Volume - I

REVISED ENVIRONMETAL IMPACT ASSESSMENT REPORT

&

ENVIRONMENTAL MANAGEMENT PLAN

FOR

Proposed Expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) through modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time

At

Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan)

[The EIA/EMP report has been prepared for the expansion of Zinc Smelter from 1,00,000 TPA to 1,40,000 TPA through modernization of process by installing new state-of-the-art with the latest technology equipment to improve efficiency.]

Study Period: Summer Season (March to May, 2022)

APPLICANT

M/s. Hindustan Zinc Ltd.
Debari Zinc Smelter, Village: Debari,
Tehsil: Girwa, District: Udaipur
(Rajasthan)-313 024
Telephone No.02942658028,
Mobile No.9937047170; 9568001100
E-mail: manas.tyagi@vedanta.co.in;
digambar.patil@vedanta.co.in

EIA CONSULTANT

J.M. EnviroNet Pvt. Ltd.
(Registered EIA Consultant Organization from NABET-QCI)
Certificate No.: NABET/EIA/2326/RA 0308, Valid Till 07.08.2026,
Emaar Digital Greens, Tower – B, Unit No. 1517,
Golf Course Ext. Road, Sector – 61, Gurugram (Haryana) – 122 011
E-mail: jmenviron@hotmail.com

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HINDUSTAN ZINC
Zinc & Silver of India

TO WHOM SO EVER IT MAY CONCERN

I, **Manas Tyagi, Dy. CEO – IBU Smelters, Hindustan Zinc Limited** give this undertaking that Hindustan Zinc Ltd. has proposed for Expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) through modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time at Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan)".

In line with the Ministry's O.M. dated 11th April, 2022 regarding grant of EC under para 7(ii) of EIA Notification, 2006, amended from time to time, the EIA/EMP Report has been prepared for "expansion of Zinc Smelter from 1,00,000 TPA to 1,40,000 TPA (in 2 phases) through modernization of process by installing new state-of-the-art with the latest technology equipment to improve efficiency" as per Standard TOR Points for carrying out the Environmental Impact Assessment (EIA) study and the data submitted is factually correct.

We further certify that we have reviewed the EIA report and take full responsibility and ownership of the content presented in the EIA report by J.M. EnviroNet Pvt. Ltd.

Date: 25.11.2024

Place: Udaipur, Rajasthan

For and on behalf of M/s. Hindustan Zinc Limited

Manas Tyagi

(Dy. CEO – IBU Smelters, Hindustan Zinc Limited)

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UNDERTAKING

We, J.M EnviroNet Pvt. Ltd. (JMEPL), having registered office at 403, 4 Floor, Jaipur Centre, B2 Bye-Pass, Tonk Road, Jaipur, Rajasthan, Environmental Consultant of M/s. Hindustan Zinc Limited for their Proposed Expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) through modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time at Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan) give this undertaking to the effect that In line with the Ministry's O.M. dated 11th April, 2022 regarding grant of EC under para 7(ii) of EIA Notification, 2006, amended from time to time, the EIA/EMP Report has been prepared for "Expansion of Zinc Smelter from 1,00,000 TPA to 1,40,000 TPA (in 2 phases) through modernization of process by installing new state-of-the-art with the latest technology equipment to improve efficiency" as per Standard TOR Points for carrying out the Environmental Impact Assessment (EIA) study and the data submitted is factually correct.

Date: 25.11.2024 **For & on behalf of J.M EnviroNet Pvt. Ltd.**

Place: Gurugram

Dr. Deepa Taneja

Managing Director

Certificate of Plagiarism Check

Title of EIA Report:	Proposed Expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) through modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time At Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan) of M/s. Hindustan Zinc Limited
Name of Accredited Organization	J.M. EnviroNet Pvt. Ltd.
Unique Identification Number	MoEFCC File. No.: J-11011/479/2006-IA-II(I) Consultant: NABET/EIA/2326/RA0308 dated 7th Aug., 2026
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Date and sign of EIA Co-Ordinator:

Name: Khem Shankar Gour

Designation: EIA Coordinator

Date and Sign of Head of Accredited Organization: Dr. Deepa Taneja Managing Director Name of the EIA consultant organization: M/s. J.M. EnviroNet Pvt. Ltd.

NABET Certificate Number & Issue date: NABET/EIA/2326/RA0308 dated 7th Aug., 2026

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DECLARATION OF ASSOCIATION IN THE EIA

MoEFCC File No.: J-11011/479/2006-IA II (I)

Declaration by Experts contributing to the EIA for Proposed Expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) through modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time at Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan) by M/s. Hindustan Zinc Limited.

I, hereby, certify that I was a part of the EIA team in the following capacity that developed the above EIA.

JM File no.: JMEPL/HZL/JM File No. 811/EIA/Nov, 2024/Final EIA (Revision no. 2), (Copy no. 0)

	Name	Period of involvement	Signature and Date:
EIA coordinator:	Mr. Khem Shankar Gour	Feb., 2022 to Nov, 2024	
TM	Ms. Nisha Sharma	Feb., 2022 to Nov, 2024	
Contact Information:	Unit No. 1517, Tower B, Emaar Digital Greens, Golf Course Extension Road, Sector 61, Gurugram 122 001 (Haryana) Email: jmenviron@hotmail.com		

Functional area experts:

S. No.	Functional areas	Name of the expert/s		Involvement (Period and task**)	Signature and date
1	AP*	FAE	Mr. Khem Shankar Gour	Feb., 2022 to Nov, 2024	
2	WP*	FAE	Mr. Khem Shankar Gour	Feb., 2022 to Nov, 2024	
3	SHW*	FAE	Mr. Khem Shankar Gour	Feb., 2022 to Nov, 2024	
4	SE*	FAE	Ms. Geetanjali Saini	Feb., 2022 to Nov, 2024	
5	EB*	FAE	Mr. Akshay Singh	April,2024 to Nov, 2024	
6	HG*	FAE	Mr. Kirti Prakash Agarwal	Feb., 2022 to Nov, 2024	
7	AQ*	FAE	Ms. Ekta Arora	Feb., 2022 to Nov, 2024	
8	Noise*	FAE	Ms. Nisha Sharma	Feb., 2022 to Nov, 2024	
		FAA	Ms. Riya Sharma	May, 2022 to Nov, 2024	

DECLARATION OF ASSOCIATION IN THE EIA

S. No.	Functional areas	Name of the expert/s		Involvement (Period and task**)	Signature and date
9	LU*	FAE	Ms. Geetanjali Saini	May, 2022 to Nov, 2024	Geetanjali Saini
10	RK*	FAE	Dr. Suresh Chandra Jain	May, 2022 to Nov, 2024	(Dr. S. C. Jain)

*One TM against each FAE may be shown

**Please attach additional sheet if required

Declaration by the Head of the accredited consultant organization/ authorized person

I, Dr. Deepa Taneja, Managing Director, J.M. EnviroNet Pvt. Ltd., hereby, confirm that the above-mentioned experts prepared the EIA for Proposed Expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) through modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time at Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan) by M/s. Hindustan Zinc Limited.

I also confirm that the consultant organization shall be fully accountable for any mis-leading information mentioned in this statement.

Signature:	Deepa Taneja
Name:	**Dr. Deepa Taneja**
Designation:	**Managing Director**
Name of the EIA consultant organization:	**JM EnviroNet Pvt. Ltd.**
NABET Certificate no. & Issue date:	NABET/EIA/2326/RA0308 dated 7th Aug., 2026

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ABBREVIATIONS

AAQM	:	Ambient Air Quality Monitoring
AAQMS	:	Ambient Air Quality Monitoring Stations
AAS	:	Atomic Absorption Spectrometer
ACF	:	Activated Carbon Filter
AERMOD	:	Atmospheric Dispersion Modelling
APCE	:	Air Pollution Control Equipment's
APM	:	Air Particulate Matter
AvRc	:	Average run-off coefficient
BDL	:	Below Detection Limit
BGL	:	Below Ground Level
BIS	:	Bureau of Indian Standards
BOD	:	Bio-chemical Oxygen Demand
CAP	:	Climate action programme
CPLC	:	Carbon Pricing Leadership Coalition
CEMS	:	Continuous Emission Monitoring System
CGWA	:	Central Ground Water Authority
CEP	:	Condensate extraction pump
CPCB	:	Central Pollution Control Board
CPP	:	Captive power Plant
CO	:	Carbon Monoxide
CA	:	Cellulose Acetate
CREP	:	Corporate Responsibility for Environment Protection
CSR	:	Corporate Social Responsibility
CTDF	:	Common Treatment and Disposal Facility
CTE	:	Consent to Establish
CTO	:	Consent to Operate
D.G	:	Diesel Generator
DL	:	Detection Limit
DO	:	Dissolved Oxygen
DMF	:	Dual Media Filter
DMP	:	Disaster Management Plan
DMIC	:	Delhi Mumbai Industrial Corridor

EAC	:	Expert Appraisal Committee
EC	:	Environmental Clearance
ECC	:	Emergency Control Centre
EIA	:	Environmental Impact Assessment
EMC	:	Environment Management Cell
EMP	:	Environmental Management Plan
ERDAS	:	Earth Resources Data Analysis System
ERT	:	Emergency Response Team
ESE	:	East of South East
ESP	:	Electrostatic Precipitator
ETP	:	Effluent treatment Plant
FAB	:	Fluidized Aerobic Bed Reactor
FCC	:	False Color Composite
FSE	:	Full-scale exercise
FE	:	Functional exercise
FICCI	:	Federation of Indian Chambers of Commerce and Industry
FPS	:	Fine Particulate Sampler
FY	:	Financial Year
GDP	:	Gross Domestic Product
GES	:	Groundwater Estimation Committee
GIS	:	Geographic Information System
GOI	:	Government of India
GOVT.	:	Government
GPS	:	Global Positioning System
GLC	:	Ground Level Concentration
Ha	:	Hectare
HAZID	:	Hazard Identification
HP	:	High Pressure
HC:	:	Hydrocarbons
HES	:	High efficiency separator
HSE	:	Health, Safety & Environment
HSL	:	High Silver Lead
HZL	:	Hindustan Zinc Limited
ISO	:	International Organization for Standardization
ILC	:	Inline calciner
ISRO	:	Indian Space Research Organization
IMD	:	India Meteorological Department
IWPA	:	Indian Wildlife protection Act
IS	:	Indian Standards
JMEPL	:	J.M. EnviroNet Private Limited
KLD	:	Kilo Litre Per Day
Km	:	Kilometer
KWH	:	Kilo Watt Hour
LULC	:	Land Use/Land Cover
LP	:	Low Pressure
MCTP	:	Moore Cake Treatment Plant
MSDS	:	Material Safety Data Sheets
MT	:	Metric Tonne

MTPA	:	Million Tonnes Per Annum
MoEFCC	:	Ministry of Environment and Forest & Climate Change
MVR	:	Mechanical Vapor recompression
MW	:	Mega Watt
NAAQS	:	National Ambient Air Quality Standards
NABARD	:	National Bank for Agriculture and Rural Development
NABL	:	National Accreditation Board for Testing And Calibration Laboratories
NABET	:	National Accreditation Board for Education & Training
NGO	:	Non- Governmental Organization
NATMO	:	National Atlas Thematic Mapping Organization
NDIR	:	Non-dispersive Infrared Detector
NE	:	North East
NNE	:	North North East
NW		North West
NH	:	National Highway
NIDM	:	National Institute of Disaster Management
NOC	:	No Objection Certificate
NNW	:	North of Northwest
NO_x	:	Oxides of Nitrogen
NRSA	:	National Remote Sensing Agency
NTU	:	Nephelometric Turbidity Unit
NW	:	North West
OHS	:	Occupational Health & Safety
OPC	:	Ordinary Portland Cement
PAT	:	Perform Achieve Trade Scheme
PAS	:	Public address system
PA	:	Polyamide
PBL	:	Project Based Learning
PCU	:	Passenger Car unit
PET	:	Potential Evapo Transpiration
PF	:	Protected forest
pH	:	Potential Hydrogen
PH		Pre- Heater
PHC	:	Public Health Centers
PM	:	Particulate Matter
PMGSY	:	Pradhan Mantri Gram Sadak Yojana
PPE	:	Personal Protective Equipment's
PPC	:	Pozzolana Portland Cement
PPM	:	Parts Per Million
PSC	:	Portland Slag Cement
PVC	:	Poly Vinyl Chloride
PVDF	:	Polyvinylidene fluoride
RDS	:	Respiratory Dust Sampler
RI	:	Rainfall Infiltration
RO	:	Reverse Osmosis
RSPM	:	Respirable Suspended Particulate Matter
RSPCB	:	Rajasthan State Pollution Control Board
R & R	:	Rehabilitation & Resettlement

S	:	South
SAR	:	Specific Absorption Rate
SC	:	Scheduled Caste
SE	:	South East
EAC	:	Expert Appraisal Committee
SEAC	:	State Expert Appraisal Committee
SECL	:	South Eastern Coalfields Limited
SEIAA	:	State Environment Impact Assessment Authority
SH	:	State Highway
SHE	:	Safety, Health and Environmental Protection
SOP	:	safe operating procedure
SIC	:	Site Incident Controller
SOI	:	Survey of India
SRTM	:	Shuttle Radar Topographic Mission
SSE	:	South of South East
SUF	:	Submerged Ultrafilter
SW	:	South West
SSW		South of Southwest
ST	:	Scheduled Tribes
SHMP	:	Sodium hexametaphosphate
STP	:	Sewage treatment Plant
TAD	:	Tertiary air Duct
TTE	:	Table-top exercise
TDS	:	Total Dissolved Solids
TGT	:	Tail Gas Treatment
ToR	:	Terms of Reference
TPA	:	Tonnes Per Annum
TPD	:	Tonnes Per Day
TPH	:	Tonnes Per Hour
USEPA	:	United States Environmental Protection Agency
USDA	:	United States Department of Agriculture
VAT	:	Value Added Tax
VRM	:	Vertical Rolling Mill
WHRB	:	Waste Heat Recovery Boiler
WMC	:	Works Main Controller
WSW	:	West of South West
WTP	:	Water Treatment Plant
ZLD	:	Zero liquid Discharge
$\mu g/m^3$	:	Micro gram per metre cube
µS/cm	:	Micro Siemens per centimeter
dB	:	Decibel
g	:	Gram
gm/sec	:	Gram per second
ha	:	Hectare
Kcal/kg	:	Kilo calorie per gram
kg/ha	:	Kilogram per hectare
kg/cm	:	Kilogram per centimeter
Kj/kg	:	Kilojoule per kilogram

km	:	Kilometer
kg/Nm^3	:	Kilogram per Newton cubic metre
mg/Nm^3	:	Milligram per Newton metre cube
m	:	Metre
mg/kg	:	Milligram per kilogram
mg/l	:	Milligram per Litre
mm	:	Millimeter
m^3/hr	:	Meter cube per hour
m/s	:	Meter per second
sq. km	:	Square kilometer

ACTIVITY 3 (a)- METALLURGICAL INDUSTRY (Ferrous and Non-ferrous)

STANDARD TERMS OF REFERENCE FOR CONDUCTING ENVIRONMENT IMPACT ASSESSMENT STUDY FOR METALLURGICAL INDUSTRY (Ferrous and Non-ferrous) AND INFORMATION TO BE INCLUDED IN EIA/EMP REPORT

GENERAL CONDITIONS-

1. Introduction

i. Background about the project
ii. Need of the project
iii. Purpose of the EIA study
iv. Scope of the EIA study

2. Project description

A. Site Details

i. Location of the project site covering village, Taluka/Tehsil, District and State.
ii. Site accessibility
iii. Adigital toposheet in pdf or shape file compatible to google earth of the study area of radius of 10km and site location preferably on 1:50,000 scale. (including all eco-sensitive areas and environmentally sensitive places).
iv. Latest High-resolution satellite image data having 1m-5m spatial resolution like quickbird, Ikonos, IRS P-6 pan sharpened etc., along with delineation of plant boundary co-ordinates. Area must include at least 100m all around the project location.
v. Environment settings of the site and its surrounding along with map.
vi. A list of major industries with name, products and distance from plant site within study area (10km radius) and the location of the industries shall be depicted in the study area map.
vii. In case if the project site is in vicinity of the water body, 50 meters from the edge of the water body towards the site shall be treated as no development/construction zone. If it's near the wetland, Guidelines for implementing Wetlands (Conservation and Management) Rules, 2017 may be followed.
viii. In case if the project site is in vicinity of the river, the industry shall not be located within the river flood plain corresponding to one in 25 years flood, as certified by concerned District Magistrate/Executive Engineer from State Water Resources Department (or) any other officer authorized by the State Government for this purpose as per the provisions contained in the MoEF&CC Office Memorandum dated 14/02/2022.
ix. Type of land, land use of the project site.
x. Status of acquisition of land. If acquisition is not complete, stage of the acquisition process as per the MoEF&CC O.M. dated 7/10/2014 shall be furnished.
xi. Engineering layout of the area with dimensions depicting existing unit as well as proposed unit indicating storage area, plant area, greenbelt area, utilities etc. If located within an Industrial area/Estate/Complex, layout of Industrial Area indicating location of unit within the Industrial area/Estate.

B. Forest and wildlife related issues (if applicable):

i. Status of Forest Clearance for the use of forest land shall be submitted.
ii. Copy of application submitted for clearance under the Wildlife (Protection) Act, 1972, to the Standing Committee of the National Board for Wildlife if the project site located within notified Eco-Sensitive Zone, 10km radius of national park/sanctuary wherein final ESZ notification is not in place as per MoEF&CC Office Memorandum dated 8/8/2019.
iii. The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, Eco-sensitive Zone and Eco-sensitive areas, the project proponent shall submit the map duly authenticated by Divisional Forest Officer showing the distance between the project site and the said areas.
iv. Wildlife Conservation Plan duly authenticated by the Competent Authorityof the State Government for conservation of Schedule I fauna, if any exists in the study area.

C. Salient features of the project

i. Products with capacities in **Tons per Annum** for the proposed project.
ii. If expansion project, status of implementation of existing project, details of existing/proposed products with production capacities in Tons per Annum.
iii. Site preparatory activities.
iv. List of raw materials required and their source along with mode of transportation.
v. Other than raw materials, other chemicals and materials required with quantities and storage capacities.
vi. Manufacturing process details along with process flow diagram of proposed units.
vii. Consolidated materials and energy balance for the project.
viii. Total requirement of surface/ ground water and powerwith their respective sources, status of approval.
ix. Water balance diagram
x. Details of Emission, effluents, hazardous waste generation and mode of disposal during construction as well as operation phase.
xi. Man-power requirement.
xii. Cost of project and scheduled time of completion.
xiii. Brief on present status of compliance (Expansion/modernization proposals)
a. Cumulative Environment Impact Assessment for the existing as well as the proposed expansion/modernization shall be carried out.
b. In case of ground water drawl for the existing unit, action plan for phasing out of ground water abstraction in next three years except for domestic purposes and shall switch over to 100 % use of surface water from nearby source.
c. Copy of <u>all</u> the Environment Clearance(s) including Amendments thereto obtained for the project from MoEF&CC/SEIAA shall be attached as an Annexure. A certified copy of the latest Monitoring Report of the Regional Office of the Ministry of Environment and Forests as per circular dated 30th May, 2012 on the status of compliance of conditions stipulated in <u>all</u> the existing environment clearances including amendments shall be provided.
d. In case the existing project has not obtained EnvironmentClearance, reasons for not taking EC under the provisions of the EIA Notification 1994 and/or EIA Notification 2006 shall be provided. Copies of Consent to Establish/No Objection Certificate and Consent to Operate (in case of units operating prior to EIA Notification 2006, CTE and CTO of FY 2005-2006) obtained from the SPCB shall be submitted. Further, compliance report to the conditions of consents from the Regional Office of the SPCB shall be submitted.

3. Description of the Environment

i. Study period

ii. Approach and methodology for data collection as furnished below.

