four main categories: forest land, cultivable waste, and non-cultivable

land. In this study area, spanning 50 Square km, three land categories are recognized: forest, cultivable waste, and land not available for cultivation.

The data reveals minimal forest coverage, with approximately 3,86,923 hectares available for various non-agricultural purposes. Non-cultivable land constitutes around 8.92 percent of the total area, encompassing barren land that cannot be economically reclaimed for agriculture, as well as land used for buildings, roads, railways, and water bodies, or reserved for other non-agricultural purposes. Cultivable wasteland includes Gaucher (common grazing land) and Groves.

8.4.3. Amenities Available in the study Area:

The availability of amenities in close proximity is a key indicator of the level of infrastructure development in a given area. The information on amenities in the villages within the study area has been sourced from the 2011 Census records. These records were obtained from various district government offices and supplemented by interviews conducted during the study. The analysis of amenities is based on the data provided by the 2011 Census.

(III) Environmental Sensitivity

S. No.	Areas	Name/ Identity	Aerial distance (within 15 km) Proposed project location boundary
1	Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value	**RESERVE FOREST**	Approx. 2 km North from the project site.
2	Areas which are important or sensitive for ecological reasons - Wetlands, watercourses or other water bodies, coastal zone, biospheres, mountains, forests	**GODAVARI RIVER**	Approx. 11.5 km; N from the project site.
3	Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration	**RESERVE FOREST**	Approx. 2 km North from the project site

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4	Inland, coastal, marine or underground waters	**Ground water**	The depth of groundwater in the nearby area ranges from 12-18 mbgl.
5	Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas	**NH-60**	Approx. 1.6 km, West from the project site.
7	Defense installations	**Yes**	Gandhinagar Army Airport -20.6 km; WNW is in close proximity of the project
8	Densely populated or built-up area	**Malegaon Town**	Approx. 1 km; NW from the project site.
9	Areas occupied by sensitive man-made land uses *(hospitals, schools, places of worship, community facilities)*	**Ashoka Universal School** **CHAITANYA SUPERSPECIALITY HOSPITAL** **Ganpati mandir**	Approx. 0.6 km S from the project site. Approx. 3.3 km; SE from the project site. Approx. 1.4 km SE from the project site.
10	Areas containing important, high quality or scarce resources. *(ground water resources, surface resources, forestry, agriculture, fisheries, tourism, minerals)*	**GODAVARI RIVER**	Approx 11.5 km; N from the project site.
11	Areas already subjected to pollution or environmental damage. *(those where existing legal environmental standards are exceeded)*	**GODAVARI RIVER**	Approx 11.5 km; N from the project site.

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12	Areas susceptible to natural hazard which could cause the project to present environmental problems (*earthquakes, subsidence, landslides, erosion, ffooding or extreme or adverse climatic conditions*)	**Earthquakes**	The site falls under the zone III as per the Seismic Zone Map of India and is thus prone to high damage risk zone. Adequate measures will be taken during the construction of the project.

CHAPTER 9

AIR QUALITY PREDICTIONS THROUGH MATHEMATICAL MODELLING

9.1. INTRODUCTION:

At Hindustan Unilever Limited (HUL) in Sinnar, Maharashtra, the existing plant has both continuous and periodic sources of pollutant emissions. This report provides a detailed overview of the processes involved, the generation of pollutants, and the proposed abatement and control measures. Specifically, Chapters 2 and 3 of this report delve into the emission characteristics of various sources, offering a comprehensive analysis.

Extensive ambient air quality monitoring has been conducted in and around the HUL facility, allowing for an understanding of how these emissions contribute to the overall background air quality. The monitoring data reflect the cumulative impact of emissions from the plant.

The facility operates two 4-ton capacity air gas (AG) boilers and one 3-ton fuel oil (F.O.) boiler, all of which are connected to a single chimney for emissions dispersal. Additionally, there are three diesel generating sets, including two units of 1250 KVA and one-unit of 1000 KVA. While these diesel generators are intended to function only during power outages from the grid, their emissions have been factored into the assessment to evaluate the worst-case scenario regarding air quality impact.