Attributes	Sampling		Remarks
	Network	Frequency	
A. Air Environment			
Micro-Meteorological • Wind speed (Hourly) • Wind direction • Dry bulb temperature • Wet bulb temperature • Relative humidity • Rainfall • Solar radiation • Cloud cover • Environmental Lapse Rate	Minimum 1 site in the project impact area	1 hourly continuous	• IS 5182 Part 1-20 • Site specific primary data is essential • Secondary data from IMD, New Delhi • CPCB guidelines to be considered.
Pollutants • $PM_{2.5}$ • PM_{10} • SO_2 • NOx • CO • HC • Other parameters relevant to the project and topography of the area	At least 8-12 locations	As per National Ambient Air Quality Standards, CPCB Notification.	• Sampling as per CPCB guidelines • Collection of AAQ data (except in monsoon season) • Locations of various stations for different parameters should be related to the characteristic properties of the parameters. • The monitoring stations shall be based on the NAAQM standards as per GSR 826(E) dated 16/11/2009 and take into account the predominant wind direction, population zone and sensitive receptors including reserved forests, • Raw data of all AAQ measurement for 12 weeks of all stations as

Attributes	Sampling		Remarks
	Network	Frequency	
			per frequency given in the NAAQM Notification of 16/11/2009 along with min., max., average and 98% values for each of the AAQ parameters from data of all AAQ stations should be provided as an annexure to the EIA Report.
B. Noise			
• Hourly equivalent noise levels	At least 8-12 locations	As per CPCB norms	-
C. Water			
Parameters for water quality • pH, temp, turbidity, magnesium hardness, total alkalinity, chloride, sulphate, nitrate, fluoride, sodium, potassium, salinity • Total nitrogen, total phosphorus, DO, BOD, COD, Phenol • Heavy metals • Total coliforms, faecal coliforms • Phyto plankton • Zoo plankton	Samples for water quality should be collected and analyzed as per: • IS: 2488 (Part 1-5) methods for sampling and testing of Industrial effluents • Standard methods for examination of water and wastewater analysis published by American Public Health Association.		
For River Bodies • Total Carbon • pH • Dissolved Oxygen • Biological Oxygen Demand • Free NH4 • Boron • Sodium Absorption Ratio • Electrical	• Surface water quality of the nearest River (60m upstream and downstream) and other surface water	• Yield of water sources to be measured during critical season • Standard methodology for collection of surface water (BIS standards)	

Attributes	Sampling		Remarks
	Network	Frequency	
Conductivity	bodies		
For Ground Water	• Ground water monitoring data should be collected at minimum of 8 locations (from existing wells /tube wells/existing current records) from the study area and shall be included.		
D. Traffic Study			
• Type of vehicles • Frequency of vehicles for transportation of materials • Additional traffic due to proposed project • Parking arrangement	-		
E. Land Environment			
Soil • Particle size distribution • Texture • pH • Electrical conductivity • Cation exchange capacity • Alkali metals • Sodium Absorption Ratio (SAR) • Permeability • Water holding capacity • Porosity	Soil samples be collected as per BIS specifications		
Land use/Landscape • Location code • Total project area • Topography • Drainage (natural) • Cultivated, forest, plantations, water bodies, roads and settlements	-		
E. Biological Environment			

Attributes	Sampling		Remarks
	Network	Frequency	
Aquatic • Primary productivity • Aquatic weeds • Enumeration of phyto plankton, zoo plankton and benthos • Fisheries • Diversity indices • Trophic levels • Rare and endangered species • Marine Parks/ Sanctuaries/ closed areas /coastal regulation zone (CRZ) **Terrestrial** • Vegetation-species list, economic importance, forest produce, medicinal value • Importance value index (IVI) of trees • Fauna • Avi fauna • Rare and endangered species • Sanctuaries / National park / Biosphere reserve • Migratory routes	• Detailed description of flora and fauna (terrestrial and aquatic) existing in the study area shall be given with special reference to rare, endemic and endangered species. Indicator species which indicate ecological and environment degradation should be identified and included to clearly state whether the proposed project would result in to any adverse effect on any species. • Samples to collect from upstream and downstream of discharge point, nearby tributaries at downstream, and also from dug wells close to activity site. • For forest studies, direction of wind should be considered while selecting forests. • Secondary data to collect from Government offices, NGOs, published literature.		
F. socio-economic			
• Demographic structure • Infrastructure resource base • Economic resource base • Health status: Morbidity pattern • Cultural and aesthetic attributes	• Socio-economic survey is based on proportionate, stratified and random sampling method. • Primary data collection through questionnaire • Secondary data from census records, statistical hard books, topo sheets, health records and relevant official records available with Govt. Agencies		

Attributes	Sampling		Remarks
	Network	Frequency	
• Education			

iii. Interpretation of each environment attribute shall be enumeratedand summarized as given below:

- Ambient air quality
- Ambient Noise quality
- Surface water quality
- Ground water quality
- Soil quality
- Biological Environment
- Land use
- Socio-economic environment

4. Anticipated Environment Impacts and mitigation measures (In case of expansion, cumulative impact assessment shall be carried out)

i. Identification of potential impacts in the form of a **matrix** for the construction and operation phase for all the environment components

Activity	Environment	Ecological	Socio-economic
Construction phase			
Operation phase			

ii. Impact on ambient air quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact)

a. Construction phase

b. Operation phase

- Details of stack emissions from the existing as well as proposed activity.
- Assessment of ground level concentration of pollutants from the stack emission based on AQIP Modelling The air quality contours shall be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any along with wind rose map for respective period
- Impact on ground level concentration, under normal, abnormal and emergency conditions. Measures to handle emergency situations in the event of uncontrolled release of emissions.

iii. Impact on ambient noise quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact)

a. Construction phase

b. Operation phase

iv. Impact on traffic (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact)

a. Construction phase

b. Operation phase

v. Impact on soil quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact)

a. Construction phase
b. Operation phase

vi. Impact on land use (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact)

a. Construction phase
b. Operation phase

vii. Impact on surface water resource and quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact)

a. Construction phase
b. Operation phase

viii. Impact on ground water resource and quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact)

a. Construction phase
b. Operation phase

ix. Impact on terrestrial and aquatic habitat (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact)

a. Construction phase
b. Operation phase

x. Impact on socio-economic environment (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact)

a. Construction phase
b. Operation phase

xi. Impact on occupational health and safety (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact)

a. Construction phase
b. Operation phase

5. Analysis of Alternatives (Technology & Site)

i. No project scenario
ii. Site alternative
iii. Technical and social concerns
iv. Conclusion

6. Environmental Monitoring Program

i. Details of the Environment Management Cell
ii. Performance monitoring schedule for all pollution control devices shall be furnished.
iii. Corporate Environment Policy

a. Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report.
b. Does the Environment Policy prescribe for standard operating process / procedures to bring into focus any infringement / deviation / violation of the environment or forest norms / conditions? If so, it may be detailed in the EIA.
c. What is the hierarchical system or Administrative order of the company to deal with the environment issues and for ensuring compliance with the environment clearance conditions? Details of this system may be given.

d. Does the company have system of reporting of non compliances / violations of environment norms to the Board of Directors of the company and / or shareholders or stakeholders at large? This reporting mechanism shall be detailed in the EIA report

iv. Action plan for **post-project environment monitoring matrix**:

Activity	Aspect	Monitoring Parameter	Location	Frequency	Responsibility
Construction phase					
Operation phase					

7. Additional Studies

i. Public consultation details (Entire proceedings as separate annexurealong with authenticated English Translation of Public Consultation proceedings).

ii. Summary of issues raised during public consultation along with action plan to address the same as per MoEF&CC O.M. dated 30/09/2020

S	Physical activity and action plan		Year of implementation (Budget in INR)			Total Expenditure (Rs. in Crores)
	Name of the Activity	Physical Targets	1st	2nd	3rd	

iii. Risk assessment

- Methodology
- Hazard identification
- Frequency analysis
- Consequence analysis
- Risk assessment outcome

iv. Emergency response and preparedness plan

8. Project Benefits

i. Environment benefits
ii. Social infrastructure
iii. Employment and business opportunity
iv. Other tangible benefits

9. Environment Cost Benefit Analysis

i. Net present value
ii. Internal rate of return
iii. Benefit cost ratio
iv. Cost effectiveness analysis

10. Environment Management Plan (Construction and Operation phase)

i. Air quality management plan
ii. Noise quality management plan

iii. Solid and hazardous waste management plan
iv. Effluent management plan
v. Storm water management plan
vi. Rain water harvesting plan
vii. Occupational health and safety management plan
viii. Green belt development plan
ix. Socio-economic management plan
x. Wildlife conservation plan (In case of presence of schedule I species)
xi. Total capital cost and recurring cost/annum for environment pollution control measures shall be included.

11. Conclusion of the EIA study

12. In addition to the above, any litigation pending against the project and/or any direction/order passed by any Court of Law against the project, if so, details thereof shall also be included. Has the unit received any notice under the Section 5 of Environment (Protection) Act, 1986 or relevant Sections of Air and Water Acts? If so, details thereof and compliance/ATR to the notice(s) and present status of the case.

SPECIAL CONDITIONS-

1. For Large ISPs, a 3-D view i.e. DEM (Digital Elevation Model) for the area in 10 km radius from the proposal site. MRL details of project site and RL of nearby sources of water shall be indicated.
2. Plan for the implementation of the recommendations made for the steel plants in the CREP guidelines.
3. Plan for solid wastes utilization
4. Plan for utilization of energy in off gases (coke oven, blast furnace)
5. System of coke quenching adopted with justification.
6. Details on environmentally sound technologies for recycling of hazardous materials, as per CPCB Guidelines, may be mentioned in case of handling scrap and other recycled materials.
7. Details on toxic metal content in the waste material and its composition and end use (particularly of slag).
8. Details on toxic content (TCLP), composition and end use of slag.
9. 100 % dolo char generated in the plant shall be used to generate power.
10. Fourth Hole fume extraction system shall be provided for SAF.WHR system shall be installed to recover sensible heat from flue gases of EAF. Provision for installation of jigging and briquetting plant to utilise the fines generated in the process.
11. No tailing pond is permitted for Iron ore slimes. Dewatering and filtration system shall be provided.
12. Emission/effluent norms as per G.S.R 894 (E) dated 4/12/2019.

Point - wise ToR Compliance

Point-wise Compliance of the ToR Points as per the standard ToR for Proposed Expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) through modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time at Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan) by Hindustan Zinc Limited.

ToR Point No.	ToR Point	ToR Compliance	Reference in EIA/EMP Report
Generic ToRs in respect of Industry Sector			
1.	**Introduction**		
i.	Background about the project	Hindustan Zinc Limited has an existing Debari Zinc Smelter established in year 1968 at Village: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan). The existing Zinc Smelter plant comprises of 1,00,000 TPA Zinc metal production capacity. Information about the project background has been incorporated in this EIA/EMP Report.	Chapter-1 Section- 1.2.1 (A) and (C) Page no. 59 – 61, 67 – 70
ii.	Need of the project	Looking into the increasing demand of Zinc, M/s. Hindustan Zinc Limited is proposing expansion within the existing premises of Zinc Smelter at Village: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan). Information about the need of the project has been incorporated in this EIA/EMP Report	Chapter-2 Section - 2.2 Page no. 86 – 87
iii.	Purpose of the EIA study	The main purpose of this report is to provide a coherent statement after analyzing all significant impact of the expansion project and measures that should be taken to eliminate and mitigate them. Details regarding the same have been incorporated in this EIA/EMP report.	Chapter-1 Section-1.1, Page no. 59
iv.	Scope of the EIA study	Scope of this study covers all the standard ToR points as well as the provisions of the EIA Notification, 2006 amended from time to time and the MOEFCC O.M. dated 11th April., 2022	Chapter-1 Section - 1.4, Page no. 84 – 85

ToR Point No.	ToR Point	ToR Compliance	Reference in EIA/EMP Report
		regarding grant of EC under para 7(ii). Details regarding the scope of the EIA Study have been incorporated in the EIA/EMP Report.	
2.	**Project Description**		
A.	**Site Details**		
i.	Location of the project site covering village, Taluka/Tehsil, District and State.	The Plant site is located at Village: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan). Location details of the plant site have been incorporated in the EIA/EMP Report.	Chapter-2 Figure- 2.1 Page no. 88
ii.	Site accessibility	The plant site is well accessible with respect to the Railway, State & National Highways as well as the Airport. The details have been incorporated in EIA/EMP report.	Chapter-3 Section 3.3 Table 3.1 Page no. 155–157
iii.	A digital Toposheet in pdf or shape file compatible to google earth of the study area of radius of 10 Km and site location preferably on 1: 50,000 scale (including all eco- sensitive areas and environmentally sensitive places).	A digital Toposheet showing the study area (10 Km radius of Plant site) and site location (including all eco- sensitive areas and environmentally sensitive places) on 1: 50,000 scale has been incorporated in this EIA/EMP Report.	Chapter - 3, Figure 3.1(d) Page no. 161
iv.	Latest High-resolution satellite image data having 1m-5m spatial resolution like quickbird, Ikonos, IRS P-6 pan sharpened etc., along with delineation of plant boundary co-ordinates. Area must include at least 100m all around the project location.	Present land use / land cover map of the plant site including 100 m around the plant site, has been prepared, based on satellite imagery, using RESOURCESAT-2A (L4FMX) digital data which was procured from National Remote Sensing Centre, Hyderabad and the same have been incorporated in this EIA/EMP Report.	Chapter - 3, Section 3.6.1.5, Figure 3.3 (a) and (b) page no. 176–180
v.	Environment settings of the site and it's surrounding along with map.	Details of the environment settings of the plant site and its surrounding study area along with the map have been incorporated in this	Chapter - 3, Table 3.1 Figure 3.1 (A),

ToR Point No.	ToR Point	ToR Compliance	Reference in EIA/EMP Report
		EIA/EMP Report.	Page no. 155–158
vi.	A list of major industries with name, products and distance from plant site within study area (10 km radius) and the location of the industries shall be depicted in the study area map.	List of major industries with name, products & distance from plant site within the study area (10 km radius) has been incorporated in this EIA/EMP Report. Study area Map showing Industries also has been incorporated in this EIA/EMP Report.	Chapter - 3, Table No. 3.2, Figure 3.1 (C), Page no. 159 – 160
vii.	In case if the project site is in vicinity of the water body, 50 meters from the edge of the water body towards the site shall be treated as no development/construction zone. If it's near the wetland, Guidelines for implementing Wetlands (Conservation and Management) Rules, 2017 may be followed.	The proposed expansion will be carried out within the existing plant premises. No additional land will be required for the same. There are three seasonal nallahs passing through the plant site from west (nearby hill) to the east direction, which remain active during rains only. There will be no disturbance to these nallah due to the proposed expansion project. The plant site does not fall in any wetland area. However, Udaisagar lake (~1 km in SSW direction from Plant site) has been listed as Wetland by State Wetland Authority, Rajasthan. The lake is geographically separated from the plant site by Panwari RF (Hill area). The proposed expansion will be carried out within the existing plant premises. As there is no wetland site existing in immediate proximity of the plant site, no significant adverse impact on the wetland area due to the proposed expansion project is envisaged. Details are given in this EIA/EMP Report.	Chapter 4, Section 4.11, page no. 274 – 277
viii.	In case if the project site is in vicinity of the river, the industry shall not be	The nearest seasonal river is Berach River (~1.5 km in SE direction from plant site). The	-

ToR Point No.	ToR Point	ToR Compliance	Reference in EIA/EMP Report
	located within the river flood plain corresponding to one in 25 years flood, as certified by concerned District Magistrate/Executive Engineer from State Water Resources Department (or) any other officer authorized by the State Government for this purpose as per the provisions contained in the MoEF&CC Office Memorandum dated 14/02/2022.	plant site is not falling with in the flood plain of Berach River.	
ix.	Type of land, land use of the project site.	Total Area of the project site is 184.2 ha. The proposed expansion will be carried out within the existing plant premises. The existing land use of the plant site is industrial and the same will remain industrial after the proposed expansion project. However, the intensity of land use will increase. Details of the same are given in EIA/EMP Report.	Chapter - 2, Section-2.3.3 Page no. 90 – 97 ***Annexure- 8***
x.	Status of acquisition of land. If acquisition is not complete, stage of the acquisition process as per the MoEF&CC O.M. dated 7/10/2014 shall be furnished.	Total project area is 184.2 ha, which is already in possession of the company. The proposed expansion will be carried out within the existing plant premises. Therefore, no additional land will be acquired for the same. Land ownership documents have been incorporated in this EIA/EMP Report.	Chapter - 2, Section-2.3.3 Page no. 90 – 97 ***Annexure- 8***
xi.	Engineering layout of the area with dimensions depicting existing unit as well as proposed unit indicating storage area, plant area, greenbelt area, utilities etc. If located within an Industrial area/Estate/Complex, layout of Industrial Area indicating location of unit within the Industrial area/Estate.	Engineering layout showing existing unit as well as proposed unit, storage area, greenbelt area, other utilities etc. has been incorporated in this EIA/EMP Report. The plant area does not fall in any Industrial area/Estate/Complex.	Chapter - 2, Figure- 2.3 (B), (C), (D) Page no. 93 – 95

ToR Point No.	ToR Point	ToR Compliance	Reference in EIA/EMP Report
B.	**Forest and wildlife related issues (if applicable):**		
i.	Status of Forest Clearance for the use of forest land shall be submitted.	• Initially, the Honorable Governor of the State of Rajasthan granted lease of 427 Acres (172.79 Ha) in 1962 for 99 years under the provisions of the Rajasthan Industrial Areas Allotment Rules, 1959, framed under Section 100 of the Rajasthan Land Revenue Act, 1956, which includes 98.74 hectares (244.01 Acres) vide lease dated 29.01.1962, 13.02 hectares (32.18 Acres) vide lease dated 26.03.1962 and 61.03 hectares (150.81 Acres) vide lease deed dated 26.03.1962 respectively. HZL commissioned the referred Zinc Smelter unit in 1968. Hindustan Zinc Limited, whilst being an erstwhile public sector undertaking, acquired additional land from nearby villages in and around the 1990s, for the purpose of its operations. • Plant and colony was established in 1968, and being used for non-forest purpose before the Forest (Conservation) Act, 1980, came into effect, therefore Forest Clearance was not applicable for Zinc Smelter Debari. • As per Hon'ble Supreme Court orders (State Of Bihar vs Banshi Ram Modi & Ors, 7.05.1985), "forest area which is broken up or cleared before the commencement of the Act, prior approval of the Central Government in terms of Section 2 of the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 is not required and it	Chapter - 2, Section-2.3.3 Page no. 90 – 97 ***Annexure- 8***

ToR Point No.	ToR Point	ToR Compliance	Reference in EIA/EMP Report
		would be required, when lease granted before the commencement of the said Act, is renewed after its coming into force. During the continuance of the lease period, the approval of the Central Government under Section 2 of the said Act is not required. • In this case also, prior approval under Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980, will only be required during renewal of Zinc Smelter Debari's lease i.e. 2061. At present, the lease of the unit is valid and in continuance. • Environment Clearance (EC) for expansion of Zinc Smelter (80,000 TPA to 1,00,000 TPA) at Village: Debari, Tehsil: Girwa, District: Udaipur (Rajasthan) was granted by MOEFCC, New Delhi vide F.No.J-11011/479/2006-IA.II(I) 19.03.2008 for total land area of 190.05 ha. CTE for the same was obtained from RSPCB vide F.No. 12(30-86) RPCB/Gr II/49 dated 5.04.2008 followed by CTO vide Letter F: 12(30-86) RPCB/Gr II/2702 dated 17.09.2008. The plant is in operation as per renewed CTO obtained from RSPCB vide Order no. 2022-2023/HDF/9282 dated 17.03.2023 (Valid upto 31.03.2027). • Subsequent to the above, M/s. Hindustan Zinc Limited proposed for the Expansion of Zinc Smelter (1,00,000 TPA to 1,40,000 TPA) through Modernization within the existing premises of Debari Zinc Smelter	

ToR Point No.	ToR Point	ToR Compliance	Reference in EIA/EMP Report
		under clause 7(ii) of EIA Notification 2006 amended from time to time At Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan). While submitting the online application along with kml file of the Plant area on the Parivesh portal, it was found that: • some part of land covering, security colony, substation, some plantation etc. is showing under forest land. Upon observing this discrepancy, for further verification of the referred land, we consulted DCF-Udaipur (North Region) and found a reflection of the same in the Decision Support System. This is contrary to the revenue records as are in place, since in the same, this land parcel as which is part of the lease deed awarded to HZL in 1962, for 99 years, is recorded in HZL's name. • After further enquiry with the revenue and forest departments it was found that the total area of Zinc Smelter Debari complex (Plant and Colony) comes out to be 184.2 ha (instead of 190.05 Ha mentioned in the EC letter). Remaining 5.85 Ha area falls outside the physical boundary Plant area (129 Ha) & Residential colony area (55.2 Ha). Hence, 184.2 Ha area is considered as projects area for this proposal.	

ToR Point No.	ToR Point	ToR Compliance	Reference in EIA/EMP Report
		• Out of this 129 ha of plant area, as per the information available with Forest department, 1.77 ha of Khasara No. 4522 and 5.20 ha of Khasra No. 4523 falls under Kantiya Forest (total area – 292 ha), which was notified as reserve forest by Mewar Government on 27.12.1947. • Similarly, out of 55.2 ha. of colony area, 11.60 ha of Kasara No. 4509, 2.40 Ha. of Khasara No. 4510 and 2.46 Ha of Khasara No. 4511 falls under Panwadi Forest (total area 225 ha), which was notified as reserve forest by Mewar Government on 21.02.1943. • Whereas, Old revenue records of Sanwat 2051 (Year 1994) are showing above khasras No. 4522, 4523, 4509, 4510, 4511 as factory area. • In this regard, DCF-Udaipur (North Region) vide Letter No. F()Survey/Uvas-Uttar/2023-24/6317 dated 22.09.2023 confirmed that there is no presence of forest land in the 121 Hectares of land as within Hindustan Zinc Limited's Zinc Smelter Debari, Udaipur, and that this does not fall within any forest area. • It is to be noted that Hindustan Zinc Limited will maintain status quo as far as the claimed forest land is concerned, and no activities are proposed to or will be carried out in this area without obtaining requisite clarity on the discrepancy or	

ToR Point No.	ToR Point	ToR Compliance	Reference in EIA/EMP Report
		necessary approvals for the same. Details has been given in this EIA/EMP Report.	
ii.	Copy of application submitted for clearance under the Wildlife (Protection) Act, 1972, to the Standing Committee of the National Board for Wildlife if the project site located within notified Eco-Sensitive Zone, 10km radius of national park/sanctuary wherein final ESZ Notification is not in place as per MoEF&CC Office Memorandum dated 8/8/2019.	Not applicable.	-
iii.	The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, Eco-sensitive Zone and Eco-sensitive areas, the project proponent shall submit the map duly authenticated by Divisional Forest Officer showing the distance between the project site and the said areas.	No National Park, Wildlife Sanctuary, Biosphere Reserve, Tiger/ Elephant Reserve, Migratory Corridor of wild animals, Eco-sensitive Zone exists within 10 km radius study area. Letter from DCF, Wildlife, Udaipur vide letter no. No.F()Survey/DCF/Udaipur North/4680 dated 14.07.2014 and vide letter no. No.F9()Survey/DCF/WL/2022-23/1635 dated 01.03.2023 regarding no National Park & Sanctuary falling within 10 km radius study area of plant site has been obtained and the same is enclosed herewith this EIA / EMP Report. Details of the eco-sensitive area viz. RF, PF, water bodies etc. falling within the 10 km radius study area are given in this EIA/EMP Report.	Chapter-3, Figure 3.1 (a) Page no. 158 ***Annexure 7b(i&ii)***

ToR Point No.	ToR Point	ToR Compliance	Reference in EIA/EMP Report
iv.	Wildlife Conservation Plan duly authenticated by the Competent Authority of the State Government for conservation of Schedule I fauna, if any exists in the study area.	List of flora and fauna existing within the study area has been authenticated by DCF, Udaipur (North) vide letter No. F()survey/DCF-North/2022-23/936 dated 23.03.2023. The same has been enclosed herewith with this EIA/EMP report. As per the authenticated list, total 9 schedule I species i.e., *Panthera pardus* (Leopard), *Vulpes bengalensis* (Indian Fox), *Canis aureus* (Golden Jackal), *Felis chaus* (Jungle Cat), *Herpestes smithii* (Ruddy Mongoose), *Hyaena hyaena* (Striped Hyena), *Hystrix indica* (Indian Crested Porcupine), *Daboia russelii* (Russell's Viper), *Pavo cristatus* (Indian Peafowl) found within the study area during survey. Wildlife conservation plan for the above species has been prepared and submitted to DCF, Udaipur (North) for approval from CWW, 30.07.2024. The Copy of the receipt is enclosed herewith with this EIA/EMP report.	Chapter-3 Page no. 223-224 ***Annexure 7a*** ***Annexure 7c II)***
C.	**Salient features of the project**		
i.	Products with capacities in Tons per Annum for the proposed project.	This is proposed expansion project. Details of the existing as well as proposed products with capacities have been given in the ToR point no. C(ii).	Chapter-2 Table No. 2.2 Page no. 99 – 101
ii.	If expansion project, status of implementation of existing project, details of existing/proposed products with production capacities in Tons per Annum.	Environment Clearance (EC) for expansion of Zinc Smelter (80,000 TPA to 1,00,000 TPA) at Village: Debari & Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan) was granted by MOEFCC, New Delhi vide F.No.J-11011/479/2006-IA.II(I) 19.03.2008. The same has been implemented as per CTO obtained from RSPCB vide letter no. Vide	Chapter 1, section 1.2.1 (B) Page no. 61 – 66 ***Annexure 1***

ToR Point No.	ToR Point	ToR Compliance	Reference in EIA/EMP Report
		Letter F: 12(30-86) RPCB/Gr II/2702 dated 17.09.2008. The latest CTO obtained from RSPCB for Zinc Smelter Plant vide Order no. 2022-2023/HDF/9282 dated 17.03.2023 (Valid upto 31.03.2027). Details of the existing as well as proposed production capacities have been given in the EIA/EMP Report.	***Annexure 4b*** ***Annexure 4(d)*** Chapter-2 Table No. 2.2 Page no. 99 – 101
iii.	Site preparatory activities	Site preparatory activities will be carried out at site (earmarked for the expansion project) within the plant premises, after obtaining all the statutory clearances/consents.	-
iv.	List of raw materials required and their source along with mode of transportation.	List of raw materials required, their quantity, source along with their mode of transportation has been incorporated in this EIA/EMP Report.	Chapter - 2, Section 2.5.1, Table-2.5 Page no. 102-103
v.	Other than raw materials, other chemicals and materials required with quantities and storage capacities.	Apart from the Raw materials, details of the quantities as well as the storage capacities of fuel have been incorporated in this EIA /EMP Report.	Chapter 2, Section no.-2.5 Page no. 102 – 111
vi.	Manufacturing process details along with process flow diagram of proposed units.	Process description along with process flow diagram for existing as well as proposed units has been incorporated in this EIA/EMP Report.	Chapter-2, Section-2.7, Page no. 112 – 146
vii.	Consolidated materials and energy balance for the project.	The material balance as well as the energy balance for the project has been incorporated in this EIA/EMP Report.	Chapter-2, Table-2.6,2.7,2.12 & 2.13, Page no. 104-105 & 110

ToR Point No.	ToR Point	ToR Compliance	Reference in EIA/EMP Report
viii.	Total requirement of surface/ ground water and power with their respective sources, status of approval.	Total water requirement for the expansion project will be 9046 KLD, which will be fulfilled from the existing sources i.e. Mansi wakal Dam, 40 MLD STP Plant & 20 MLD STP plant installed to treat the sewage generated from Udaipur city. No additional water abstraction permission will be required for the proposed expansion project. Copy of the water permissions have been enclosed herewith this EIA/EMP report. Total power requirement for the expansion project will be 110 MW; which will be sourced from WHRB & Solar Power plant at site as well as CPPs at sister units at Zawar, Dariba & Chanderiya and AVVNL. 3 DG Sets will be available at plant site for power back up with capacity as 16.0 MW (Existing: 2x7.4 MW & Proposed: 1x1.2 MW). Details regarding the same are given in this EIA/EMP Report.	Chapter-2 Section-2.5.3.1 Table-2.10 Page no. 107 Chapter-2 Section-2.5.4 Table-2.11 Page no. 110
ix.	Water balance diagram	Water balance diagram (existing as well as proposed) has been incorporated in this EIA/EMP Report.	Chapter–2 Figure-2.5(A) & (B), Page no. 108-109
x.	Details of Emission, effluents, hazardous waste generation and mode of disposal during construction as well as operation phase.	Details regarding emission, effluents, solid & hazardous waste generation along with their mode of disposal during construction as well as operation phase have been incorporated in this EIA/EMP Report.	Chapter-2, Section-2.10.4, Table- 2.22 Page no. 151–153
xi.	Man Power Requirement	The total manpower requirement for the expansion project will be 849 persons (Existing manpower is 784 persons & 65	Chapter-2, Section-2.5.5, Table-2.14

ToR Point No.	ToR Point	ToR Compliance		Reference in EIA/EMP Report
		additional after proposed expansion project) including regular and contractual. Details of the same have been incorporated in this EIA/EMP Report.		Page no. 110-111
xii.	Cost of project and scheduled time of completion.	Total Cost of the Project	Rs. 2500 Crores (Rs 2200 crores for phase I & 300 crores for phase II)	Chapter-2 Section-2.4 Table-2.3 Page no. 102
		Time of Completion	Phase one 1 will be completed in ~12 months *(after getting all the statutory approvals)* Details of activities along with time required have been incorporated in this EIA/EMP Report.	
			EC for phase II will be taken after getting all the statutory clearances from the concerned authorities for phase I.	
xiii.	Brief on present status of compliance (Expansion / modernization proposals)	The status of compliance for the expansion project has been given in the reply of following points:		
a.	Cumulative Environment Impact Assessment for the existing as well as the proposed expansion / modernization shall be carried out.	Cumulative Environment Impact Assessment for the existing as well as the proposed expansion project has been carried out. Details of the same have been incorporated in this EIA/EMP Report.		Chapter 4, Section 4.5 Page No. 240
b.	In case of ground water drawl for the existing unit, action plan for phasing out of ground water abstraction in next	No ground water is being or will be abstracted for the project. The water requirement for the existing plant is being met from the surface		-

ToR Point No.	ToR Point	ToR Compliance	Reference in EIA/EMP Report
	three years except for domestic purposes and shall switch over to 100 % use of surface water from nearby source.	water as well as treated water from STPs. The same practice will continue for the proposed expansion project as well. Details of the same have been incorporated in this EIA / EMP Report.	
c.	Copy of all the Environment Clearance(s) including Amendments thereto obtained for the project from MoEF&CC/SEIAA shall be attached as an Annexure. A certified copy of the latest Monitoring Report of the Regional Office of the Ministry of Environment and Forests as per circular dated 30th May, 2012 on the status of compliance of conditions stipulated in all the existing environment clearances including amendments shall be provided.	Debari Zinc Smelter was commissioned in the year 1968. The Environment Clearance (EC) was obtained for the expansion of Zinc Smelter (80,000 TPA to 1,00,000 TPA) at Village: Debari, Tehsil: Girwa, District: Udaipur (Rajasthan) by MOEFCC, New Delhi vide F.No.J-11011/479/2006-IA.II(I) dated 19.03.2008. *Copy of the same is enclosed herewith this EIA / EMP Report.* Certified compliance report of the conditions stipulated in the EC letter has been obtained from IRO, MOEFCC, Jaipur vide letter no.IV/ENV/R/IND-104/720/2009 dated 04.12.2023. Copy of the same has been incorporated in this EIA/EMP Report.	Chapter 1, section 1.2.1 (A), Page no. 59 – 61 ***Annexure 1*** ***Annexure 2***
d.	In case the existing project has not obtained Environment Clearance, reasons for not taking EC under the provisions of the EIA Notification 1994 and/or EIA Notification 2006 shall be provided. Copies of Consent to Establish/No Objection Certificate and Consent to Operate (in case of units operating prior to EIA Notification 2006, CTE and CTO of FY 2005-2006) obtained from the SPCB shall be submitted. Further, compliance report to the	Not applicable; as Environmental Clearance has already been obtained for the existing project.	-

ToR Point No.	ToR Point	ToR Compliance	Reference in EIA/EMP Report
	conditions of consents from the Regional Office of the SPCB shall be submitted.		
3.	**Description of the Environment**		
i.	Study period	Baseline study has been carried out during Summer Season (March to May, 2022).	-
ii.	Approach and methodology for data collection		
Air Environment			
Micro-Meteorological • Wind Speed (Hourly) • Wind direction • Dry Bulb Temperature • Wet bulb Temperature • Relative humidity • Rainfall • Solar radiation • Cloud cover • Environmental Lapse rate	Site-specific meteorological data (hourly temperature, relative humidity, wind speed, wind direction, wet bulb temperature, dry bulb temperature, Rainfall, Solar radiation, Cloud cover) as well as relevant secondary data were collected during Summer Season (March to May, 2022). Hourly meteorological data has been enclosed herewith the EIA/EMP Report. Details regarding rainfall have been incorporated in the EIA/EMP Report.	Chapter 3, Section 3.6.3 Page No. 185-189 ***Annexure 11*** Chapter 3, Table 3.9 Page No. 184 – 185
Pollutants • $PM_{2.5}$ • PM_{10} • SO_2 • NO_x • CO • HC Other parameters relevant to the project and topography of the area.	AAQ monitoring was carried out at 8 locations for PM_{10}, $PM_{2.5}$, SO_2, NO_x, CO, HC, Zn and Pb during Summer Season (March to May, 2022) within 10 km radius study area of the plant site. Details have been incorporated in the EIA/EMP Report.	Chapter 3 Section 3.6.3.1 Page no. 190 – 195
Noise			
Hourly equivalent noise levels	Noise level monitoring was carried at 8 locations within the study area during	Chapter 3 Section

ToR Point No.	ToR Point	ToR Compliance	Reference in EIA/EMP Report
		Summer Season (March to May, 2022). Details of the same have been incorporated in this EIA/EMP Report.	3.6.3.2 Page no. 195– 199
Water			
Parameters for water quality • pH, temp, turbidity, magnesium, hardness, total alkalinity, chloride, sulphate, nitrate, fluoride, sodium potassium, salinity • Total nitrogen, total phosphorous, DO, BOD, COD, Phenol • Heavy metals • Total coliforms, faecal coliforms • Phytoplankton D. Zoo plankton		Surface water quality as well as ground water quality has been analyzed for samples collected from the study area at 4 locations for surface water and 8 locations for ground water. Details of the water quality analysis have been incorporated in this EIA/EMP Report.	Chapter 3 Section 3.6.4 Page no. 198-206
For River Bodies • Total Carbon • pH • Dissolved Oxygen • Biological Oxygen • Demand • Free NH4 • Boron • Sodium Absorption • Ratio • Electrical Conductivity		Surface water quality has been analyzed for samples collected from the study area at 4 locations. Details of the surface water quality analysis have been incorporated in this EIA/EMP Report.	Chapter 3 Section 3.6.4.1 Page no. 199 – 202
For Ground Water		Ground water quality has been analyzed for samples collected from the study area at 8 locations. Details of the ground water quality analysis have been incorporated in this EIA/EMP Report.	Chapter 3 Section 3.6.4.2 Page no. 202 – 206
D. Traffic Study			

ToR Point No.	ToR Point	ToR Compliance	Reference in EIA/EMP Report
	• Type of vehicles • Frequency of vehicles for transportation of materials • Additional traffic due to proposed project • Parking arrangement	Traffic study of the area w.r.t. existing traffic, type of vehicles, frequency of vehicles for transportation of materials has been carried out. Additional traffic load due to proposed expansion project has been calculated as per IRC guidelines. Details of the same along with the mitigation measures and the parking facilities have been incorporated in this EIA/EMP Report.	Chapter 4 Section 4.14 Page no. 285 – 290
Land Environment			
	Soil • Particle size Distribution • Texture • pH • Electrical Conductivity • Cation exchange capacity • Alkali metals • Sodium Absorption Ratio (SAR) • Permeability • Water holding Capacity	Soil sampling was carried out at 8 locations within the study area during Summer Season (March to May, 2022). Details of the same have been incorporated in this EIA/EMP Report.	Chapter 3 Section 3.6.4.3 Page no. 206 – 209
	Land use/ Landscape • Location code • Total project area • Topography • Drainage (natural) • Cultivated, forest, plantations, water bodies, roads and settlements	Location Code: 45H/10(G43T10), 45H/11(G43T11), 45H/14(G43T14) & 45H/15(G43T15) Total plant area is 184.2 Ha, which is already in possession of the company. The proposed expansion will be carried out within the existing plant premises. Topography of the plant site is undulated. Details have been incorporated in the EIA/EMP Report. Map showing drainage pattern of the plant site and the study area has been incorporated in the EIA/EMP Report.	Chapter 1, section 1.3.1 Page no. 83 – 84 Chapter 3 Section 3.6.1.3 Page no. 168 Chapter 3 Figure 3.2(e) Page no. 173 Chapter 3

ToR Point No.	ToR Point	ToR Compliance	Reference in EIA/EMP Report
		Land use/Land Cover details of the study area based of satellite imagery has been prepared and incorporated in the EIA/EMP Report.	Figure 3.3(a & b) Page no. 177 – 178
Biological Environment			
a. **Aquatic** • Primary productivity • Aquatic weeds • Enumeration of phyto plankton, zooplankton and benthos • Fisheries • Diversity indices • Trophic levels • Rare and endangered species Marine Parks/ Sanctuaries/ closed areas /coastal regulation zone (CRZ)		Detailed description of flora and fauna (terrestrial and aquatic) existing in the study area with special reference to rare, endemic and endangered species has been incorporated in this EIA/EMP Report. Indicator Species have been identified for the study area and details have been incorporated in this EIA/EMP Report. No wastewater is being/ will be discharged outside the plant. The Plant will remain "Zero Liquid Discharge" Unit after the proposed expansion. The plant site is located in Udaipur District of Rajasthan. Therefore, it is far away from the coast line. There is no National Park, Wildlife Sanctuary, Biosphere Reserve, Tiger Reserve, Wildlife Corridor etc. existing within the 10 km radius study area. However, the study area is having 20 Reserved Forests and 2 Protected Forest etc. within 10 km radius. The above details have been incorporated in this EIA/EMP Report.	Chapter 3 Section 3.7 Page no. 209 – 224
b. **Terrestrial** • Vegetation-species list, economic importance, forest produce, medicinal value Importance value index (IVI) of trees • Fauna • Avi fauna • Rare and endangered species • Sanctuaries / National Park /Biosphere reserve Migratory routes			
Socio - Economic			
• Demographic structure • Infrastructure resource base • Economic resource base • Health status: Morbidity pattern • Cultural and aesthetic attributes		Socio-economic survey was carried out for the study area using Simple Random Sampling method with a well-structured questionnaire prepared for Household & Village survey; Personal Interview and FGDs.	Chapter 3 Section 3.8 Page no. 224 – 234

ToR Point No.	ToR Point	ToR Compliance	Reference in EIA/EMP Report
	• Education	Apart from that, secondary data was collected from authentic sources like Government department, Census 2011, District Census Handbook, Maps etc. Details of socio-economic study carried out for have been incorporated in this EIA/EMP Report.	
iii.	Interpretation of each environment attribute shall be enumerated and summarized as given below: • Ambient air quality • Ambient Noise quality • Surface water quality • Ground water quality • Soil quality • Biological Environment • Land use • Socio-economic environment	Interpretation of each environment attributes like Ambient air quality, Ambient Noise Level, Surface water quality, Ground water quality and soil quality has been done for the baseline study carried out for the project along with the Biological Environment, Land use and Socio-economic environment. Details of the same have been incorporated at the respective sections in this Draft EIA/EMP Report	Chapter – 3 Section - 3.6.3.1, Page No. 195 Section - 3.6.3.2, Page No. 198 Section - 3.6.4, Page No. 202 & 206 Section - 3.6.4.3, Page No. 208 – 209
4.	**Anticipated Environment Impacts and mitigation measures (In case of expansion, cumulative impact assessment shall be carried out)**		
i.	Identification of potential impacts in the form of a matrix for the construction and operation phase for all the environment components **Activity** / **Environment** / **Ecological** / **Socio-economic** Construction phase Operation phase	Identification of potential impacts in the form of a matrix for the construction and operation phase for all the environment components has been carried out and the same has been incorporated in this EIA/EMP Report.	Chapter-4, Section-4.4, Table-4.4, Page no.237 -- 239

ToR Point No.	ToR Point	ToR Compliance	Reference in EIA/EMP Report
ii.	Impact on ambient air quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase • Details of stack emissions from the existing as well as proposed activity. • Assessment of ground level concentration of pollutants from the stack emission based on AQIP Modelling the air quality contours shall be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any along with wind rose map for respective period. • Impact on ground level concentration, under normal, abnormal and emergency conditions. Measures to handle emergency situations in the event of uncontrolled release of emissions.	Impacts on Ambient Air Quality with the expected sources, control measures, their assessment and mitigation measures for both construction and operation phase have been incorporated in this EIA/EMP Report. • Existing and proposed stack emission details have been incorporated in this EIA/EMP Report. • The incremental ground level concentration of pollutants from the stack emissions based on site-specific meteorological features has been predicted via computation done through mathematical modelling by using AERMOD Version 10.2.1. Isopleths showing air quality contours plotted on location map have been prepared. Details have been incorporated in this EIA/EMP Report. • Impact on ground level concentration, under normal, abnormal and emergency conditions has been assessed and the measures to handle emergency situation in case of uncontrolled release have been provided in this EIA/EMP report.	Chapter-4 Section-4.7 Page no. 241–265 Chapter-4 Table-4.7.3.3 Page no. 247 – 248, 257
iii.	Impact on ambient noise quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase	Impact on ambient noise level during the construction & operation phase of the project along with mitigation measures have been incorporated in this EIA/EMP Report.	Chapter-4 Section-4.8 Page No. 265 -267
iv.	Impact on traffic (Sources; Embedded control measures; Assessment; Mitigation measures;	Impacts on traffic during the construction and operation phase of the project along with mitigation measures have been incorporated	Chapter 4 Section 4.14 Page no. 285

ToR Point No.	ToR Point	ToR Compliance	Reference in EIA/EMP Report
	Residual impact) a. Construction phase b. Operation phase	in this EIA/EMP Report.	– 290
v.	Impact on soil quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase	Impact on soil quality during the construction & operation phase of the project along with mitigation measures have been incorporated in this EIA/EMP Report.	Chapter-4 Section- 4.10, Page no.272 – 274
vi.	Impact on land use (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase	Impact on land use & topography during the construction & operation phase of the project along with mitigation measures have been incorporated in this EIA/EMP Report.	Chapter-4, Section-4.6, Page no. 240 - 241
vii.	Impact on surface water resource and quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase	Impact on surface water resource and quality during the construction & operation phase of the project along with mitigation measures have been incorporated in this EIA/EMP Report.	Chapter-4, Section-4.9, Page no. 267-272
viii.	Impact on ground water resource and quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase	Impact on ground water resource and quality during the construction & operation phase of the project along with mitigation measures have been incorporated in this EIA/EMP Report.	Chapter-4, Section-4.9, Page no. 267-272
ix.	Impact on terrestrial and aquatic habitat (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase	Impact on terrestrial and aquatic habitat during the construction & operation phase of the project along with mitigation measures have been incorporated in this EIA/EMP Report.	Chapter 4, Section 4.11, page no. 274 – 277

ToR Point No.	ToR Point	ToR Compliance	Reference in EIA/EMP Report
x.	Impact on socio-economic environment (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase	Impact on socio-economic environment during the construction & operation phase of the project along with mitigation measures have been incorporated in this EIA/EMP Report.	Chapter-4, Section-4.12, Page no. 277–282
xi.	Impact on occupational health and safety (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase	Impact on occupational health and safety during the construction & operation phase of the project along with mitigation measures have been incorporated in this EIA/EMP Report.	Chapter-4, Section-4.13, Page no. 282 – 284
5.	**Analysis of Alternatives (Technology & Site)**		
i.	No Project Scenario	Debari Zinc Smelter was commissioned in the year 1968. As per revenue record, total Land is already under the possession of M/s. Hindustan Zinc Ltd. Present land use of the plant site is industrial and it will remain same after the proposed expansion project. Details are given in the EIA/EMP Report.	Chapter-5, Section-5.3, Page no. 296-297
ii.	Site alternative	The existing plant area is 184.2 ha. The proposed expansion will be done within the existing plant premises. No Additional land will be required for the same. Therefore, no alternative site has been considered for the expansion project. Details have been incorporated in this EIA/EMP Report.	Chapter-5 Section-5.1 to 5.4, Page no. 294 – 297
iii.	Technical and social concerns	Detailed justification of alternative technology has been incorporated in this EIA/EMP Report.	
iv.	Conclusion	Conclusion for the Alternative of site & technology has been incorporated in this EIA/EMP Report.	