The primary pollutants emitted from the stacks at HUL include sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and particulate matter (PM). In this section of the report, the peak incremental concentrations of these pollutants are predicted and superimposed on the existing background air quality levels. The air quality predictions presented in Chapters 2 and 3 illustrate the anticipated post-project ambient air quality results, enabling a thorough assessment of the potential environmental impact of the plant's operations.

9.2. BOILERS:

The facility operates two air gas (AG) boilers, each with a capacity of 4 tons, alongside a 3-ton fuel oil (F.O.) boiler. All three boilers are integrated into a single chimney system designed for the efficient dispersal of emissions. The primary pollutants emitted from these boilers include sulfur dioxide (SO_2), nitrogen oxides (NOx), and particulate matter (PM).

Detailed specifications for the emission stacks and the relevant emission conditions are provided in Table 9.1 of this report. The boilers utilize both AG and fuel oil as their energy sources, contributing to the overall emission profile of the facility.

Seasonal variations in emissions have been observed, with the lowest emission rates for SO_2, NOx, and PM recorded during the monsoon season. In contrast, the highest emission rates for these pollutants occur during the winter months. This seasonal fluctuation is indicative of the influence of atmospheric conditions, which can affect the dispersion and concentration of emissions in the surrounding environment. Understanding these trends is crucial for assessing the environmental impact of the facility's operations and for developing effective emission control strategies.

9.2.1. POLLUTION LOAD:

Table 9.1 presents detailed specifications for the emission stacks, along with the anticipated quantities of emissions from the facility's boilers across Mar'24 & June'24. This table serves as a critical reference for understanding the emission characteristics associated with the different operational conditions of the boilers.

The data illustrates that the concentrations of particulate matter (PM), sulfur dioxide (SO_2), and nitrogen oxides (NOx) exhibit considerable variability depending on the specific boiler sets in use. This variability can be attributed to differences in the operational efficiency, fuel type, and combustion conditions of each boiler.

Moreover, the concentrations of these pollutants are not only influenced by the type of boiler but also by seasonal changes. For instance, atmospheric conditions such as temperature, humidity, and wind patterns significantly affect pollutant dispersion and concentration levels. As a result, emissions may vary markedly between seasons, with specific patterns emerging: higher emissions may be observed in certain seasons, such as winter, while lower emissions are typically recorded during the monsoon season.

Understanding these seasonal and operational variations is essential for accurately assessing the environmental impact of the facility's emissions and for implementing effective pollution control measures tailored to the conditions of each season.

Table 9.1 Stack Gas Analysis

1. Stack attached : Boiler
2. Stack Height : 30 meter
3. Stack Diameter : 0.45 meter
4. Stack area : 0.1590 m2
6. Flue Gas Temperature : 405 Deg K

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S. No.	DESCRIPTION	UNIT	RESULT MAR'24	RESULT JUN'24	MPCB LIMITS
1.	PARTICULATE MATTER	mg/NM3	41.97	36.72	150
2.	SO2	mg/NM3	68..52	56.60	--
		Kg/day	4.32	3.35	As per consent
3.	NOx	ppm	40	36	--

9.3 Diesel Generating Sets (D.G. Sets)

At Hindustan Unilever Limited (HUL), there are three diesel generating sets (D.G. sets) with capacities of two units at 1250 KVA each and one unit at 1000 KVA. These D.G. sets are primarily utilized during production to provide backup power in the event of a power failure from the grid. The fuel employed for these generating sets is high-speed diesel (HSD).

The emissions from the D.G. sets primarily consist of sulfur dioxide (SO_2) and nitrogen oxides (NOx). The generation of particulate matter (PM) is influenced by the sulfur content in the HSD fuel, which can vary. This variability in sulfur content can lead to fluctuations in the amount of particulate matter produced during operation.

DG Set- I

1. Stack attached : DG

2. Stack Height : 7.2 meter

3. Stack Diameter : 0.28 meter

4. Velocity: 9.54 m/s

4. Stack area : 0.0615 m2

6. Flue Gas Temperature : 506 Deg K

7. Gas Volume: 1244.68 Nm3/ Hr

Table – 9.4: Stack Gas Analysis

S. No.	DG Capacity	DESCRIPTION	UNIT	RESULT Mar'24	RESULT Jun'24	MPCB LIMITS
1.	1250 KVA	PARTICULATE MATTER	mg/NM3	40.19	36.41	150
2.		SO2	mg/NM3	90.82	84.16	--
			kg/day	2.71	2.44	115
3.		NOx	ppm	88	81	

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DG Set- II

1. Stack attached : DG

2. Stack Height : 7.2 meter

3. Stack Diameter : 0.28 meter

4. Velocity: 7.98 m/s

4. Stack area : 0.0615 m2

6. Flue Gas Temperature : 462 Deg K

7. Gas Volume: 1141.13 Nm3/ Hr

Table – 9.5: Stack Gas Analysis

S. No.	DG Capacity	DESCRIPTION	UNIT	RESULT Mar'24	RESULT Jun'24	MPCB LIMITS
1.	1000 KVA	PARTICULATE MATTER	mg/NM3	43.19	36.41	150
2.		SO2	mg/NM3	71.80	62.19	--
			kg/day	1.97	1.61	115
3.		NOx	ppm	62	55	

9.4. Mathematical Model For Pollutant Dispersion:

Most of the mathematical models for pollutants dispersion in atmosphere are based on Gaussian dispersion. The basic model for computing the pollutant concentrations (μg/m3) for any point with location coordinates x, y and z (m) with respect to the base of a single source of effective length He (m) above base, and strength of emission Q (mg/s) is given by

$$C(X,Y,Z\,He) = \frac{10^6\,Q}{2\pi\sigma y\sigma z U} exp\left[-\frac{1}{2}\left(\frac{Y}{\sigma y}\right)^2\right]$$

$$\left[exp\left\{-\frac{1}{2}\left(\frac{z-He}{\sigma z}\right)^2\right\} + exp\left\{-\frac{1}{2}\left(\frac{z-He}{\sigma z}\right)^2\right\}\right] \qquad (9.1)$$

where U (m/s) is the average wind velocity in X direction (downwind direction), $\sigma\gamma$ and σz are the standard deviations of dispersion coefficients in Y (cross wind or lateral) and Z (vertical) direction (m), respectively, at a distance X in downwind directions from the base of the emission source stack. Validity of Gaussian plume dispersion model has been tested extensively for different atmospheric stability conditions provided reasonable estimates of He, $\sigma\gamma$, σz and U are made. ISI has also adopted this basic model for plume dispersion and this model forms the basis of dispersion modeling.

9.5. Downwind Ground Level Concentration:

Ground level concentrations of pollutants in downwind direction will always be higher in comparison to cross wind direction for any downwind distance X. These concentrations can be obtained by putting Z=0 and Y=0 in the equation 9.1 to give:

$$C(X,0,0,He) = \frac{10^6}{\pi\sigma Y\sigma Zu} exp\left[-\frac{1}{2}\left(\frac{He}{\sigma z}\right)\right]^2 \qquad (9.2)$$

It may be noted that the dispersion coefficients σy and σz depend on downwind distance X and atmospheric stability conditions.

9.6. Atmospheric Stability Classification:

Many alternative models are developed by different authors to related oy and σz with downwind distance X under different atmospheric stability conditions. Unfortunately, none of these had been found to be comprehensive enough to be applicable under all types of topographical and meteorological conditions. On the basis of all available information, ISI adopted the "Pasquill Gifford Stability Classification System" for flat terrains and "McElroy Stability Classification System" for non-smooth and uneven areas, such as urban areas and other undulating areas.

The study area is flat and other buildings are also of low to medium height, Therefore, Pasquill-Gifford stability Classification shall be applicable in accordance with ISI recommendations. Pasquill-Gifford Classification divides atmospheric stability into six classes based on wind speed and solar isolation/ cloud cover conditions.