ToR Point No.	ToR Point	ToR Compliance	Reference in EIA/EMP Report
6.	**Environmental Monitoring Program**		
i.	Details of the Environment Management Cell	Detail regarding Environment Management Cell (EMC) its structure and responsibilities has been provided in this EIA/EMP Report.	Chapter-10, Section-10.3, Figure-10.3 Page no. 362
ii.	Performance monitoring schedule for all pollution control devices shall be furnished.	Performance monitoring schedule for all pollution control devices for the plant is being done on yearly basis. The same practice will continue for the proposed expansion project. The same has been incorporated in this EIA/EMP Report.	Chapter-6, Section-6.2.2, Table-6.2, Page no. 300– 303
iii.	Corporate Environment Policy a. Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report. b. Does the Environment Policy prescribe for standard operating process / procedures to bring into focus any infringement / deviation / violation of the environment or forest norms /conditions? If so, it may be detailed in the EIA. c. What is the hierarchical system or Administrative order of the company to deal with the environment issues and for ensuring compliance with the environment clearance conditions? Details of this system may be given. d. Does the company have system of reporting of non-compliances/violations of environment norms to the Board of Directors of the company and/ or	• Yes, the company has a laid down Corporate HSE Policy approved by its Board of Directors and site Environment Policy approved by Chief Operating Officer Smelters. Both the policy has been incorporated in this EIA / EMP Report. • Yes, the company has formulated the standard operating procedures (SOPs) to implement the environmental standards. • The hierarchical system or Administrative order of the company to address environmental issues and for ensuring compliance with the environmental clearance conditions are in place. The above details have been incorporated in this EIA/EMP Report.	Chapter-10, Section-10.3, Figure – 10.1, Page no. 360

<table>
<tr><th>ToR Point No.</th><th>ToR Point</th><th>ToR Compliance</th><th>Reference in EIA/EMP Report</th></tr>
<tr><td></td><td>shareholders or stakeholders at the large? This reporting mechanism shall be detailed in the EIA report</td><td></td><td></td></tr>
<tr><td>iv.</td><td>Action plan for post-project environment monitoring matrix:
<table>
<tr><th>Activity</th><th>Aspect</th><th>Monitoring Parameter</th><th>Location</th><th>Frequency</th><th>Responsibility</th></tr>
<tr><td colspan="6">Construction phase</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="6">Operation phase</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table></td><td>Action plan for post-project environmental monitoring has been incorporated in this EIA/EMP report.</td><td>Chapter-6, Section-6.2.2, Table-6.2, Page no. 300– 303</td></tr>
<tr><td>7.</td><td colspan="2">Additional Studies</td><td></td></tr>
<tr><td>i.</td><td>Public consultation details (Entire proceedings as separate annexure along with authenticated English Translation of Public Consultation proceedings).</td><td>The proposal is for obtaining Environmental Clearance for expansion project under para 7(ii)(a) of EIA Notification, 2006, amended from time to time and in line with the MOEFCC's OM dated 11.04.2022. Therefore, Public Consultation is not envisaged in this project.</td><td>Chapter-7 Section 7.2 Page No. 305</td></tr>
<tr><td>ii.</td><td>Summary of issues raised during public consultation along with action plan to address the same as per MoEF&CC O.M. dated 30/09/2020.
<table>
<tr><th rowspan="2">S. No.</th><th colspan="2">Physical Activity and action plan</th><th colspan="3">Year of Implementation</th><th rowspan="2">Total Expenditure (Rs. In Cr.)</th></tr>
<tr><th>Name of the activ</th><th>Physical Targets</th><th>1st</th><th>2nd</th><th>3rd</th></tr>
</table></td><td>The proposal is for obtaining Environmental Clearance for expansion project under para 7(ii)(a) of EIA Notification, 2006, amended from time to time and in line with the MOEFCC's OM dated 11.04.2022. Therefore, Public Consultation is not envisaged in this project.
However, an amount of Rs. 35.27 Crores has been earmarked for social development activities within the study area during 3 years.</td><td>Chapter 8 Table 8.4 Page no. 348– 350</td></tr>
</table>

ToR Point No.	ToR Point	ToR Compliance	Reference in EIA/EMP Report
	ity		
iii.	Risk Assessment • Methodology • Hazard identification • Frequency analysis • Consequence analysis • Risk assessment outcome	Risk Assessment Plan including Methodology, Hazard identification, Frequency and Consequence analysis and outcome has been incorporated in this EIA/EMP Report.	Chapter – 7 Section 7.3 Page no. 305–325
iv.	Emergency response and preparedness plan	Emergency Response and Preparedness Plan, Onsite and Offsite Disaster (natural and Man-made) Management Plan including Risk Assessment and damage control has been incorporated in this EIA/EMP Report.	Chapter – 7 Section 7.3.6 & 7.3.7 Page no. 311 – 321
8.	**Project Benefits**		
i.	Environment benefits	Detailed Project benefits of the expansion project have been incorporated in this EIA/EMP Report under the following heads: i. Environment benefits ii. Social infrastructure iii. Employment and business opportunity iv. Other tangible benefits	Chapter-8, Section-8.2 Page no. 344 - 347
ii.	Social infrastructure		
iii.	Employment and business opportunity		
iv.	Other tangible benefits		
9.	**Environment Cost Benefit Analysis**		
i.	Net present value	Cost Benefit Analysis has been carried out for the expansion project and the same has been incorporated in this EIA/EMP Report.	Chapter-9, Section-9.1 Page no.353 – 357
ii.	Internal rate of return		
iii.	Benefit cost ratio		
iv.	Cost effectiveness analysis		
10.	**Environment Management Plan (Construction and Operation phase)**		
i.	Air quality management plan	Details regarding Air quality management plan have been incorporated in this EIA/EMP Report.	Chapter–10, Section- 10.5 Page no. 364– 365

ToR Point No.	ToR Point	ToR Compliance	Reference in EIA/EMP Report
ii.	Noise quality management plan	Details regarding Noise quality management plan have been incorporated in this EIA/EMP Report.	Chapter–10, Section- 10.6 Page no. 365-366
iii.	Solid and hazardous waste management plan	Details regarding Solid and hazardous waste management plan have been incorporated in this EIA/EMP Report.	Chapter-10, Section- 10.8 Page no. 366 - 367
iv.	Effluent management plan	Details regarding Effluent management plan have been incorporated in this EIA/EMP Report.	Chapter-10, Section- 10.7, Page no. 366
v.	Storm water management plan	Details regarding Storm water management plan have been incorporated in this EIA/EMP Report.	Chapter-10, Section- 10.7, Page no. 366
vi.	Rain water harvesting plan	Details of the existing rain water harvesting structures available in the plant site along with the rainwater harvesting measures adopted and same will be followed after the proposed expansion project have been incorporated in this EIA/EMP report.	Chapter-10, Section- 10.10.3 Page no. 371–372
vii.	Occupational health and safety management plan	Details regarding Occupational health and safety management plan including Plan and fund allocation to ensure the Occupational Health and Safety of all contract and casual workers has been has been incorporated in this EIA/EMP Report.	Chapter-10, Section-10.12 Page No. 377– 387
viii.	Green belt development plan	Out of the total plant area i.e., 184.2 ha., 76.28 ha (41.41 %) area has already been developed under greenbelt/plantation. The same will be maintained and densed via gap plantation to achieve the plantation density @2500 trees/ ha. Details of the greenbelt action plan have been incorporated in EIA/EMP report.	Chapter – 10 Section -10.11 Page No. 372 – 376

ToR Point No.	ToR Point	ToR Compliance	Reference in EIA/EMP Report
ix.	Socio-economic management plan	Details regarding Socio-economic Development plan have been incorporated in this EIA/EMP Report	Chapter-8, Section-8.3 Page no.347
x.	Wildlife conservation plan (In case of presence of schedule I species)	As per the authenticated list, total 9 schedule I species i.e., *Panthera pardus* (Leopard), *Vulpes bengalensis* (Indian Fox), *Canis aureus* (Golden Jackal), *Felis chaus* (Jungle Cat), *Herpestes smithii* (Ruddy Mongoose), *Hyaena hyaena* (Striped Hyena), *Hystrix indica* (Indian Crested Porcupine), *Daboia russelii* (Russell's Viper), *Pavo cristatus* (Indian Peafowl) found within the study area during survey. Wildlife conservation plan for the above species has been prepared and submitted to DCF, Udaipur (North) for approval from CWW, 30.07.2024. The Copy of the receipt is enclosed herewith with this EIA/EMP report.	Chapter-3 Page no. 223-224 ***Annexure 7c & 7d***
xi.	Total capital cost and recurring cost/annum for environment pollution control measures shall be included.	Cost for Environmental Protection Measures: ❖ Capital Cost: Rs 600.628 Crores ❖ Recurring Cost: Rs. 70 Crores/annum. Detailed breakup of cost has been included in this EIA/EMP report.	Chapter – 10 Section - 10.13, Table no. 10.6 Page. 387 - 388
11.	**Conclusion of the EIA study**	Conclusion & summary of the EIA study carried out for the expansion project has been incorporated in the EIA/EMP Report.	Chapter– 11, Page no. 389 – 404
12.	In addition to the above, any litigation pending against the project and/or any direction/order passed by any Court of Law against the project, if so, details thereof shall also be included. Has the unit received any notice under the Section 5 of Environment (Protection) Act, 1986 or relevant	No litigation is pending against the project and/or any direction/order passed by any Court of Law against the project. The unit has not received any notice under the Section 5 of Environment (Protection) Act, 1986 or relevant Sections of Air and Water	Chapter 1, section 1.2.1.(B) Page no. 61 – 66

ToR Point No.	ToR Point	ToR Compliance	Reference in EIA/EMP Report
	Sections of Air and Water Acts? If so, details thereof and compliance/ATR to the notice(s) and present status of the case.	Acts.	
SPECIAL CONDITIONS			
1.	For Large ISPs, a 3-D view i.e. DEM (Digital Elevation Model) for the area in 10 Km radius from the proposal site. MRL details of project site and RL of nearby sources of water shall be indicated.	A 3-D view i.e., DEM (Digital Elevation Model) for the area in 10 km radius from the plant site has been incorporated in the EIA/EMP Report. The elevation of the plant site is between 561 mRL to 663 mRL. The elevation of the nearby water body i.e. Udaisagar Right Canal, is 527 mRL. The same has been incorporated in the EIA/EMP Report.	Chapter-7 Figure 7.1 Page no. 307
2.	Plan for the implementation of the recommendations made for the steel plants in the CREP guidelines.	Plan for the implementation of the recommendations made for the Zinc Smelter plants in the CREP guidelines has been prepared and incorporated in this EIA / EMP Report.	Chapter – 10 Section - 10.4 Page no. 363–364
3.	Plan for solid waste utilization	Details of Solid Waste Generation and Management plan have been incorporated in this EIA/EMP Report.	Chapter – 10 Section – 10.8 Page no.366 - 367
4.	Plan for utilization of energy in off gases (coke oven, blast furnace)	This is a Zinc Smelter project. Therefore, utilization of energy in off gases (coke oven, blast furnace) is not applicable in this project. However, Waste heat recovery boiler (8 MW) has been installed with the existing roaster to utilize the waste heat. Another waste heat recovery boiler (10 MW) will be installed with the proposed Roaster to utilize the off gases. Details have been incorporated in the EIA/EMP Report.	Chapter 2 Section 2.7 Page No. 112 – 146

ToR Point No.	ToR Point	ToR Compliance	Reference in EIA/EMP Report
5.	System of coke quenching adopted with justification	This is a Zinc Smelter project. Therefore, System of coke quenching is not applicable in this project.	-
6.	Details on environmentally sound technologies for recycling of hazardous materials, as per CPCB Guidelines, may be mentioned in case of handling scrap and other recycled materials.	Chemical sludge from waste water treatment, Used or spent oil, Filters contaminated with oil, Anode Mud, Process residues, Purification Cake and Zinc ash/skimming/other zinc bearing wastes arising from smelting and refining, zinc dross bottom will be sold to Registered Recycler. Details have been incorporated in the EIA/EMP Report.	Chapter 2, Section 2.10.4, page 151 – 153
7.	Details on toxic metal content in the waste material and its composition and end use (particularly of slag)	Analysis report on toxic metal content and its composition and end use (particularly of Slag from Moore cake treatment plant has been incorporated in this EIA/EMP Report.	***Annexure 14***
8.	Details on toxic content (TCLP), composition and end use of slag.	TCLP report on toxic content and its composition and end use of slag from Moore cake treatment plant has been incorporated in this EIA/EMP Report.	***Annexure 14***
9.	100% of dolo char generated in the plant shall be used to generate power	This is a Zinc Smelter project. Therefore, this point is not applicable in this project.	-
10.	Fourth Hole fume extraction system shall be provided for SAF. WHR system shall be installed to recover sensible heat from flue gases of EAF. Provision for installation of jigging and briquetting plant to utilize the fines generated in the process.	This is a Zinc Smelter project. There are no SAF or EAF existing or proposed for the expansion project. All the furnaces installed at plant site are Induction Furnaces. Waste heat recovery boiler (8 MW) has been installed with the existing roaster to utilize the waste heat. Another waste heat recovery boiler (10 MW) will be installed with the proposed Roaster to utilize the off gases. No provision for installation of jigging and briquetting plant has been made in the	-

ToR Point No.	ToR Point	ToR Compliance	Reference in EIA/EMP Report
		expansion project. Details have been incorporated in this EIA/EMP Report.	
11.	No tailing pond is permitted for Iron ore slimes. Dewatering and filtration system shall be provided.	This is a Zinc Smelter project. Therefore, this point is not applicable in this project.	
12.	Emission/effluent norms as per G.S.R 894 (E) dated 4/12/2019	G.S.R 894 (E) dated 4/12/2019 was the draft notification inviting comments to the draft standards for the steel industry. Therefore, not applicable for this project. However, The Company will comply with the prevailing emission & effluent norms prescribed by CPCB for Zinc Smelters.	-

EXECUTIVE SUMMARY

1. INTRODUCTION

M/s Hindustan Zinc Ltd (HZL) is part of the Vedanta conglomerate, which is recognized as one of the most successful producers of various non-ferrous metals in India. HZL is an India-based company, which is engaged in the mining and smelting of Zinc, Lead and Silver metal and Wind energy in India. The Company's operations include five Zinc-Lead mines, over four Zinc Smelters, a Lead Smelter, a Zinc-Lead Smelter, a silver refinery plant and over six captive power plants in the state of Rajasthan. In addition, the Company also has a rock-phosphate mine in Maton near Udaipur in Rajasthan and Zinc, Lead, Silver processing and refining facilities in the State of Uttarakhand. The Company has wind power plants in the States of Rajasthan, Gujarat, Karnataka, Tamil Nadu and Maharashtra. It has a metal production capacity of over one million tons per annum with its key Lead-Zinc mines in Rampura Agucha, Kayad and Sindesar Khurd, and smelting complexes in Chanderiya, Debari and Dariba, all in the state of Rajasthan.

M/s Hindustan Zinc Ltd. is one of the largest Lead-Zinc integrated producer & a Leading producer of silver with more than 60 years of experience in Mining & Smelting. Reserves & Resources of about Million Tones as on 31st March 2022 sufficient for more than 25 years of mine life. Clean Development Mechanism (CDM) projects on waste heat recovery & wind power have an annual Certified Emission Reduction potential of over 6.13 Lac TON of CO_2. Total Exchequer to Government till 31st March, 2023 was Rs. 24892 Crores, Crore including dividend of 9,422 Crore including royalty and taxes. HZL has established Sewage Treatment Plant at Udaipur under PPP model to treat 60 MLD sewage and utilize treated water in its operations. Vision to enhance the quality of life and economic wellbeing of the communities around its operations, mainly SAKHI, MARYADA, KHUSHI campaigns, Shiksha Sambal Project, Jeevan Tarang Programme, Samadhan Programme reaching over 1.4 million plus beneficiaries and 234 villages across Rajasthan.

HZL is now proposing expansion for its existing Debari Zinc Smelter unit established in 1968 at Debari, Udaipur, Rajasthan, within the existing plant premises. This report has been prepared in reference to the Ministry's O.M. dated 11th April, 2022 regarding grant of EC under para 7(ii) of EIA Notification, 2006, amended from time to time for which EIA/EMP Report has been prepared as per Standard TOR Points for carrying out the Environmental Impact Assessment (EIA) study for "Proposed Expansion of Zinc Smelter (1,00,000 TPA to 1,40,000 TPA) through modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time at Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan)by M/s. Hindustan Zinc Limited".

This expansion will be carried out in 2 phases, in 1st phase the capacity expansion will be done up to 1,20,000TPA (20%) along with Roaster installation and in the 2nd Phase, capacity will be further increased up to 1,40,000TPA (40%) by Modernization of process by installation of new state of art

with latest technology equipment's to improve efficiency. Recovery, reduction in power consumption & GHG emission as well as elimination of manual activities.

M/s. Hindustan Zinc Limited is hereby proposing for "Proposed Expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) through modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time At Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan)" .

Details of the existing Clearances & Consents are given in Chapter 1, table 1.1 of this EIA/EMP Report. As per EIA Notification dated 14thSept., 2006, as amended from time to time; the project falls under S. No. 3 (Material Production), Category "A", Project or Activity 3 (a)- Metallurgical Industries (ferrous & non–ferrous).

Following activities are planned in Debari Smelter Unit:

1. Increasing existing capacity from 1,00,000 MTPA to 1,20,000 MTPA in Phase-I and then 1,20,000 MTPA to 1,40,000 MTPA in Phase II by:
   - Expansion in melting capacity section of existing melting of 10.5 TPH by adding 1 induction furnace and 1 slab casting line (24TPH).
   - Installation of New Jumbo Cellhouse equipped with Crane for improvement in Current efficiency from existing 84% to 87% and then to 92% there by reduction of power consumption
   - Installation of Automatic cathode stripping machine.
   - Installation of Anode flattening Machine.
   - Installation of New Leaching and Purification equipped with Automatic filter press.
   - Present small cells (576 Nos') will be replaced by Jumbo cells (80 Nos')
   - Replacement of existing rectifiers from 58 MVA to 80 MVA capacity,
   - Installation of Cooling tower for Rectifier heat exchanger
2. Installation of new Acid Leaching section having higher capacity reactors of 200 m3 and thickeners having diameter of 21 meter.
3. Installation of new Roaster of capacity 3,00,000TPA calcine is proposed to be installed along with Sulphuric acid plant capacity of 2,89,000 TPA to treat the SO_2 laden off gases from proposed roaster.
4. Installation of additional 5 nos. of reactor and 2 thickeners in leaching section equipped with calcine dosing system and bag filter to control fugitive dust emission
5. Installation of tail gas treatment plant.
6. For Environment expects separate Ventilation system Bag filters are provided for furnace and work zone and stack has been provided.
7. Provision of dust control system/ bag filters has been provided at material transfer points
8. Installation of additional RO-ZLD of 2000KLD capacity.

2. JUSTIFICATION FOR THE PROJECT

Proposed expansion will be done within the existing plant premises. The site for the existing plant was finalized considering the ideal location for the industries. Following factors were considered while selecting the site:

- The site has ample flat land for accommodating plant and related facilities within the existing DZS premises.
- Availability of reliable power & water supply.
- Nearness to NH-27 & NH-48 makes it easier to transport raw materials & final product at market.
- Availability of suitable source of raw material
- There is no National Park, Wildlife Sanctuary and Biosphere Reserve within 10 km radius area of plant site.
- Availability of manpower in the nearby area.
- Already established industrial environment and necessary infrastructure.
- Using the Eco-friendly Clean Technology.
- Economies of scale will result in lower operating cost.

3. DETAILS ABOUT THE PROJECT

3.1. Brief Description of the Project

Hindustan Zinc Limited has an existing Debari Zinc Smelter established in year 1968 at Village: Debari, Tehsil: Girwa, District: Udaipur (Rajasthan). The existing plant comprises of Zinc Smelter Plant [1,00,000 TPA Zinc metal 4,19,000 TPA Sulphuric Acid, 4,45,000 TPA Calcine, 320 TPA Cadmium metal / Sponge (equivalent metal), 2,000 TPA Sodium Chloride, 16,500 TPA Sodium Sulphate]. The plant has Solar Power Plant of 12.50 MW, WHRB 8 MW and has Emergency DG sets with total capacity of 14.80 MW (2*7.4 MW).

The chronology of events of the said project is as below:

- Initially, the Honorable Governor of the State of Rajasthan granted lease of 427 Acres (172.79 Ha) in 1962 for 99 years under the provisions of the Rajasthan Industrial Areas Allotment Rules, 1959, framed under Section 100 of the Rajasthan Land Revenue Act, 1956, which includes 98.74 hectares (244.01 Acres) vide lease dated 29.01.1962, 13.02 hectares (32.18 Acres) vide lease dated 26.03.1962 and 61.03 hectares (150.81 Acres) vide lease deed dated 26.03.1962 respectively. HZL commissioned the referred Zinc Smelter unit in 1968. Hindustan Zinc Limited, whilst being an erstwhile public sector undertaking, acquired additional land from nearby villages in and around the 1990s, for the purpose of its operations.
- Hindustan Zinc Limited (HZL) has filed a suit [Case Title: HZL vs Nandram & Ors. (Case No. 117/204)] before SDO/SDM Court, Girwa, Udaipur against Nandram & 23 others under Rajasthan Tenancy Act, 1955 for mutation and correction of revenue records.
- Plant and colony was established in 1968, and being used for non-forest purpose before the Forest (Conservation) Act, 1980, came into effect, therefore Forest Clearance was not applicable for Zinc Smelter Debari.