9.7. Atmospheric Dispersion Coefficients:

Atmospheric dispersion coefficients vary with downwind distance from emission sources for different atmospheric stability conditions. Table 9.9 gives the variation of crosswind dispersion coefficients, and

vertical dispersion coefficient z, as a function of downwind distance from the source, X for different stability conditions. These equations used for computations are proposed by Brigg's for open country and are valid up to a distance of 10 Km from the emission source.

9.8. Effective Stack Height:

The effective height of the stack, He, to be used is given by He = Hs + Hpr, where Hs is the actual physical height of stack above ground level and Hpr is the plume rise due to thermal and momentum factors. A very large number of correlations are available to predict plume rise. In this case, plume rise has been determined by using the Holland's equation which is as follows:

$$He = \frac{VL}{U}(1.5 + 2.68 \times 10^{-3} P \left(\frac{Ts-Ta}{Ts}\right) D)$$

Where

He = Rise in stack height in meter

D = The inside stack diameter in meter

V = Stack gas velocity in m/sec.

Ts = Stack gas temperature in oK

Ta = Ambient air temperature in oK

P = Atmospheric pressure in ml.

Under stable condition, such as of C, stability class, a value 1.1 times of H may be used.

9.9. Observation on GLC of PM:

Taking into considerations, the atmospheric condition of the site, namely, wind speed and solar radiations, the ground level concentrations of PM from different stacks have been worked out under stability class C of Pasquill stability classes. The observations are given in Annexure:

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CHAPTER 10

ENVIRONMENTAL MANAGEMENT PLAN (EMP)

-10.1. BASIC CONCEPTS:

An Environmental Management Plan (EMP) is an essential outcome of a thorough Environmental Impact Assessment (EIA) conducted for any development project. This plan outlines a structured approach to managing environmental issues arising from the project, ensuring that various resources are utilized as efficiently as possible.

The EMP details corrective measures aimed at minimizing wastewater generation, ensuring that waste, effluent, and residuals are treated effectively, and promoting the recovery and recycling of materials whenever feasible. The overarching strategy of the EMP focuses on reducing pollution-related costs while simultaneously achieving significant savings in both resource use and production costs. The implementation of the EMP is designed to be as effective as possible in attaining these objectives.

The subsequent sections of this chapter will provide a detailed discussion of the specific measures that will be adopted to mitigate potential adverse environmental impacts and address particular environmental challenges.

To this end, a comprehensive Environmental Management Plan has been developed. This plan includes proposed pollution control systems along with additional mitigatory measures aimed at reducing the undesirable impacts previously identified. These measures will be elaborated upon in the following sections, outlining actionable strategies to enhance environmental performance and ensure compliance with applicable regulations and standards.

10.2. CORRECTIVE MEASURES:

Corrective measures that can be implemented to address environmental issues can be divided into two distinct categories:

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Class A: Preventive Measures

Preventive measures are proactive strategies aimed at reducing or eliminating the likelihood of specific environmental problems occurring in the first place. These measures focus on identifying potential risks and implementing practices and technologies that minimize or negate those risks. By taking preventive actions, organizations can effectively safeguard the environment and promote sustainability before issues arise.

Class B: Mitigative Measures

Mitigative measures, on the other hand, are reactive strategies designed to address and alleviate the severity of existing environmental problems. These measures focus on minimizing the impacts of environmental issues that have already manifested, thereby reducing their intensity and potential harm. Implementing mitigative measures is crucial for managing ongoing environmental challenges and restoring ecological balance.

During the course of this Environmental Impact Assessment (EIA), specific corrective measures have been identified to address the environmental concerns associated with the project. These measures will be discussed in detail in the following sections, providing a comprehensive overview of both preventive and mitigative strategies tailored to meet the project's environmental management objectives.

10.3. WATER POLLUTION PREVENTION:

The existing project HUL, Sinnar produce waste water used in gardening.