- As per Hon'ble Supreme Court orders (State Of Bihar vs Banshi Ram Modi & Ors, 7.05.1985), "forest area which is broken up or cleared before the commencement of the Act, prior approval of the Central Government in terms of Section 2 of the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 is not required and it would be required, when lease granted before the commencement of the said Act, is renewed after its coming into force. During the continuance of the lease period, the approval of the Central Government under Section 2 of the said Act is not required.
- In this case also, prior approval under Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980, will only be required during renewal of Zinc Smelter Debari's lease i.e. 2061. At present, the lease of the unit is valid and in continuance.
- Environment Clearance (EC) for expansion of Zinc Smelter (80,000 TPA to 1,00,000 TPA) at Village: Debari, Tehsil: Girwa, District: Udaipur (Rajasthan) was granted by MOEFCC, New Delhi vide F.No.J-11011/479/2006-IA.II(I) 19.03.2008 for total land area of 190.05 ha. CTE for the same was obtained from RSPCB vide F.No. 12(30-86) RPCB/Gr II/49 dated 5.04.2008 followed by CTO vide Letter F: 12(30-86) RPCB/Gr II/2702 dated 17.09.2008. The plant is in operation as per renewed CTO obtained from RSPCB vide Order no. 2022-2023/HDF/9282 dated 17.03.2023 (Valid upto 31.03.2027).
- Subsequent to the above, M/s. Hindustan Zinc Limited proposed for the Expansion of Zinc Smelter (1,00,000 TPA to 1,40,000 TPA) through Modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time At Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan). While submitting the online application along with kml file of the Plant area on the Parivesh portal vide Proposal No. IA/RJ/IND1/457836/2024 dated 06.01.2024 withdrawn on 19.07.2024, it was found that:
- some part of land covering, security colony, substation, some plantation etc. is showing under forest land. Upon observing this discrepancy, for further verification of the referred land, we consulted DCF-Udaipur (North Region) and found a reflection of the same in the Decision Support System. This is contrary to the revenue records as are in place, since in the same, this land parcel as which is part of the lease deed awarded to HZL in 1962, for 99 years, is recorded in HZL's name.
- After further enquiry with the revenue and forest departments it was found that the total area of Zinc Smelter Debari complex (Plant and Colony) comes out to be 184.2 ha (instead of 190.05 Ha mentioned in the EC letter). Remaining 5.85 Ha area falls outside the physical boundary Plant area (129 Ha) & Residential colony area (55.2 Ha). Hence, 184.2 Ha area is considered as projects area for this proposal.
- Out of this 129 ha of plant area, as per the information available with Forest department, 1.77 ha of Khasara No. 4522 and 5.20 ha of Khasra No. 4523 falls under Kantiya Forest (total area – 292 ha), which was notified as reserve forest by Mewar Government on 27.12.1947.

- Similarly, out of 55.2 ha. of colony area, 11.60 ha of Kasara No. 4509, 2.40 Ha. of Khasara No. 4510 and 2.46 Ha of Khasara No. 4511 falls under Panwadi Forest (total area 225 ha), which was notified as reserve forest by Mewar Government on 21.02.1943.
- Whereas, Old revenue records of Sanwat 2051 (Year 1994) are showing above khasras No. 4522, 4523, 4509, 4510, 4511 as factory area.
- In this regard, DCF-Udaipur (North Region) vide Letter No. F()Survey/Uvas-Uttar/2023-24/6317 dated 22.09.2023 confirmed that there is no presence of forest land in the 121 Hectares of land as within Hindustan Zinc Limited's Zinc Smelter Debari, Udaipur, and that this does not fall within any forest area.
- It is to be noted that Hindustan Zinc Limited will maintain status quo as far as the claimed forest land of hectares is concerned, and no activities are proposed to or will be carried out in this area without obtaining requisite clarity on the discrepancy or necessary approvals for the same.

Now M/s. Hindustan Zinc Limited is submitting an application for "Proposed Expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) through Modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time At Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan)". Meanwhile, the EIA/EMP Report has been prepared for both phases of the expansion.

Brief description about the proposed Project is given in Table - 1

Table 1: Salient features of the Project

S. No.	Particulars	Details
A.	**Nature of the Project**	Expansion Project
B.	**Size of the Project**	M/s. Hindustan Zinc Limited is proposing the expansion of existing plant from 1,00,000 TPA to 1,40,000 TPA. This expansion will be carried out in 2 phases, in 1st phase the capacity expansion will be achieved upto 1,20,000 TPA (20%) through modernization with installation of state of art jumbo cell house, higher capacity reactors & thickeners in L&P section and Roaster. In the 2nd Phase, capacity will be further increased upto 1,40,000TPA (40%) by debottlenecking, improvement in current, melting efficiency & metal recovery. This will result into improvement in metal recovery, recovery of minor metals and reduction in specific power, fresh water, GHG emissions. M/s. Hindustan Zinc Limited is hereby proposing for "Proposed Expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) through modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time At Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan)".

S. No.	Particulars	Details
C.	**Category of the Project**	Category "A", Project or Activity 3(a)- Metallurgical Industries (ferrous & non–ferrous).
D.	**Location Details**	
1.	Plot No./Khasra No.	Land documents are enclosed as ***Annexure 8***
2.	Villages	Debari and Bichhri
3.	Tehsil	Girwa
4.	District	Udaipur
5.	State	Rajasthan
6.	Latitude& Longitude	A: 24°36'28.25"N 73°48'51.06"E B: 24°36'7.67"N 73°49'26.92"E C: 24°35'30.90"N 73°49'37.68"E D: 24°36'11.89"N 73°48'32.26"E
7.	Toposheet No.	Core Zone: 45H/14(G43T14) Buffer Zone: 45H/10(G43T10), 45H/11(G43T11), & 45H/14(G43T14) & 45H/15(G43T15)
E.	**Area Details**	
1.	Total Plant Area	Total Plant Area: - 184.2 ha (129 ha plant area + 55.2 ha colony area)
2.	Greenbelt/ Plantation Area	Out of the total plant area (184.2 ha), 76.28 ha (41.41 %) area has already been developed. The same will be maintained and enhanced by doing gap plantation to achieve the plantation density @ 2500/ha.
F.	**Environmental Setting Details *(with approximate aerial distance and direction from the plant site)***	
1.	Nearest Town/City	• Udaipur (~5.6 km in WSW direction from plant site)
2.	Nearest Railway Station	• Debari RS (~1.5 km in NNW direction from plant site) • Rana Pratapnagar RS (~7.0 km in WSW direction from plant site) • Khemli RS (~9.5 in NNE direction from plant site)
3.	National Highway	• NH-27 (Near to Plant Boundary in North direction from plant site) • NH-48 (~2.5 km in West direction from plant site) • SH-9 (~5.0 km in NE direction from plant site) • MDR- 36A (~0.3 in North direction from plant site)
4.	Nearest Airport	Maharana Pratap Airport – Udaipur (~5.8 km in East direction from plant site)
5.	National Park, Wildlife Sanctuary, Biosphere Reserve, Tiger Reserve, Wildlife Corridors, Reserved /	• Panwari RF (Khasara No. 4509, 4510 and 4511 of plant area falls under Panwari Forest) • RF (~1.0 km in ENE direction from plant site) • Kantia RF (Khasara No. 4522 and 4523 of plant area falls under Kantia Forest) • Kamlodia RF (~2.0 km in SW direction from plant site)

S. No.	Particulars	Details
	Protected Forest (PF)etc. within 10 km radius	• RF (~2.0 km in South direction from Plant site) • Bara Magra RF (~1.0 km in NNW direction from plant site) • Bhainsra RF (~3.5 km in NNW direction from plant site) • Segria RF (~3.5km in West direction from plant site) • Hinglashia RF (~3.5 km in SW direction from plant site) • Bordi RF (~3.5 km in WSW direction from plant site) • Dhenkli RF (~4.5 km in NW direction from plant site) • Gugla RF (~5.5 km in West direction from plant site) • Umra RF (~6.5 km in SW direction from plant site) • Bagdara RF (~8.0 km in SSW direction from plant site) • Santu RF (~6.5 km in SSE direction from plant site) • Nahar Magra RF (~6.5 km in NE direction from plant site) • Amberi PF (~8.5 km in NW direction from plant site) • Amarbir RF (~7.0 km in SSE direction from plant site) • Nauva RF (~8.0 km in NNW direction from plant site) • Hora RF (~8.5 km in SW direction from Plant site) • Kheradi RF (~8.5 km in NNW direction from plant site) • Chirwa Ka Ghata (~9.0 Km in NNW direction from plant site)
6.	Water Body within 10 km radius	• Udaisagar Lake (~1.0 km in SSW direction from Plant site) • Berach River (~1.5 km in SE direction from Plant site) • Udai Sagar Left Canal (~5.5 km in NE direction from Plant site) • Udai Sagar Right Canal (~1.5 km in ESE direction from Plant site) • Udai Sagar Middle Canal (~0.5 km in East direction from Plant site) • Karget Canal (~2.5 km in SSE direction from Plant site) • Dabok Pond (~3.0 km in ENE direction from Plant site) • Ahar Nadi (~3.5 km in SW direction from Plant site) • Vela Nala (~6.5 km in ENE direction from Plant site) • Khemlitalav (~8.0 km in NNE direction from Plant site) • Bagdara Talav (~8.0 km in SSW direction from Plant site) • Ganeshpura pond (~8.5 km in West direction from Plant site) • Gadela Nadi (~9.0 km in NNE direction from Plant site) There are three seasonal nallahas passing through the plant site, which have run off water from the nearby hill in west direction during rains only Apart from the above, study area is having many seasonal ponds, nallahs, water channels which are active during rainy season.

S. No.	Particulars	Details
7.	Wetlands within the study area as per State Wetland Authority	No Wetland site notified under Ramsar Convention, is falling within 10 km radius study area. However, Udai Sagar lake (~1.0 km in SSW direction from Plant site) has been listed as Wetland by State Wetland Authority, Rajasthan. (source:https://environment.rajasthan.gov.in/content/environment/en/state-wetland-authority/list-of-identified-wetlands.html)
8.	Seismic Zone	Zone - II [as per IS 1893 (Part-I): 2002] i.e., Low Damage Risk Zone
G.	**Basic Requirements of the Project**	
	Water Requirement (KLD)	Existing – 8000 Additional after expansion – 1046 Total after expansion - 9046 *Total water requirement for industrial and Domestic usage will be met from Mansi Wakal Dam and STP Udaipur.No additional fresh water is required for proposed project. Treated sewage from Udaipur STP will be used as additional water for proposed expansion.*
	Power Requirement (MW)	*Existing – 90* *Additional due to expansion – 20* *Total after expansion – 110* *Source:* WHRB & Solar Power plant at site; CPPs from sister units at Zawar, Dariba & Chanderiya & AVVNL. DG Sets for power back up.*Additional power required for proposed expansion shall be sourced from WHRB or renewable energy*
	Steam Requirement (TPH)	Existing - 24 Additional - 8 Total after expansion – 32
	Manpower Requirement (Number)	*Existing – 784* *Additional – 65* *Total after expansion - 849* *Additional manpower will be sourced locally from nearby area. In addition to above 400 nos of manpower is being used for projects and other improvement projects.*
H.	**Cost Details**	
	Total Cost for the Project	Rs. 2500 crores (Phase I Rs. 2200 Cr. & Phase II Rs. 300 Cr.)
	Cost for Environmental Protection Measures	Capital Cost: Rs. 600.628 Crores/- Recurring Cost: Rs. 70 Crore /annum

Source: Pre-feasibility Report

3.2. Major Requirements for proposed expansion project

3.2.1. Raw Material Requirement

Major raw material required for Zinc Smelter is Zinc concentrate, Calcine, High silver Lead and various additives Fuel etc. Details regarding quantity of raw materials, their source along with distance and

mode of transportation are given in Table – 2

Table 2: Raw Material Requirement & Additives Requirement

S. No.	Particular	UNIT	Quantity					Probable transportation	
			Existing	Additional		Total Additional	Total After expansion	Source	Distance and mode
				Phase I	Phase II				
1.	Zinc concentrate/Calcine	TPA	491000	107919	88094	196013	687013	HZL Mines	50 km to 310 Kms
2.	Zinc Secondaries - Zinc Dross/ Ash/ Zinc bearing waste	TPA	5250	1183	1072	2255	7505	HZL Smelter	Within same premises
3.	High Silver Lead (HSL)	TPA	0	1500	0	1500	1500	HZL Smelter	By covered truck DSC- 80 Km CLZS- 110 km
4.	Zinc dust	TPA	0	4800	700	5500	5500	HZL Smelter	By covered truck DSC- 80 Km CLZS- 110 km
5.	Zinc Sulphate	TPA	-	9283	1111	10394	10394	Ancillary	By covered truck DSC- 80 Km CLZS- 110 km
6.	Pyro metallurgical Slag	TPA	Nil	60,000	0	60,000	60,000	HZL Smelter	By covered truck DSC- 80 Km CLZS- 110 km
7.	Moore Cake	TPA	Nil	50,000	0	50,000	50,000	HZL Smelter	Stock of HZL & By covered truck DSC- 80 Km CLZS- 110 km
8.	Coke fines	TPA	Nil	25,200	0	25200	25200	Indigenous /imported	Approx. 1500kms Through Trucks

S. No.	Particular	UNIT	Quantity					Probable transportation	
			Existing	Additional		Total Additional	Total After expansion	Source	Distance and mode
				Phase I	Phase II				
9.	LGLC (low grade silver crust/cake)	TPA	Nil	0	30,000	30000	30000	HZLs DSC & CLZS Smelter	By covered truck DSC- 80 Km CLZS- 110 km

Source: Pre-feasibility Report

3.2.2. *Fuel Requirement*

Details regarding quantity of fuel required, their source along with distance & mode of transportation for expansion project are given in Table – 3.

Table 3: Fuel Requirement

S. No.	Particular	Unit		Probable transportation	
			Quantity Total After expansion	Source	Distance and mode
1.	Fuel HSD/LDO/LPG/ CNG/PNG	KLA	1450	IOCL / Reliance, Gujarat Based Refinery/Oil Depot	Approx. 1000 km
2.	Fuel LPG at Melting	MTA	87	Indane Depot	Approx 5 Km to 50 Km
3.	Fuel HSD/LDO at MCTP	KLA	960	IOCL / Reliance, Gujarat Based Refinery/Oil Depot	Approx. 1000 km

Source: Pre-feasibility Report

4. PROCESS DESCRIPTION

The process description of the Zinc Smelter Complex includes the following units:

A. Zinc Smelter
   a. Roasting Plant
   b. Gas Cleaning
   c. Sulphuric Acid Plant
   d. Tail Gas Treatment Plant
   e. Leaching Plant

f. Purification Plant

g. Cell House

h. Melting and Casting Plant

B. Power Generation

a. WHRB

b. Solar Power Plant

c. DG Set

C. Other associate Facilities

a. ETP

b. STP

c. RO-ZLD with MVR

d. MCTP

Detailed Process Description are given in chapter 2, Section 2.7 of EIA/EMP Report

5. DESCRIPTION OF ENVIRONMENT

5.1. Presentation of Results (Air, Noise, Water & Soil)

Ambient air quality monitoring has been carried out at 8 monitoring locations within the 10 km radius of the study area on 24 hourly bases.

- The concentration of PM2.5 and PM10 for all the 8 AAQM stations were in range of 26.5 to 51.3 µg/m3 and 58.9 to 88.1 µg/m3 respectively, SO2 and NO2 were found to be in range of 6.6 to 16.6 µg/m3 and 12.2 to 28.2 µg/m3 respectively. CO was found to be in range of BDL to 1.12 mg/m3. The concentration Zinc (Zn) ranges between BDL (DL: 1 µg/m3) to 3.02 µg/m3, the concentrations of Total Hydrocarbon was BDL (DL: 1.0 mg/m^3) to 2.2 mg/m3 and the concentrations of lead was BDL (DL: 0.02 µg/m3) to 0.39 µg/m3.
- Ambient noise levels were monitored at 8 locations around the plant site Noise level varies from 51.5 to 66.4 Leq dB (A) during day time and from 41.7 to 56.4 Leq dB (A) during night time.
- Surface water quality analysis for 4 sampling locations shows that pH varies 7.44 to 7.7, Total dissolved solids varies from 996.0 to 1136.0 mg/l, Total hardness 341.59 to 584.14 mg/l and conductivity (1626.0 to 1823.0 µS/cm). The COD (24 to 63.3 mg/l) and BOD (7.6 to 18 mg/l). The nutrients were also found low viz. sulphate (92.80 to 121.60 mg/l), nitrate (4.82 to 8.54 mg/l), calcium (63.35 to 120.75 mg/l), magnesium (44.60 to 68.74 mg/l). The Dissolved oxygen (66.1 to 7.2 mg/l) indicated that the water bodies are safe for aquatic biodiversity.
- Ground water quality analysis for 8 sampling locations shows that pH varies from 7.42 to 7.85, Total dissolved solids varies from 636 to 1498 mg/l, Total hardness from 301.9 to 792.0 mg/l and conductivity (972 to 2412 µS/cm). The nutrients were also found low viz. sulphate (92.07 to 201.3 mg/l), nitrate (15.04 to 33.06 mg/l), calcium (87.13 to 188.12 mg/l), magnesium (20.55 to 78.40 mg/l). indicated that all the samples comply to the drinking water standard (IS: 10500-2012) except 2 locations (Village Debari and Village Lakadwas) where Total Hardness values are out of the prescribed limit.

- Soil monitoring was carried out at 8 locations and the analysis results showed that soil colour is Reddish, Light and dark brown & the textures of the soil samples majorly were Sandy Clay to Sandy Clay loam. The samples have rich content of organic matter comprising of 0.78 % to 1.11 for the plant growth, nitrogen (160.25 to 333 kg/ha) better to sufficient, phosphorus (42.6 to 98.64 kg/ha) medium to more than sufficient and potassium (513.26 to 1491.02 kg/ha) more than sufficient, Magnesium (315 to 614.5 mg/kg), and Calcium (1943 to 3062 mg/kg).

Above baseline study results shows that the emission levels & water quality parameters are within the prescribed norms, however the HZL is being/will adopt adequate Environmental pollution control measures in order to minimize the environment pollution due to the proposed expansion project activities. Details are given in Chapter 4 & 10 of this EIA/EMP report.

5.2. Biological Environment

As per the field survey and List of Flora by ENVIS, MoEF&CC; no endemic, endangered and rare species of flora have been observed in the study area. Total 216 species were reported out of which 57 trees, 39 shrubs, 91 herbs, 20 species of grass and 09 species of climbers have been recorded in the study area based on primary observation as well as based on information collected from the secondary data. Out of all the floral species found in the study area 37 are agricultural crops.

Among fauna 16 species of mammals, 5 species of reptiles, 9 amphibians and were recorded from the study area. Among avifauna 70 species were recorded in the study area. No National Park, Sanctuary, Biosphere Reserve, Migratory Corridor of wild animals exists within 10 km radius of study area. Among aquatic fauna 10 species were recorded in the study area.

As per the authenticated list, total 9 Schedule 1 species i.e., *Panthera pardus* (Leopard), *Vulpes bengalensis* (Indian Fox), *Canis aureus* (Golden Jackal), *Felis chaus* (Jungle Cat), *Herpestes smithii* (Ruddy Mongoose), *Hyaena hyaena* (Striped Hyena), *Hystrix indica* (Indian Crested Porcupine), *Daboia russelii* (Russell's Viper), *Pavo cristatus* (Indian Peafowl) found within the study area during survey.

Wildlife conservation plan for the above species has been prepared and submitted to DCF, Udiapur for authentication from CWW, Udaipur vide letter dated 30.03.2023. The receipt of the same is enclosed herewith with this EIA/EMP report as ***Annexure 7C(i).*** Receipt for approval of revised Wildlife conservation plan submitted to DCF, Udaipur for authentication from CWW, Udaipur on 30.07.2024 is enclosed herewith with this EIA/EMP report as ***Annexure 7C(ii).*** Final Report for WLCP submitted for approval on 30.07.2024 has been attached as ***Annexure 7d*** with this EIA/EMP report.

5.3. Socio-Economic Environment

The population of the study area as per 2011 Census records is 577495 (for 10 km radius). Total no. of households is 120209. Scheduled Caste fraction of the population of the study area is 58458 (10.12%) and Scheduled Tribe 56783 (9.83%). Literacy rate of the area is 85.62%. Total working population and non-working population is 35.36% and 64.64%, respectively in the study area.

There are mainly 10 educational institutions, 9 places of worship, 1 post office are present within 01 Km of the study area. Apart from these 3 seasonal nallahs are also passing through the plant site.

Mitigation Measures for Environmental Sensitive Areas within 01 Km Radius of the Plant Site is given in Chapter 4, section 4.12.1 of this EIA/EMP report.

6. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Anticipated environmental impacts due to operation of the proposed expansion project along with mitigation measures are given in Chapter 4 of this EIA/EMP Report.

7. ENVIRONMENTAL MONITORING PROGRAMME

Details of the environmental monitoring schedule / frequency, which will be undertaken for various environmental components, as per conditions of EC / CTE / CTO are given in Table - 4.