10.4. AIR POLLUTION PREVENTION:

The majority of the equipment utilized in the existing project operates on electricity, which effectively eliminates the generation of air pollutants associated with fuel combustion. Consequently, the primary source of emissions from the facility is particulate matter (PM), which is produced by the 2 stacks connected to Boiler and diesel generating (D.G.) sets. The emission of PM is a significant concern within the existing plant operations.

To address and mitigate the rate of PM emissions, the facility has implemented a range of control measures and equipment specifically designed for this purpose. Key among these measures are:

1. **High-Efficiency Bag Dust Collectors:** These advanced filtration systems are installed to significantly reduce the levels of particulate matter in the exhaust gases. The bag dust collectors effectively capture fine particles before they can be released into the atmosphere, ensuring compliance with environmental standards.
2. **Dust Suppression and Extraction Systems:** These systems are employed to control emissions at various points of dust generation throughout the facility. By implementing suppression techniques, the facility minimizes the dispersion of dust into the air, while extraction systems help in capturing and removing airborne particulates from the operational environment.

3. **Green Belt Development and Afforestation**: To further enhance air quality and contribute to environmental sustainability, extensive green belts and afforestation initiatives have been undertaken in available spaces within the plant. The establishment of green areas not only helps in absorbing pollutants but also promotes biodiversity and provides a buffer against dust emissions.

Through these comprehensive control measures, the facility aims to effectively manage particulate matter emissions and minimize their impact on the surrounding environment. Continuous monitoring and maintenance of these systems are essential to ensure their optimal performance and to meet the required environmental standards.

10.5. NOISE ENVIRONMENT:

The potential sources of noise within the factory area have been identified as originating from several key locations: the mill area, the packing area, the vicinity of the main gate, and the administrative block, particularly when the mills are in operation.

It is important to note that the sound pressure level produced by a noise source diminishes as the distance from the source increases due to wave divergence. Specifically, an expected attenuation of approximately 6 dB(A) occurs for every doubling of the distance between the noise source and the receptor. This relationship is illustrated in Table 5.3 of Chapter 5, which provides detailed measurements and assessments of sound levels in the factory.

To mitigate the effects of noise exposure on personnel working near noisy machinery, appropriate noise control measures have been implemented. These include the provision of earplugs and earmuffs, which offer effective noise reduction in the range of 10 to 15 dB(A).

Additionally, physical barriers and shields, such as walls and acoustic enclosures, have been installed around machines that generate high levels of noise. These structures are designed to further contain sound emissions and reduce the impact of noise on the surrounding environment.

The development of a green belt surrounding the factory has also contributed significantly to noise attenuation. The vegetation acts as a natural sound barrier, helping to absorb and diffuse noise before it can reach neighboring areas.

Furthermore, the plant takes diligent care to ensure that noise levels within occupational areas remain within permissible standards, in accordance with environmental regulations.

As a result of these comprehensive noise control measures and practices, the operational activities of the plant do not have any adverse impact on the surrounding environment or the occupational environment. Continuous monitoring and maintenance of noise levels are conducted to ensure ongoing compliance and to protect the health and well-being of workers and nearby residents.

10.6. IMPACT ON FLORA AND FAUNA:

In the vicinity of the factory, there is a notable absence of forest cover, wildlife, and rare species of plants. The surrounding environment primarily consists of domesticated animals and commonly cultivated trees.

Given the operational characteristics of the factory, it has been determined that there will be no detrimental effects on ambient air quality, water quality, or ambient noise levels. As a result, it is unlikely that the factory operations will adversely impact the domestic animals in the area or the health and growth of the commonly grown trees.

The lack of sensitive ecological receptors in the vicinity, coupled with the factory's commitment to maintaining high environmental standards, supports the conclusion that factory activities will not pose a risk to the local fauna or flora. Continuous monitoring of environmental parameters will be conducted to ensure that any potential impacts are promptly identified and managed, further safeguarding the well-being of the surrounding ecosystem. This proactive approach reinforces the factory's role as a responsible entity within the community, contributing positively to the local environment without compromising its integrity.