Table 4: Post Project Monitoring

S. No.	Aspect	Monitoring parameters	Location	Schedule and frequency of monitoring	Responsibility
CONSTRUCTION PHASE					
1.	Ambient Air Quality Monitoring	PM_{10}, $PM_{2.5}$, SO_2, NO_2	Work Zone-Construction site	Quarterly	HZL/ NABL Accredited Laboratory
2.	Noise Level Monitoring	Noise Level	Work zone-construction site	Quarterly	HZL/ NABL Accredited Laboratory
3.	Ground water monitoring	As per IS : 10500-2012	Construction site	Pre-Monsoon & Post Monsoon	NABL Accredited Laboratory
	OPERATIONAL PHASE				
4.	Meteorological data	Dry bulb temp, wet bulb temp, relative humidity, wind speed, wind direction and rainfall	Permanent station in plant premises. The wind sensor is preferably at 10 m height above the ground without any surrounding hindrances that may affect the free flow of wind	1 No. Online metrological station.	HZL
5.	Ambient Air Quality	PM_{10}, $PM_{2.5}$, SO_2, NO_2 CO (As per NAAQS 2009)	Plant premises and in nearby villages	4 Nos. continuous ambient air quality monitoring stations (CAAQMS) have already been installed after getting site approval from SPCB (PM_{10}, $PM_{2.5}$, SO_2, NO_2, CO at an angle of 120° each). Manual ambient air quality monitoring will be conducted at 4 different locations around the plant area by NABL Accredited Laboratory- Quarterly	HZL / NABL Accredited Laboratory
6.	Stack	PM, SO_2, NO_X,	At all major	Online continuous	Online

S. No.	Aspect	Monitoring parameters	Location	Schedule and frequency of monitoring	Responsibility
	Emission Monitoring	Acid Mist, Pb	combustion-based stacks.	monitoring system will be there for proposed unit as per CPCB directions. In absence of online system, manual monitoring as per CTO condition. Quarterly	continuous monitoring system/ NABL accredited lab
7.	Performance Evaluation of pollution control equipment		All pollution control devices	Annually	HZL
8.	Fugitive Emission		Locations across Raw Material Handling area, storage area, Silos, near control rooms, workshop, yards, junction houses, etc.	Quarterly	HZL
9.	Noise Level Monitoring		Inside the plant boundary	Quarterly	HZL
10.	Water Quality/effluents	Water quality of surface and ground as per IS: 10500-2012 except radioactivity	Ground water & Surface water	Six monthly	HZL/ NABL accredited lab
		Effluent- pH, TSS, TDS, BOD, COD	ETP/STP - Outlet	ETP/STP- daily effluent quality monitoring by own lab (pH, COD & TSS- Daily basis TDS & BOD – Weekly). Online water flow meter and web camera as per CPCB guideline will be installed.	HZL
11.	Soil quality for fertility	N, P, K, organic matter, water holding capacity, density, texture, etc.	One location inside the plant area	Yearly	NABL accredited lab
12.	Inventory of hazardous waste		Within plant	Yearly or as directed by SPCB	HZL
13.	Medical check-up of employees		Nearby hospitals/ Health Centre/On-site Occupational health Centre	Half Yearly	HZL
14.	Water Consumption		At all consumer points through water meter	Continuous through water meter	HZL

8. ADDITIONAL STUDIES

As per EIA Notification dated 14th Sept. 2006, and its subsequent amendments; in reference to the Ministry's O.M. dated 11th April, 2022 regarding grant of EC under para 7(ii) of EIA Notification, 2006, amended from time to time for which EIA/EMP Report has been prepared as per standard TOR Points for carrying out the Environmental Impact Assessment (EIA) study, the Following Additional studies are required to be carried out for the expansion project:

1. Hydro-geological Study and Rainwater Harvesting Plan
2. Risk Assessment and Disaster Management Plan

The detail information regarding additional studies is given in chapter 7 of this EIA/EMP report.

9. PROJECT BENEFITS

The proposed expansion project will help in combating the growing demand of Zinc in the market & hence will help in the economic growth of the country. The company will result in growth of the surrounding areas by increasing direct and indirect employment opportunities in the region including ancillary development and supporting infrastructure. Development of social amenities will be in the form of medical facilities, education to underprivileged and creation of self-help groups. The state will get revenues in terms of taxes and local people will get direct & indirect employment. Business opportunities for local community will be available. No adverse effect on environment is envisaged as proper mitigation measures will be taken up for the same. An amount of Rs. 35.27 Crores has been earmarked for Socio-Economic development activities within the study area during 3 years and Rs. 7.11 Crores for adoption of two villages i.e., Debari and Bichhri for model village development. Details are given in section 8.5 of chapter 8 of this EIA/EMP Report.

10. ENVIRONMENT MANAGEMENT PLAN

This is a proposal for Expansion within the existing Premises of Debari Zinc Smelter. The anticipated environmental impacts of the Plant will be mainly due to the constructional and operational activities. Therefore, following components has been considered for Impact Assessment:

1. Air Quality
2. Noise Level
3. Water Quality
4. Soil Environment
5. Occupation Health & Safety

Various mitigation measures have been proposed to take care of the environment in respect of air, water, noise, soil and the green cover of the plant site and nearby villages.

Table 5: Environment Management

S. No.	Particular	Description
1.	Air Quality Management	• Emissions generated from production process as well as the prescribed limits from CPCB & MOEFCC are as PM (3 Zinc melting furnaces: 50 mg/Nm3, 2 oil fired Boilers: 600 mg/Nm^3, Slag grinding Plant: 50 mg/Nm3 and DG Sets: 75 mg/Nm^3), SO_2 (Sulphuric acid Plant II and III: 950 mg/Nm^3, 1.5 kg/ton of acid production and oil fired boiler: 600 mg/Nm^3), Acid Mist (Sulphuric acid Plant II and III: 50

S. No.	Particular	Description
		mg/Nm^3), NO_x (2 oil fired boilers: 450 mg/Nm^3, DG Sets: 710 mg/Nm^3), NMHC (DG Sets: 100mg/Nm^3) & CO (DG Sets: 150mg/Nm^3). • Double Conversion Double Absorption (DCDA) Acid Plant to maintain SO_2 emission within the prescribed norms of 1.5 Kg/MT production. • Additional Tail Gas Treatment (TGT) is proposed to minimize SO_2 emissions from 1.5 to 1.0 Kg/MT of Sulphuric Acid production in 2nd roaster and proposed roaster. • Demister pad in acid plant is better designed to reduce the emission of acid mist. • In process, material is being transferred in closed conveyors. • Extensive dust extraction network consisting of Venturi Scrubbers and Bag Filters are provided. • Ventilation systems followed by bag filters, are provided in the metal tapping area to control work zone emissions • State-of-The-Art DCDA Acid Plants & Tail Gas Treatment Plant in roaster. • Concentrate shed, raw material storage yard, concentrate unloading point area, Belt conveyors and other material transfer points etc. are provided with water sprinklers to arrest the dust and fugitive sources of dust. • In order to minimize fugitive emissions Zn concentrate containing 8-10% moisture is being handled. • All existing Stacks are installed with online analyzers and connected to CPCB & RSPCB Server. • Mobile vacuum dust sweeping system on industrial roads and vacuum dust cleaning system for plant area are exist at smelter to control airborne dust due to the vehicles movement. Regular road washing is being done on internal roads. • Vehicular emissions are maintained as per standard. • Avenue plantation is ensured along with internal roads to control dust emissions. • 4 no's of CAAQMS (Continuous Ambient Air Quality Monitoring Stations are installed with consultation of RSPCB. • 41.41 % of the area has already been covered with greenbelt / plantation at site. • DG sets are installed to provide power back up during emergency. • Emissions from DG set are /will be dispersed through the stack. Adequate stack height has been maintained for the existing DG set as per CPCB guideline.
2.	Wastewater Management	• The existing total water requirement of the plant is 8000 KLD. Which included 6950 KLD industrial & 1050 KLD Domestic water. • Total wastewater generated from the plant is 3494 KLD (3425 KLD from Zinc Smelter, 41 KLD from DG cooling tower & 28 KLD from MCTP) which is being treated in existing ETPs (5760 KLD) out of which 494 KLD of treated water is being used in process and remaining 3000 KLD of effluent is further treated in recently installed RO-ZLD/MVR unit. Additional 1700 KLD of effluent is envisaged from proposed projects and for which capacity of existing 3000 KLD RO-ZLD/MVR unit will be increased to 5000 KLD by expansion. • No expansion is proposed in ETP. Debottlenecking /Replacement of existing equipment is planned to improve efficiency. • All trade effluent is being & will be treated in ETP followed by RO- ZLD with MVR unit and zero discharge is being & will be ensured. • Domestic wastewater (150 KLD) generated from the Plant is being/will be treated in existing STP (200 KLD) and treated water is being /will be used in plantation purpose within the plant premises. • Domestic sewage generated from Colony is treated in 600 KLD STP. Treated water is being used in plantation and horticulture purpose. • No wastewater is being discharged outside the plant. The Plant will remain

S. No.	Particular	Description
		"Zero Liquid Discharge" Unit after the proposed expansion.
3.	Noise Management	• All the design/installation precautions as specified by the manufacturers with respect to noise control will be strictly adhered to for the expansion project too. • High noise generating sources are insulated adequately by providing suitable enclosures. • Design and layout of building to minimize transmission of noise, segregation of particular items of plant and to avoid reverberant areas. • Use of lagging with attenuation properties on plant components/ installation of sound attenuation panels around the equipment. • Equipment producing high noise are designed and procured with acoustic enclosures. • Other than the regular maintenance of the various equipment, ear plugs/muffs are recommended for the personnel working close to the noise generating units. • All the openings like covers and partitions are designed properly. • Provision of Inlet and outlet mufflers; easy to design and construct. • Noise control system designed to form an integral part of the plant. • The existing greenbelt with rich canopy helps to attenuate the noise emitted by the various sources in the plant.
4.	Solid & Hazardous Waste Management	• The total hazardous waste generated from the proposed expansion project will include: - Spent Catalysts (68 TPA), Empty barrels/containers/liners contaminated with hazardous chemicals/waste (15 TPA), Chemical Sludge from water (ETP Cake) (24789 TPA), Cooler Cake (1416 TPA) and Waste or residues containing oil (970 TPA) will be sent to CTDF Udaipur or registered recycler, or used for reprocessing/coprocessing. Process residue (2000 TPA), Purification Cake (2929 TPA), Used oil/spent oil (55 TPA), Resin from water purification (2 TPA) will be reused in the process or will be sold to the registered recyclers. Anode Mud (1902 TPA) will be Co processing in cement plant /Registered recycler/Reprocessing / CTDF Udaipur. Filters contaminated with oil (2 TPA) will be sent to CTDF Udaipur or will be Co-incinerated in the Cement Kiln. • Additional hazardous waste generated due to the proposed expansion includes: Clarifier Cake/Calcium salts from RO-ZLD (7300 TPA), Insulation Waste/glass wool (100 TPA), Discarded Asbestos sheet (350 TPA), other solid waste like Slag generated from MCTP (50,000 TPA). • Zinc ash skimming/dross (7505TPA) will be Reuse in process/sales to registered recyclers. • Jarosite (123383TPA) is being and will be sent to cement industries. • Municipal solid waste generated from the plant is being and will be segregated and disposed-off scientifically.
5.	Greenbelt Development & Plantation	• Out of the total plant area (184.2 ha), 76.28 ha (41.41 %) area has already been developed. The same will be maintained and enhanced by doing gap plantation to achieve the plantation density @ 2500/ha. • Miyawaki plantation has been done in one acre by planting 8000 plant saplings in one acre area. • The Species planted are Shisam, Neem, Arjuna, Jamun, Casiasamea, Peltophorum, Alstonia etc. • The same will be maintained and enhanced by doing gap plantation.

Source: Pre-feasibility Report

11. OCCUPATIONAL HEALTH AND SAFETY

To control and minimize the risks at workplace, Debari Zinc Smelter by M/s. Hindustan Zinc Limited has implemented Health, Safety and Environment Policy with the following objectives:

- Healthy & Safe working environment for employees is the prime concern of the company.
- Hindustan Zinc Limited is committed to maintain safe & healthy work environment for employees, against hazards & risks through:
  - Continuously developing & maintaining safe work practices.
  - Focus on operational & occupational hazards & risks.
  - Creating awareness about preventive health & safety measures.
  - Providing safety Equipment to all employees.
  - A well-equipped first aid health center established at plant site.
  - Carrying out risk assessment associated with its operation and taking the remedial measures.

12. CONCLUSION

It is appropriate to say that the proposed expansion project is an environmentally friendly project which will not cause any significant negative impact in the area, as adequate pollution control measures and preventive measures are being/will be adopted to maintain the range of various pollutants within the permissible limits. Regular monitoring of all the components of environment is being/will be done. Increased social welfare measures are being/will be taken by the company that will bring development and progress in the near-by villages. Maintenance of Greenbelt around the area has been/will be also taken up as an effective pollution mitigation technique as well as to control the pollutants released from the plant premises towards the near-by area.

Therefore, proposed expansion within the existing Debari Zinc Smelter will not degrade the environmental quality of surrounding environment. It would contribute towards the improvement of the socio-economic conditions and aesthetics of the surrounding areas.

CHAPTER- 1

INTRODUCTION

1.1 PURPOSE OF THE REPORT

This report has been prepared in reference to the Ministry's O.M. dated 11th April, 2022 regarding grant of EC under para 7(ii) of EIA Notification, 2006, amended from time to time for which EIA/EMP Report has been prepared as per Standard TOR Points for carrying out the Environmental Impact Assessment (EIA) study for "Proposed Expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) through modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time At Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan)" by M/s. Hindustan Zinc Limited.

The main purpose of this report is to provide a coherent statement after analyzing all significant impact of the proposed Expansion within the existing Debari Zinc Smelter and also the measures that should be taken to eliminate and mitigate the impacts. The report broadly contains essential information of:

- The proponent to implement the proposal in an environmentally and socially responsible way;
- The responsible authority to make an informed decision on the proposal, including the terms and conditions that must be attached to an approval or authorization.

1.2 IDENTIFICATION OF PROJECT AND PROJECT PROPONENT

1.2.1 Identification of the Project

A. Details of the Existing Project

Hindustan Zinc Limited has an existing Debari Zinc Smelter established in year 1968 at Village: Debari, Tehsil: Girwa, District: Udaipur (Rajasthan). The existing plant comprises of Zinc Smelter Plant [1,00,000 TPA Zinc metal 4,19,000 TPA Sulphuric Acid, 4,45,000 TPA Calcine, 320 TPA Cadmium metal / Sponge (equivalent metal), 2,000 TPA Sodium Chloride, 16,500 TPA Sodium Sulphate]. The plant has Solar Power Plant of 12.50 MW, WHRB 8 MW and has Emergency DG sets with total capacity of 14.80 MW (2*7.4 MW).

The chronology of events of the said project is as below:

- Initially, the Honorable Governor of the State of Rajasthan granted lease of 427 Acres (172.79 Ha) in 1962 for 99 years under the provisions of the Rajasthan Industrial Areas Allotment Rules, 1959, framed under Section 100 of the Rajasthan Land Revenue Act, 1956, which includes 98.74 hectares (244.01 Acres) vide lease dated 29.01.1962, 13.02 hectares (32.18 Acres) vide lease dated 26.03.1962 and 61.03 hectares (150.81 Acres) vide lease deed dated 26.03.1962 respectively. HZL commissioned the referred Zinc Smelter unit in 1968. Hindustan Zinc Limited, whilst being an erstwhile public sector undertaking, acquired additional land from nearby villages in and around the 1990s, for the purpose of its operations.
- Plant and colony were established in 1968, and being used for non-forest purpose before the Forest (Conservation) Act, 1980, came into effect, therefore Forest Clearance was not applicable for Zinc Smelter Debari.
- As per Hon'ble Supreme Court orders (State Of Bihar vs Banshi Ram Modi & Ors, 7.05.1985), "forest area which is broken up or cleared before the commencement of the Act, prior approval of the

Central Government in terms of Section 2 of the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 is not required and it would be required, when lease granted before the commencement of the said Act, is renewed after its coming into force. During the continuance of the lease period, the approval of the Central Government under Section 2 of the said Act is not required.

- In this case also, prior approval under Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980, will only be required during renewal of Zinc Smelter Debari's lease i.e. 2061. At present, the lease of the unit is valid and in continuance.
- Environment Clearance (EC) for expansion of Zinc Smelter (80,000 TPA to 1,00,000 TPA) at Village: Debari, Tehsil: Girwa, District: Udaipur (Rajasthan) was granted by MOEFCC, New Delhi vide F.No.J-11011/479/2006-IA.II(I) 19.03.2008 for total land area of 190.05 ha. CTE for the same was obtained from RSPCB vide F.No. 12(30-86) RPCB/Gr II/49 dated 5.04.2008 followed by CTO vide Letter F: 12(30-86) RPCB/Gr II/2702 dated 17.09.2008. The plant is in operation as per renewed CTO obtained from RSPCB vide Order no. 2022-2023/HDF/9282 dated 17.03.2023 (Valid upto 31.03.2027).
- Subsequent to the above, M/s. Hindustan Zinc Limited proposed for the Expansion of Zinc Smelter (1,00,000 TPA to 1,40,000 TPA) through Modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time At Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan). While submitting the online application along with kml file of the Plant area on the Parivesh portal vide Proposal No. IA/RJ/IND1/457836/2024 dated 06.01.2024 withdrawn on 19.07.2024, it was found that:
- some part of land covering, security colony, substation, some plantation etc. is showing under forest land. Upon observing this discrepancy, for further verification of the referred land, we consulted DCF-Udaipur (North Region) and found a reflection of the same in the Decision Support System. This is contrary to the revenue records as are in place, since in the same, this land parcel as which is part of the lease deed awarded to HZL in 1962, for 99 years, is recorded in HZL's name.
- After further enquiry with the revenue and forest departments it was found that the total area of Zinc Smelter Debari complex (Plant and Colony) comes out to be 184.2 ha (instead of 190.05 Ha mentioned in the EC letter). Remaining 5.85 Ha area falls outside the physical boundary Plant area (129 Ha) & Residential colony area (55.2 Ha). Hence, 184.2 Ha area is considered as projects area for this proposal.
- Out of this 129 ha of plant area, as per the information available with Forest department, 1.77 ha of Khasara No. 4522 and 5.20 ha of Khasra No. 4523 falls under Kantiya Forest (total area – 292 ha), which was notified as reserve forest by Mewar Government on 27.12.1947.
- Similarly, out of 55.2 ha. of colony area, 11.60 ha of Kasara No. 4509, 2.40 Ha. of Khasara No. 4510 and 2.46 Ha of Khasara No. 4511 falls under Panwadi Forest (total area 225 ha), which was notified as reserve forest by Mewar Government on 21.02.1943.
- Whereas, old revenue records of sanwat 2051 (year 1994) are showing above khasra No. 4522, 4523,4509, 4510, 4511 as factory area.
- In this regard, DCF-Udaipur (North Region) vide Letter No. F()Survey/Uvas-Uttar/2023-24/6317 dated 22.09.2023 confirmed that there is no presence of forest land in the 121 Hectares of land as

within Hindustan Zinc Limited's Zinc Smelter Debari, Udaipur, and that this does not fall within any forest area.

- It is to be noted that Hindustan Zinc Limited will maintain status quo as far as the claimed forest land is concerned, and no activities are proposed to or will be carried out in this area without obtaining requisite clarity on the discrepancy or necessary approvals for the same.

Now M/s. Hindustan Zinc Limited is submitting an application for "Proposed Expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) through Modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time At Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan)". Meanwhile, the EIA/EMP Report has been prepared for both phases of the expansion.

B. Details regarding Court Case

There is one court case filed by HZL before SDM/SDO Court regarding land mutation and the details are as follows:

Case Title: HZL vs Nandram & Ors. (Case No. 117/204)

Hindustan Zinc Limited ('HZL') has filed a suit before SDO/SDM Court, Girwa, Udaipur against Nandram & 23 others under Rajasthan Tenancy Act, 1955 for mutation and correction of revenue records. That the land of the following appendices is situated in Revenue Village – Bichdi, Teh. Kurabad, Udaipur, and these land parcels were acquired by HZL but the revenue records as on date do not reflect the same. Details are as below:

Appendix – 1

Account Number	Khasra Number	Area (In Hec.)	Current Tenant as per Revenue Records
New 184, Old 157	76	0.1500	HZL and Nandram
	77	0.0300	HZL and Nandram
	78	0.1800	HZL and Nandram
	79	0.0050	HZL and Nandram
	80	0.0450	HZL and Nandram
	81	0.600	HZL and Nandram
	82	0.1050	HZL and Nandram
	83	0.0750	HZL and Nandram
	86	0.3500	HZL and Nandram
	87	0.4400	HZL and Nandram
	88	0.3500	HZL and Nandram
	89	0.3700	HZL and Nandram
	90	0.5600	HZL and Nandram

Appendix – 2

Account Number	Khasra Number	Area (In Hec.)	Current Tenant as per Revenue Records
New 416 Old 330	104	0.0100	Satar Khan
	105	0.0150	Satar Khan
	106	0.0100	Satar Khan
	107	0.0150	Satar Khan
	108	0.0200	Satar Khan
	109	0.0550	Satar Khan
	110	0.0250	Satar Khan
	111	0.0600	Satar Khan
	112	0.0150	Satar Khan

Account Number	Khasra Number	Area (In Hec.)	Current Tenant as per Revenue Records
	113	0.0550	Satar Khan
	114	0.1800	Satar Khan
	115	0.2200	Satar Khan
	116	0.1900	Satar Khan
	117	0.0700	Satar Khan
	118	0.1500	Satar Khan
	119	0.1600	Satar Khan
	120	0.0150	Satar Khan
	121	0.0950	Satar Khan
	122	0.0300	Satar Khan
	123	0.0350	Satar Khan
	124	0.8300	Satar Khan

Appendix – 3

Account Number	Khasra Number	Area (In Hec.)	Current Tenant as per Revenue Records
New 439 Old 355	125	0.2400	Heeralal

Appendix – 4

Account Number	Khasra Number	Area (In Hec.)	Current Tenant as per Revenue Records
New 36 Old 30	4671	2.0400	Laxman Singh & Others

Appendix – 5

Account Number	Khasra Number	Area (In Hec.)	Current Tenant as per Revenue Records
New 320 Old 266	414	0.0650	Lalibai & Ors.
	415	0.0900	Lalibai & Ors.
	416	0.0500	Lalibai & Ors.
	417	0.1000	Lalibai & Ors.
	418	0.0850	Lalibai & Ors.
	419	0.0350	Lalibai & Ors.
	420	0.0600	Lalibai & Ors.
	421	0.0500	Lalibai & Ors.
	422	0.0400	Lalibai & Ors.

Appendix – 6

Account Number	Khasra Number	Area (In Hec.)	Current Tenant as per Revenue Records
New 1 Old 1	103	0.0300	State Government

Appendix – 7

Account Number	Khasra Number	Area (In Hec.)	Current Tenant as per Revenue Records
New 465 Old 1	102	0.0100	UIT
	128	0.0550	UIT
	129	0.1000	UIT
	95	0.0200	UIT
	64	0.2500	UIT
	21	0.0350	UIT

That the above-mentioned lands have, upon acquisition by HZL, been in its possession since the year 1988 (more than 30 years ago) and the said lands are continuously being used by HZL, and it has established its own structures on these lands, as well as a boundary wall. The said boundary wall was constructed about 25 years ago, which is confirmed from Google Map and other photographs and documents.

Due to the apathy of the revenue officers, these land parcels were not registered in the name of HZL, and the names of its old account holders remained in the records. That the above-mentioned entries are fiscal entries which as per law should be corrected and the name of HZL should be mentioned in the records.

HZL has prayed for a decree of declaration to be passed in favour of HZL and against Nandram & 23 Ors., to the effect that HZL is the account holder of the lands mentioned in Appendices 1 to 7 and that these land parcels as owned by HZL, which are situated within the boundary wall of HZL, should be recorded in the revenue records like Jamabandi, map trace and other relevant documents.

Apart from the above, no other litigation pending against the project and/or any direction / order passed by any Court of Law against the project and / or land in which the project is existing and the unit has not received any notice under the Section 5 of Environment (Protection) Act, 1986 or relevant Sections of Air and Water Acts. The undertaking regarding the same is given in this EIA/EMP Report as ***Annexure 18***.

Existing Clearance and Consents

Copy of the existing Environmental Clearance has been enclosed as ***Annexure - 1*** along with this EIA / EMP Report. Details regarding the existing Environmental Clearance, and Consents are given below in Table No. 1.1.

Table No. 1.1: Environmental Clearance and Consents

S. No.	Particular	Letter No & Date
Existing Environmental Clearances (EC)		
1.	Environment Clearance (EC) for expansion of Zinc Smelter (80,000 TPA to 1,00,000 TPA) at Village: Debari, Tehsil: Girwa, District: Udaipur (Rajasthan) was granted by MOEFCC, New Delhi	Vide Letter F.No.J-11011/479/2006-IA.II(I) 19.03.2008 ***(Annexure 1)***
S. No.	**Particular**	**Letter No & Date**
Consent To Establish (CTE)		
1.	CTE obtained from RSPCB for DG Sets 29.6 MW (4x7.4 MW) of M/s Hindustan Zinc Limited Zinc Smelter, Debari, Udaipur	Vide Letter F: 12(30-86) RPCB/Gr III/5701 dated: 20.01.2003. ***(Annexure 3a.)***
2.	CTE obtained from RSPCB for Expansion of Zinc Smelter (Zinc Metal: 59000 TPA – 80000 TPA, Sulphuric Acid: 1,30,000 TPA, Cadmium (Pencil & sphere: 250TPA) of M/s Hindustan Zinc Limited Zinc Smelter, Debari, Udaipur	Vide Letter F: 12(30-86) RPCB/Gr III/17178 dated: 19.01.2004. ***(Annexure 3b.)***
3.	CTE obtained from RSPCB for expansion of Zinc Smelter (Zinc Metal: 1,00,000 TPA; Sulphuric Acid: 14,19,000 TPA; Calcine: 4,45,000 TPA; Cadmium: 320 TPA) of M/s Hindustan Zinc Limited smelter, Debari, Udaipur	vide F.No. 12(30-86) RPCB/Gr II/49 dated 5.04.2008 ***(Annexure 3c.)***
S. No.	**Particular**	**Letter No & Date**
Current Consent To Operate (CTO)		
1.	CTO obtained from RSPCB for Zinc Smelter Debari (Zinc Metal: 80,000 TPA; Sulphuric Acid: 1,30,000 TPA; Cadmium (Pencils & spheres: 250TPA)	Vide Letter F: 12(30-86) RPCB/Gr III/11821 dated 03.07.2006 (Valid upto 01.12.2005 to 30.11.2006). ***(Annexure 4a)***
2.	CTO obtained from RSPCB for Zinc Smelter Plant (Zinc Metal: 1,00,000 TPA; Sulphuric Acid: 4,19,000 TPA; Calcine: 4,45,000 TPA; Cadmium: 320 TPA)	Vide Letter F: 12(30-86) RPCB/Gr II/2702 dated 17.09.2008 (Valid up to 31.03.2009). ***(Annexure4b)***

S. No.	Particular	Letter No & Date
3.	CTO obtained from RSPCB for Zinc Smelter Plant (Zinc Metal: 1,00,000 TPA; Sulphuric Acid: 4,19,000 TPA; Solar Power plant: 12.50 MW; Power generation from waste heat recovery: 8 MW; Calcine: 4,45,000 TPA; Cadmium: 320 TPA)	vide Order no. 2018-2019/CPM/5329 dated 17.09.2018. (Valid Upto 31.03.2022). ***(Annexure 4c)***
4.	CTO obtained from RSPCB for Zinc Smelter Plant (Zinc Metal: 1,00,000 TPA; Sulphuric Acid:4,19,000 TPA; Solar Power plant: 12.50 MW; Power generation from waste heat recovery: 8 MW; Calcine: 4,45,000 TPA; Cadmium: 320 TPA; Calomel: 15 TPA; Sodium Chloride:2,000 TPA; Sodium Sulphate: 16,500 TPA)	vide Order no. 2022-2023/HDF/9282 dated 17.03.2023 (Valid upto 31.03.2027). (***Annexure 4d)***
5.	CTO for Treatment of Stock Piled Moore Cake (Maximum Oxide Production 50 TPD) (200 TPD)	Vide Letter F: 12(30-488) RPCB/Gr III/902 dated 12.05.2004. (***Annexure 4e)***
6.	CTO for stockpiled Moore cake treatment plant Raw Zinc Oxide Powder (50 TPD)	vide order no. 2018-2019/CPM/5310 dated 27.08.2018 (Valid Upto 31.05.2023) ***(Annexure 4f)***
7.	CTO for stockpiled Moore cake treatment plant Raw Zinc Oxide Powder (50 TPD)	vide order no. 2023-2024/HDF/9464 dated 09.10.2023 (Valid Upto 31.05.2028). ***(Annexure 4g)***
8.	CTO for DG Set (2x7.4 MW) 14.80 MW	vide order no. 2019-2020/CPM/5509 dated 30.08.2019. ***(Annexure 4h)***
9.	CTO issued for Central Hospital Zinc smelter Debari Plant (16 Beds)	vide order no. 2021-2022/Udaipur/8773 dated 21.01.2022 (Valid Upto 30.04.2027) ***(Annexure 4i)***
10.	CTO issued for Zinc Smelter Debari Colony STP plant (66,800 Sq. meter), Plot Area (61.03 ha)	vide order no. 2019-2020/HSW/6435 dated 11.11.2019 ***(Annexure 4j)***

DETAILS OF EXISTING UNITS WITH PRODUCTION CAPACITY AND STATUS OF EC/CTOs

S. No.	Products	Unit	Production Capacity				Reference	Status of Implementation
			Existing					
			As per EC		Operating			
			Capacity	Configuration	Capacity	Configuration		
A.	**Products:**							
1.	Zinc metal Special High Grade/High Grade Zinc Cathode/Ingot Zinc Alloys etc.	TPA	1,00,000	1 x 1,00,000	1,00,000	1 x 1,00,000	• EC vide no. J-11011/479/2006-IA.II(I) dated 19.03.2008 (***Annexure-1a*** of Final EIA/EMP Report) • CTO vide Order no. 2022-2023/HDF/9282 dated 17.03.2023 (***Annexure-4d*** of Final EIA/EMP Report).	***Implemented***
2.	Raw Zinc Oxide (RZO)	TPA	NIL	NIL	17500	1 x 17500	• CTO vide order no. 2023-2024/HDF/9464 dated 09.10.2023 (***Annexure-4g*** of Final EIA/EMP Report)	***Implemented***
B.	**By Products/ Intermediate Product**							
3.	Sulphuric Acid	TPA	4,19,000	1x 44474 (Roaster 1) 1 x 85526 (Roaster 2) 1 x 289000 (Roaster 3)	3,74,526	1 x 85526 (Roaster 2) 1 x 289000 (Roaster 3)	• EC vide no. J-11011/479/2006-IA.II(I) dated 19.03.2008 (***Annexure-1a*** of Final EIA/EMP Report) • CTO vide Order no. 2022-2023/HDF/9282 dated 17.03.2023 (***Annexure-4d*** of Final EIA/EMP Report).	***Implemented***
4.	Calcine	TPA	4,45,000	1 x 47902 (Roaster 1) 1 x 97098 (Roaster 2) 1 x 300000 (Roaster 3)	3,97,098	1 x 97098 (Roaster 2) 1 x 300000 (Roaster 3)	• EC vide no. J-11011/479/2006-IA.II(I) dated 19.03.2008 (***Annexure-1a*** of Final EIA/EMP Report) • CTO vide Order no. 2022-2023/HDF/9282 dated 17.03.2023 (***Annexure-4d*** of Final EIA/EMP Report).	***Implemented***
5.	Cadmium metal / Sponge (equivalent metal)	TPA	320	1 x 320	320	1 x 320	• EC vide no. J-11011/479/2006-IA.II(I) dated 19.03.2008 (***Annexure-1a*** of Final EIA/EMP Report) • CTO vide Order no. 2022-2023/HDF/9282 dated 17.03.2023 (***Annexure-4d*** of Final EIA/EMP Report).	***Implemented***
6.	Calomel	TPA	NIL	NIL	15	1 x15	• CTO vide Order no. 2022-2023/HDF/9282 dated 17.03.2023 (***Annexure-4d*** of Final EIA/EMP Report).	***Implemented***

S. No.	Products	Unit	Production Capacity				Reference	Status of Implementation
			Existing					
			As per EC		Operating			
			Capacity	Configuration	Capacity	Configuration		
7.	Sodium Sulphate/ Chloride/ Compound	TPA	NIL	NIL	18500	18500	• CTO vide Order no. 2022-2023/HDF/9282 dated 17.03.2023 ***(Annexure-4d*** of Final EIA/EMP Report).	***Implemented***
C. Power								
8.	Solar Power Plant	MW	-	-	12.5	1 x 12.5	• CTO vide Order no. 2022-2023/HDF/9282 dated 17.03.2023 ***(Annexure-4d*** of Final EIA/EMP Report).	***Implemented***
9.	WHRB	MW	-	-	8	1 x8	• CTO vide Order no. 2022-2023/HDF/9282 dated 17.03.2023 ***(Annexure-4d*** of Final EIA/EMP Report).	***Implemented***
10.	DG Sets	MW	-	-	14.80	2 x 7.4	• CTO vide Order no. 2019-2020/CPM/5509 dated 30.08.2019 ***(Annexure-4d*** of Final EIA/EMP Report).	***Implemented***

Note: All old CTEs/CTOs/ HW Authorization has already been enclosed as ***Annexures 3*** (Page no. 393-401)***, Annexure 4***(Page no. 402-450)***, & Annexure 5*** (Page no. 451-457) of Final EIA/EMP Report.

C. *Project Proposal*

Hindustan Zinc Ltd. has proposed for Expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) through modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time at Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan)".

In line with the Ministry's O.M. dated 11th April, 2022 regarding grant of EC under para 7(ii) of EIA Notification, 2006, amended from time to time, the EIA/EMP Report has been prepared for "expansion of Zinc Smelter from 1,00,000 TPA to 1,40,000 TPA (in 2 phases) through modernization of process by installing new state-of-the-art with the latest technology equipment to improve efficiency" as per Standard TOR Points for carrying out the Environmental Impact Assessment (EIA) study.

Details of the production capacities before and after expansion are as given in Table - 1.2:

Table - 1.2: Project Proposal for Expansion

S. No.	Products	Unit	Production Capacity & Configuration										Remarks
			Existing				Additional				Total after expansion		
			As per EC		Operating		Phase I		Phase II		Capacity	Configuration	
			Capacity	Configuration	Capacity	Configuration	Capacity	Configuration	Capacity	Configuration			
1.	Zinc metal Special High Grade/High Grade Zinc Cathode/Ingot Zinc Alloys etc.	TPA	1,00,000	1 x 1,00,000	1,00,000	1 x 1,00,000	20,000 (20%)	1 x 20,000	20,000 (20%)	1 x 20,000	1,40,000	1 x 1,40,000	Expansion through Modernization of process by installation of new state of art with latest technology equipment's to improve efficiency. Recovery, reduction in power consumption & GHG emission as well as elimination of manual activities.

M/s. Hindustan Zinc Limited is proposing the expansion of existing plant from 1,00,000 TPA to 1,40,000 TPA. This expansion will be carried out in 2 phases, in 1st phase the capacity expansion will be achieved upto 1,20,000 TPA (20%) through modernization with installation of state of art jumbo cell house, higher capacity reactors & thickeners in L&P section and Roaster. In the 2nd Phase, capacity will be further increased upto 1,40,000TPA (40%) by debottlenecking, improvement in current, melting efficiency & metal recovery.

This will result into improvement in metal recovery, recovery of minor metals & reduction in specific power, fresh water, GHG emissions. This could be done by installation of New cellhouse equipped with fully automated Crane, Auto stripping machine, Anode flattening machine along with highly efficient rectifiers and transformers to meet the requirement at electrolysis New Leaching & Purification plant will be installed equipped with series of reactors, thickeners, Spiral Heat Exchanger and automatic filter press. Further to ensure the SHG grade final finished good production, installation of new 24 TPH M&C will be done. In addition to this roaster of capacity 300000 TPA calcine is proposed to be installed along with Sulphuric acid plant capacity of 289000 TPA to treat the SO2 laden off gases from proposed roaster within the existing premises of Debari Zinc Smelter. Details of the By-products are given as under:

S. No.	Products	Unit	Production Capacity										Remarks
			Existing				Additional				Total after expansion		
			As per EC		Operating		Phase I		Phase II		Capacity	Configuration	
			Capacity	Configuration	Capacity	Configuration	Capacity	Configuration	Capacity	Configuration			
1.	Raw Zinc Oxide (RZO)	TPA	NIL	NIL	17500	1 x 17500	NIL	NIL	NIL	NIL	17500	1 x 17500	Operating as per CTO No Change
2.	Sulphuric Acid	TPA	4,19,000	1x 44474 (Roaster 1) 1 x 85526 (Roaster 2) 1 x 289000 (Roaster 3)	3,74,526	1 x 85526 (Roaster 2) 1 x 289000 (Roaster 3)	79500 (18.97%)	1 x 289000 (New Roaster)	79500 (18.97%)	NIL	578000	1 x 289000 (Roaster 3) 1 x 289000 (New Roaster)	Existing granted quantity as per EC & CTO is 419000 TPA. However, existing operating capacity is 3,74,526TPA, as the Roaster 1 has been dismantled. Roaster 2 will also be dismantled after stabilization of new Roaster
3.	Calcine	TPA	4,45,000	1 x 47902 (Roaster 1) 1 x 97098 (Roaster 2) 1 x 300000 (Roaster 3)	3,97,098	1 x 97098 (Roaster 2) 1 x 300000 (Roaster 3)	77,500 (17.42 %)	1 x 300000 (New Roaster)	77,500 (17.42 %)	NIL	6,00,000	1 x 300000 (Roaster 3) 1 x 300000 (New Roaster)	Existing granted quantity as per EC & CTO is 445000 TPA. However, existing operating capacity is 397098 TPA, as the Roaster 1 has been dismantled. Roaster 2 will also be dismantled after stabilization of new Roaster
4.	Cadmium metal / Sponge	TPA	320	1 x 320	320	1 x 320	62 19.37%)	1 x 62	62 (19.37%)	1 x 62	444	1 x 444	Increase in production capacity due to change in concentrate quality

S. No.	Products	Unit	Production Capacity										Remarks
			Existing				Additional				Total after expansion		
			As per EC		Operating		Phase I		Phase II		Capacity	Configuration	
			Capacity	Configuration	Capacity	Configuration	Capacity	Configuration	Capacity	Configuration			
	(equivalent metal)												
5.	Calomel	TPA	NIL	NIL	15	1 x15	3 (20%)	1 x 6	3 (20%)	Nil	21	1 x 21	Increase in production capacity for waste utilization
6.	Sodium Sulphate/ Chloride/ Compound	TPA	NIL	NIL	18500	18500	2500 (13.51%)	1 x 6700 R3 TGT 1 x 8400 New Roaster TGT1 x 8400	2500 (13.51%)	NIL	23500	1 x 6700 R3 TGT 1 x 8400 New Roaster TGT1 x 8400	Increase in production capacity for waste utilization

D. Screening Category

As per EIA Notification dated 14thSept., 2006, as amended from time to time; the project falls under S. No. 3 (Material Production), Category "A", Project or Activity *'3(a)'-Metallurgical Industries (ferrous & non–ferrous).*

***E. Compliance of the criteria given in MOEFCC, OM* dated 11th April., 2022, para 4(i-ix)**

In reference to the MOEFCC's O.M. dated 11th April., 2022 regarding grant of EC under para 7(ii) of EIA Notification, 2006, amended from time to time for which EIA/EMP Report has been prepared as per Standard TOR Points for "Proposed Expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) through modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time At Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan)" by M/s. Hindustan Zinc Limited.

Point wise compliance of *the criteria given in MOEFCC, OM* dated 11th April., 2022, para 4(i-ix) *has been given as under:*

S.No.	Criteria	Reply
1.	Project should have gone through the public hearing process, at least once, for its existing EC capacity on which expansion is being sought, except those category projects which have been exempted as per para 7 III(i) of EIA Notification 2006 and its amendments.	The Public Hearing has been conducted for the project on 30.04.2007, for expansion of Zinc Smelter (80,000 TPA to 1,00,000 TPA) at Village: Debari, Tehsil: Girwa, District: Udaipur (Rajasthan).
2.	There should not be change in category of the project from 'B2' to 'B1' or 'A' due to proposed modernization or expansion.	The category of the project will remain "A" for the proposed expansion project.
3.	There is no additional land acquisition or forest land diversion involved for the proposed expansion or there is no increase in lease area with regard to mining vis-a-vis the area mentioned in the EC, based on which public hearing has been held earlier.	• Initially, the Honorable Governor of the State of Rajasthan granted lease of 427 Acres (172.79 Ha) in 1962 for 99 years under the provisions of the Rajasthan Industrial Areas Allotment Rules, 1959, framed under Section 100 of the Rajasthan Land Revenue Act, 1956, which includes 98.74 hectares (244.01 Acres) vide lease dated 29.01.1962, 13.02 hectares (32.18 Acres) vide lease dated 26.03.1962 and 61.03 hectares (150.81 Acres) vide lease deed dated 26.03.1962 respectively. HZL commissioned the referred Zinc Smelter unit in 1968. Hindustan Zinc Limited, whilst being an erstwhile public sector undertaking, acquired additional land from nearby villages in and around the 1990s, for the purpose of its operations. • Plant and colony was established in 1968, and being used for non-forest purpose before the Forest (Conservation) Act, 1980, came into effect, therefore Forest Clearance was not applicable for Zinc Smelter Debari. • As per Hon'ble Supreme Court orders (State Of Bihar vs Banshi Ram Modi & Ors, 7.05.1985), "forest area which is broken up or cleared before the commencement of the Act,

S.No.	Criteria	Reply
		prior approval of the Central Government in terms of Section 2 of the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 is not required and it would be required, when lease granted before the commencement of the said Act, is renewed after its coming into force. During the continuance of the lease period, the approval of the Central Government under Section 2 of the said Act is not required. • In this case also, prior approval under Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980, will only be required during renewal of Zinc Smelter Debari's lease i.e. 2061. At present, the lease of the unit is valid and in continuance. • Environment Clearance (EC) for expansion of Zinc Smelter (80,000 TPA to 1,00,000 TPA) at Village: Debari, Tehsil: Girwa, District: Udaipur (Rajasthan) was granted by MOEFCC, New Delhi vide F.No.J-11011/479/2006-IA.II(I) 19.03.2008 for total land area of 190.05 ha. CTE for the same was obtained from RSPCB vide F.No. 12(30-86) RPCB/Gr II/49 dated 5.04.2008 followed by CTO vide Letter F: 12(30-86) RPCB/Gr II/2702 dated 17.09.2008. The plant is in operation as per renewed CTO obtained from RSPCB vide Order no. 2022-2023/HDF/9282 dated 17.03.2023 (Valid upto 31.03.2027). • Subsequent to the above, M/s. Hindustan Zinc Limited proposed for the Expansion of Zinc Smelter (1,00,000 TPA to 1,40,000 TPA) through Modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time At Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan). While submitting the online application along with kml file of the Plant area on the Parivesh portal, it was found that: • Some part of land covering, security colony, substation, some plantation etc. is showing under forest land. Upon observing this discrepancy, for further verification of the referred land, we consulted DCF-Udaipur (North Region) and found a reflection of the same in the Decision Support System. This is contrary to the revenue records as are in place, since in the same, this land parcel as which is part of the lease deed awarded to HZL in 1962, for 99 years, is recorded in HZL's name. • After further enquiry with the revenue and forest departments it was found that the total area of Zinc Smelter Debari complex (Plant and Colony) comes out to be 184.2 ha (instead of 190.05 Ha mentioned in the EC letter). Remaining 5.85 Ha area falls outside the physical boundary Plant area (129 Ha) & Residential colony area (55.2 Ha). Hence, 184.2 Ha area is considered as projects area for this proposal. • Out of this 129 ha of plant area, as per the information available with Forest department, 1.77 ha of Khasara No. 4522