10.7. SOCIO-ECONOMIC IMPACT:

10.7.1. Socio-Economic Survey:

During a preliminary socio-economic survey conducted in the villages surrounding the factory site, a random selection of communities was observed to assess the status of the local population and their perceptions regarding the proposed expansion of the factory. The following key features emerged from the survey:

1. **Demographics:** The dominant demographic group consists of farmers, followed by laborers, artisans, service providers, and business professionals.
2. **Literacy Rates:** Literacy levels are notably higher among adults over the age of 45, while the younger generation exhibits a significant level of literacy. However, a concerning trend is observed among adult females, who display the highest rates of illiteracy in the community.
3. **Family Size:** Families belonging to the labor class tend to be the largest, with an average size of 6 to 8 members. This is followed by small and marginal farmers, as well as artisans.
4. **Economic Activities:** Farming is primarily the domain of large farmers. Smaller farmers and laborers are increasingly seeking alternative sources of income due to economic pressures.
5. **Housing and Sanitation:** Housing and sanitation issues are prevalent in many villages. While medium to large farmers may have pucca (permanent) farmhouses, the majority of families reside in poorly ventilated and inadequate housing conditions.

6. **Electricity Supply**: Most villages have access to electricity; however, the reliability of power supply is quite poor, leading to frequent disruptions.
7. **Fuel Usage:** The local population primarily relies on wood and cow dung as fuel sources for cooking and heating.
8. **Community Sentiment Towards the Factory:** The local residents express a high level of satisfaction with the existing factory and its proposed expansion. They appreciate the employment opportunities, educational advancements, medical facilities, and enhanced commercial and entertainment options that the factory provides. Many residents believe that the expansion will further bolster their economic activities.

Employment

The factory requires personnel across various categories, with a strong preference for hiring local residents. Although the expansion program does not anticipate creating new employment opportunities, any future need for additional workers will prioritize local candidates. The existing factory has significantly contributed to the economic development of the area by injecting considerable funds into the local economy through salaries, service costs, infrastructure improvements, and the purchase of agricultural products such as grains, vegetables, milk, meat, and eggs. This influx of income has resulted in a marked increase in consumption and purchasing power within the community, leading to diverse lifestyles and a shift in traditional cultural and social values. Consequently, a range of goods and services previously unavailable in the area has become accessible.

Medical Facilities

All factory workers are covered under the Employees' State Insurance (ESI) scheme, which provides them with access to a comprehensive range of medical facilities. For employees not covered under ESI, a Group Insurance Policy is in place to ensure their health needs are met. The factory employs a registered medical practitioner who conducts regular health check-ups for employees and attends to any medical emergencies or accidents that may arise. Additionally, the Nearest Hospital and the ESI dispensary are located within a 5-kilometer radius of the plant, offering further medical services as needed. Overall, the existing medical facilities are adequate to meet the health care needs of all workers.

Green Belt Development

Sufficient green belts have been established within the plant premises. A 10-meter wide green belt surrounds all sides of the factory, and well-planned gardens have been developed in strategic areas, including around the Compressor House, in front of the store, and near the D.G. House and HUL House. In addition, various plants have been planted along both sides of the road outside the factory to enhance the environmental quality of the area.

Rainwater Harvesting and Artificial Recharge to Ground Water

The premises of Hindustan Unilever Ltd., located in the Industrial Area in Sinnar, District Nashik, Maharastra, have a total fresh water requirement of 313 m^3/day, equating to approximately 114245

m^3/year. The factory is classified as non-water intensive and falls within the Critical category as per water usage guidelines. In compliance with the Central Ground Water Authority (CGWA) guidelines, the factory is required to implement artificial recharge measures to offset 100% of its groundwater withdrawal.

To meet this requirement, the industry has 4 artificial recharge system that includes rainwater harvesting through pavements and rooftop catchment. Thus, Hindustan Unilever Ltd. is committed to adhering to all terms and conditions set forth by the CGWA and formally requests the grant of a No Objection Certificate (NOC) for groundwater withdrawal.