S.No.	Criteria	Reply
		and 5.20 ha of Khasra No. 4523 falls under Kantiya Forest (total area – 292 ha), which was notified as reserve forest by Mewar Government on 27.12.1947. • Similarly, out of 55.2 ha. of colony area, 11.60 ha of Kasara No. 4509, 2.40 Ha. of Khasara No. 4510 and 2.46 Ha of Khasara No. 4511 falls under Panwadi Forest (total area 225 ha), which was notified as reserve forest by Mewar Government on 21.02.1943. • Whereas, Old revenue records of Sanwat 2051 (Year 1994) are showing above khasras No. 4522, 4523, 4509, 4510, 4511 as factory area. • In this regard, DCF-Udaipur (North Region) vide Letter No. F()Survey/Uvas-Uttar/2023-24/6317 dated 22.09.2023 confirmed that there is no presence of forest land in the 121 Hectares of land as within Hindustan Zinc Limited's Zinc Smelter Debari, Udaipur, and that this does not fall within any forest area. • It is to be noted that Hindustan Zinc Limited will maintain status quo as far as the claimed forest land is concerned, and no activities are proposed to or will be carried out in this area without obtaining requisite clarity on the discrepancy or necessary approvals for the same. • The proposed expansion will be done within the existing plant premises. No additional land acquisition will be required for the proposed expansion.
4.	The proposed expansion shall not be more than 50% of production capacity as mentioned in the prior EC, issued on the basis of public hearing held and the same shall be allowed in minimum three phases.	M/s. Hindustan Zinc Limited is proposing the expansion of existing plant from 1,00,000 TPA to 1,40,000 TPA. This expansion will be carried out in 2 phases, in 1st phase the capacity expansion will be achieved upto 1,20,000 TPA (20%) through modernization with installation of state of art jumbo cell house, higher capacity reactors & thickeners in L&P section and Roaster. In the 2nd Phase, capacity will be further increased upto 1,40,000TPA (40%) by debottlenecking, improvement in current, melting efficiency & metal recovery. This will result into improvement in metal recovery, recovery of minor metals and reduction in specific power, fresh water, GHG emissions. M/s. Hindustan Zinc Limited is hereby proposing for "Proposed Expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) through modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time At Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan)".
5.	Predicted environmental quality parameters arising out of proposed expansion/ modernization shall be within the prescribed norms and	Predicted environmental quality parameters arising out of proposed expansion are within the prescribed norms. Details given as under: Ground Level Concentrations (Incremental & Resultant) for Proposed expansion project

<table>
<tr><th>S.No.</th><th>Criteria</th><th>Reply</th></tr>
<tr><td></td><td>the same shall be maintained as per prescribed norms.</td><td>
<table>
<tr><th rowspan="2">Particular</th><th colspan="3">Concentration (µg/m3)</th><th rowspan="2">CPCB NAAQS Standards µg/m3</th></tr>
<tr><th>Baseline</th><th>Incremental</th><th>Resultant</th></tr>
<tr><td>PM10</td><td>81.7</td><td>2.23</td><td>83.93</td><td>100</td></tr>
<tr><td>PM2.5</td><td>42.6</td><td>0.89</td><td>43.49</td><td>60</td></tr>
<tr><td>SO2</td><td>15.3</td><td>7.15</td><td>21.95</td><td>80</td></tr>
<tr><td>NO2</td><td>26.3</td><td>4.88</td><td>31.18</td><td>80</td></tr>
<tr><td>CO</td><td>980</td><td>0.93</td><td>980.93</td><td>4000</td></tr>
</table>
</td></tr>
<tr><td>6.</td><td>The proposed expansion should not result in reduction in greenbelt area as stipulated in earlier EC, or if the existing ratio of greenbelt is more than 33%, after expansion it should not reduce below 33%.</td><td>Noted and agreed to.
Out of the total plant area 184.2 ha, 76.28 ha (41.41%) area has already been developed under greenbelt/ plantation. The same will be maintained and strengthened by doing gap plantation for the proposed expansion.</td></tr>
<tr><td>7.</td><td>The project proponent should have satisfactorily complied the conditions stipulated in the existing EC(s) and satisfactorily fulfilled all the commitments made during the earlier public hearing/ consultation proceedings and also the commitments given while granting previous expansion, as may be applicable.
This shall be duly recorded in the certified compliance report issued by the IRO/CPCB/SPCB, which should not be more than one year old at the time of submission of application.</td><td>Status of Implementation of the commitments made during earlier Public Hearing has been enclosed with the EIA/EMP Report as Annexure 15. Certified compliance report of the conditions stipulated in the EC letter has been obtained from IRO, MOEFCC, Jaipur vide letter no. IV/ENV/R/IND-104/720/2009 dated 04.12.2023. Copy of the same has been enclosed as Annexure 2 of the EIA/EMP Report.</td></tr>
<tr><td>8.</td><td>Public consultation shall be undertaken (if applicable as per table below) by obtaining response in writing, as per para 7 III (ii)(b) of EIA Notification 2006, except those categories of projects which have been exempted as per para 7 III(i) of EIA Notification 2006 and its amendments.</td><td>This expansion will be carried out in 2 phases, in phase -1 capacity expansion will be achieved up to 1,20,000 TPA (20%) through modernization with installation of state of art jumbo cell house, higher capacity reactors & thickeners in L&P section and Roaster. In the Phase-2, capacity will be further increased up to 1,40,000TPA (40%) by debottlenecking and improvement in current & melting efficiency and metal recovery.
This will result into improvement in metal recovery, recovery of minor metals and reduction in specific power, fresh water, GHG emissions.
However, as per para 5 (II) of OM dated 11.04.2022, the proposed expansion is exempted from public consultation.</td></tr>
<tr><td>9.</td><td>Effluent monitoring including air quality monitoring systems as specified in the existing EC, if stipulated, should have been installed.</td><td>Effluent Monitoring as well as Air quality monitoring systems have already been installed in line with the conditions stipulated in existing EC and Consents.</td></tr>
</table>

F. Compliance of the criteria given in MOEFCC, OM dated 11th April., 2022, para 5

As per the compliance of the criteria given in MOEFCC, OM dated 11th April., 2022, para 5 current proposal scenario falls under Scenario II which are given under here as:

Scenario	Intended change through modernization/change of product mix/expansion	Requirement of revised EIA/EMP Report	Requirement of Certified Compliance Report	Requirement of Fresh Public Consultation	Whether reference to Appraisal Committee is required
II	Up to 20 percent based on environmental safeguards conditions.	Yes	Yes	No	Yes
	Compliance of the Requirement	EIA/EMP Report has been uploaded as Enclosure pt. no. 21.1 of Form 1 Part C	CCR of EC Conditions has been uploaded in point no. 20.3 of Form 1 Part C along with the Application of EC	Not Applicable for this proposal	To be Done

Note: *The EIA/EMP Report has been prepared for expansion of Zinc Smelter from 1,00,000 TPA to 1,40,000 TPA (in 2 phases) through modernization of process by installing new state-of-the-art with the latest technology equipment to improve efficiency.*

G. Additional Details Sought (ADS) Reply:

The proposal has been submitted on PARIVESH Portal dated 19.07.2024 & it was considered in EAC (Industry I) Meeting dated 16.10.2024 (Agenda item No. 67.14) and the proposal was deferred for ADS. An ADS has been generated on 23.10.2024 and the ADS reply details are given as under:

<table>
<tr><th>S.No.</th><th>ADS Point Raised</th><th>ADS Point Reply</th></tr>
<tr><td>1.</td><td>The PP reported that as per the existing EC letter dated 19.03.2008, the total project area of Zinc Smelter Debari is 190.05 Ha. Out of which 5.88 Ha falls outside physical boundary of Plant area (129 Ha) & Residential colony area (55.2 Ha). Hence, 184.2 Ha area has been considered as the project area for this expansion proposal. Proposed expansion will be done within the existing plant premises. Hence, no additional land is required. Total project area is 184.2 ha. The EAC noted that there is reduction in project area and PP has also not obtained any amendment in EC in this regard. Since PP has applied for expansion under the provisions of para 7(ii) of EIA Notification, 2006 and as per the criteria no.</td><td>The total project area as per the last EC is 190.05 ha. The Map showing the total project area i.e. 190.05 ha including Plant area, Colony area as well as the land patched outside the Plant & Colony is given in the Chapter 2 of the Revised Final EIA/EMP Report.

Patches wise area breakup details of the total project area has been given as under for your kind perusal:
<table>
<tr><th>Particular</th><th>Area (Hectare)</th></tr>
<tr><td>Patch 1</td><td>0.42</td></tr>
<tr><td>Patch 2</td><td>0.54</td></tr>
<tr><td>Patch 3</td><td>0.38</td></tr>
<tr><td>Patch 4</td><td>0.12</td></tr>
<tr><td>Patch 5</td><td>2.17</td></tr>
<tr><td>Patch 6</td><td>1</td></tr>
<tr><td>Patch 7</td><td>0.12</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>S.No.</th><th>ADS Point Raised</th><th>ADS Point Reply</th></tr>
<tr><td></td><td>iii and vi of para 4 of MoEF&CC's OM dated 11.04.2022, pertaining to Guidelines for granting Environment Clearance(EC) under para 7(ii)(a) of EIA Notification, 2006, for expansion up to 50%, within the existing premises/ mine lease area, without additional land acquisition, there shall be any addition in the project land area or reduction in the greenbelt area. In view of the same, the EAC sought clarification from PP w.r.t. the change in the project land area and greenbelt area in pursuance to MoEF&CC's OM dated 11.04.2022.
EAC mentioned that the proposal can be appraised for 190.05 Ha area only, and also asked PP to upload updated kml file for the project land area of 190.05Ha.</td><td><table><tr><td>Patch 8</td><td>1.1</td></tr><tr><td>Colony Area</td><td>55.2</td></tr><tr><td>Plant Area</td><td>129</td></tr><tr><td>Total</td><td>190.05</td></tr></table></td></tr>
<tr><td>2.</td><td>The EAC noted that out of the total reported project area of 184.2 ha, 23.43 ha is a forest land. PP reported that the Honourable Governor of Rajasthan granted Hindustan Zinc Limited (HZL) a 99-year lease for 427 acres (172.79 hectares) in 1962, including several parcels of land for establishing its Zinc Smelter. The plant was commissioned in 1968, before the Forest (Conservation) Act, 1980, making Forest Clearance inapplicable at that time. According to a Supreme Court order, prior approval under the Forest (Conservation) Act is not required for forest land cleared before the Act's commencement unless the lease is renewed after the Act took effect. For Zinc Smelter Debari, this approval will only be needed upon lease renewal in 2061. The current lease remains valid. Given the critical nature of the issue related to forest</td><td>In line with the said point, detailed note regarding the status of the project land including forest land along with supporting documents has been enclosed as ***Annexure 8*** with the Revised Final EIA/EMP Report.</td></tr>
</table>

S.No.	ADS Point Raised	ADS Point Reply
	land, the EAC advised Industry-1 sector to obtain comments from the FC Division of MoEF&CC for this case.	
3.	The EAC deliberated on the water utilisation and requested the project proponent to conduct a detailed water utilization apportionment study for the proposed expansion project. The study should include the current water consumption, the additional requirement due to expansion, and the availability of water resources, along with the impact on local water bodies and communities. The proponent is advised to submit a clear plan for optimizing water usage and explore possibilities for recycling and reuse to minimize the demand for fresh water.	The existing water requirement for the project is 8000 KLD, including 7100 KLD (6950 KLD for Industrial purpose + 150 KLD for Domestic purpose) for the Plant and 900 KLD for the residential colony. The water requirement is being met by Mansi Wakal Dam, 40 MLD STP Plant & 20 MLD STP Udaipur. As per the Application for EC submitted for the expansion project on 19.07.2024, the additional water requirement for the proposed expansion project was considered as 3800 KLD, making the total water requirement after proposed expansion as 9046 KLD. In line with the ADS Point number 3, the additional water requirement for the proposed expansion project has been reassessed and reduced from 3800 KLD to 1046 KLD, resulting in total water requirement after the proposed expansion as 9046 KLD. The additional water requirement has been reduced by considering the following measures proposed for the expansion project: ✓ Air Cooled Condenser ✓ Seal water recirculation system ✓ Condensate recovery system in L&P ✓ Replacement of fresh water by process solution in flocculant & Classifier ✓ Membrane type element in FP Revised water balance diagram for the expansion project is given in the Chapter 2 of Revised Final EIA/EMP Report. No additional fresh water is required for proposed expansion project as the additional water (1046 KLD) will be sourced from Udaipur STP. No ground water abstraction is being & will be done for the proposed expansion project.

S.No.	ADS Point Raised	ADS Point Reply
		Apart from the above the following mitigation measures are being and will be adopted to ensure no adverse impact on the nearby water bodies due to the expansion project: ✓ The 1st surface runoff during monsoon within the plant site will be diverted through the drains to the water harvesting pond which prevents the runoff of the plant from mixing into the nearby water bodies. ✓ The waste water generated from plant and colony is being and will be treated in the respective ETP and STP and will be recycled within the premises. ✓ No wastewater is being and will be discharged outside the plant premises as HZL is maintaining Zero Liquid Discharge and after expansion also it will continue to be a zero Liquid discharge facility.
4.	The EAC noted that the traffic study submitted by the project proponent does not provide a comprehensive picture of the potential impacts post-expansion. The committee requested the proponent to submit a detailed traffic impact assessment, including projected vehicular load due to the expansion, potential traffic congestion, and the resulting impact on air quality and road safety. Additionally, the proponent should provide mitigation measures to minimize pollution, such as optimizing traffic flow, dust control mechanisms, and measures to reduce emissions from vehicles.	The Traffic Study details including projected vehicular load due to the expansion, potential traffic congestion, and the resulting impact on air quality and road safety along with the mitigation measures to minimize pollution, such as optimizing traffic flow, dust control mechanisms, and measures to reduce emissions from vehicles are given in the Chapter 4 of the Revised Final EIA/EMP Report.
5.	PP reported that as per the authenticated list, total 9 Schedule 1 species i.e., Panthera pardus (Leopard), Vulpes bengalensis (Indian Fox), Canis aureus (Golden Jackal),	HZL taken several initiatives to avoid impact on reserve forest by strengthening plantation of local species towards forest boundary adjacent to our colony boundary and other area. By ensuring display boards of

S.No.	ADS Point Raised	ADS Point Reply
	Felis chaus (Jungle Cat), Herpestes smithii (Ruddy Mongoose), Hyaena hyaena (Striped Hyena), Hystrix indica (Indian Crested Porcupine), Daboia russelii (Russell's Viper), Pavo cristatus (Indian Peafowl) found within the study area during survey & budget of Rs. 25 crores have been allocated for the conservation of Schedule I species within the study area of plant site. Wildlife conservation plan has been prepared and the same has been submitted for authentication to DCF, Udaipur (North), dated 30.07.2024. However, the EAC noted that the conservation plan approval is still pending. Furthermore, it was observed that as per the Specific Condition vii. of the earlier EC dated 19th March 2008, the PP was required to prepare and implement a conservation plan in consultation with the State Forest Department, which remains non-compliant. The EAC sought clarification on this non-compliance.	speed limit, training and awareness on biodiversity conservation in nearby schools and community. Some of the activities carried out by the unit for conservation of wild fauna around premises in consultation with Forest Department are given as under: ✓ Biodiversity study of Flora, Fauna, & butterfly for Zinc Smelter, Debari within 10 Km radius have been completed by the expert. ✓ Display board for awareness indicating conservation of wild fauna. ✓ 1000 nos. of medicinal plants have been planted in colony. ✓ Preservation of trees and shrubs for providing better niche for the animals. ✓ Installation of artificial nesting of Birds to promote Biodiversity conservation has been proposed. ✓ Awareness program has been conducted for employees and their families on the occasion of Sparrow Day, Water Day, Biodiversity Day, Earth Day & World Environment Day. the company carries out the above activities in consultation with local forest department. The correspondence done with the forest department regarding the same and the minutes of Metting held with DCF, Udaipur dated 17.08.2021 along with some of the photographs of the activities undertaken by HZL are enclosed as Annexure 19 with the Revised EIA/EMP Report.
6.	PP reported that Hindustan Zinc Limited (HZL) has filed a suit [Case Title: HZL vs Nandram & Ors. (Case No. 117/204)] before SDO/SDM Court, Girwa, Udaipur against Nandram & 23 others under Rajasthan Tenancy Act, 1955 for mutation and correction of revenue records. The land of	Case Title: HZL vs Nandram & Ors. (Case No. 117/2024) is currently pending before the SDO/SDM Court, Udaipur for hearing: • **Implication of the final Court order, if it is passed in Hindustan Zinc Limited's ('HZL') favour:** If the SDO/SDM court passes the order in favour of HZL, then this order will be further referred to the Tehsil

S.No.	ADS Point Raised	ADS Point Reply
	the following appendices is situated in Revenue Village – Bichdi, Teh. Kurabad, Udaipur, and these land parcels were acquired by HZL but the revenue records as on date do not reflect the same. The EAC advised the PP to submit details on the potential implications of the case outcome on the proposed project.	office and after inspecting the land parcels and taking any other action as may be required in line with the same, the current Jamabandis which are at present incorrectly in the name of other title holders, will be transferred to the name of HZL and the mutation of the relevant title records will accordingly be done. • **Implication of final Court order, if it is passed against HZL:** If the declaration suit, as filed by us is rejected by the SDO/SDM Court, then an appeal will be filed against the said order before the relevant appellate forum, in challenge of the concerned order. **Please note the following:** • The land area/Khasras, which are part of the Declaration suit are not part of the proposed expansion project area. The land parcels, which are part of the proposed expansion project area are already in the name of the HZL and clear title/mutation of these land parcels is with HZL, with no challenge from any individual or entity. • The land parcels, which are part of the Declaration suit have, upon acquisition by HZL, been in its possession since the year 1988 (more than 30 years ago) and the said lands have been continuously used by HZL, and it has established its own structures on these lands in accordance with law and due permissions, for over 25 years, which stands confirmed from certified photographs and documents in this regard. • Furthermore, it is to be noted that the outcome of the filed Declaration suit will not have any negative impact on the proposed expansion project.
7.	It is reported that Udai Sagar Lake (-1.0 km, SSW) has been listed as Wetland by State Wetland Authority, Rajasthan, 3 seasonal nallahas are passing through the plant site, which have run off water from the nearby hill in west direction during rains only. The	The application for obtaining NOC regarding the proximity of the Udai Sagar Lake (~1.0 km, SSW) from the Project site has been submitted to the Rajasthan State Wetland Authority (RSWA) on 24.10.2024. The matter is under process with the authority. Copy of the correspondence done with RSWA on this matter is

S.No.	ADS Point Raised	ADS Point Reply
	EAC noted that the Hon'ble Supreme Court has directed in many cases for wetlands conservation, and considering the same, the Committee advised PP to obtain NOC from the State Wetland Authority. PP shall prepare and provide details about the wetland conservation plan.	enclosed as ***Annexure 20*** with the Revised Final EIA/EMP Report.
8.	The EAC sought a detailed mass balance of toxic elements such as mercury (Hg), cadmium (Cd), and nickel (Ni) for the proposed project. This should include source, distribution, and potential environmental pathways, along with mitigation measures to manage and control any potential risks associated with these elements. PP shall present the same during next appraisal.	A detailed mass balance of toxic elements such as mercury (Hg), cadmium (Cd), and nickel (Ni) for the proposed project including the source, distribution, and potential environmental pathways, along with mitigation measures to manage and control any potential risks associated with these elements is attached as ***Annexure 21*** with the Revised final EIA/EMP Report.
9.	The EAC advised the project proponent to submit a detailed plan for the management and disposal of spent electrolyte generated after the electrolysis process. This should include information on storage, treatment, recycling or disposal methods, and measures to ensure compliance with applicable environmental standards and regulations to prevent contamination.	The details regarding the storage, treatment, recycling or disposal methods, and measures to ensure compliance with applicable environmental standards and regulations to prevent contamination of spent electrolyte are enclosed as Annexure **22** of the Revised Final EIA/EMP Report.
10.	The EAC deliberated on the composition of sludge generated from the Effluent Treatment Plant (ETP) in relation to the proposed expansion project. Specifically, clarification shall be provided on the expected levels of toxic elements within the sludge and the treatment methods that will be implemented to manage it.	Composition of the ETP Sludge has been analysed by third party. Test Report of the same has been enclosed as ***Annexure 23*** with the Revised Final EIA/EMP Report. Heavy metals present in the ETP Sludge are precipitated by doing lime soda softening. Afterwards, the sludge is disposed in CTDF -Gudli (Udaipur). Same practice will be adopted for the proposed expansion project as well.
11.	The EAC opined that PP/Consultant has to revise the EIA/EMP Report along with all the details as per the provisions of the EIA	The EIA/EMP Report & the Proposal presentation is revised in compliance to the abovementioned ADS

S.No.	ADS Point Raised	ADS Point Reply
	Notification, 2006. The EAC further advised PP/Consultant to represent the case again with revised proposal presentation.	Points and uploaded on the PARIVESH Portal again for the kind perusal by Hon'ble EAC members.
12.	The EAC agreed to the request of PP/Consultant and allowed them to reappear after the revision of the application incorporating the desired information.	The application has been revised as per the above replies of ADS points.

1.2.2 Introduction of the Project Proponent

Project Proponent

M/s Hindustan Zinc Ltd. is one of the largest Lead-Zinc integrated producers & a Leading producer of silver with more than 60 years of experience in Mining & Smelting. Reserves & Resources of about 448 million Tones as on 31st March 2022 sufficient for more than 25 years of mine life. Clean Development Mechanism (CDM) projects on waste heat recovery & wind power have an annual Certified Emission Reduction potential of over 6.13 Lac TON of CO_2. Total Exchequer to Government till 31st March, 2023 was Rs. 24892 Crores, Crore including dividend of 9,422 Crore including royalty and taxes. HZL has established Sewage Treatment Plant at Udaipur under PPP model to treat 60 MLD sewage and utilize treated water in its operations. Vision to enhance the quality of life and economic wellbeing of the communities around its operations, mainly SAKHI, MARYADA, KHUSHI campaigns, Shiksha Sambal Project, Jeevan Tarang Program, Samadhan Program reaching over 1.4 million plus beneficiaries and 234 villages across Rajasthan.

M/s Hindustan Zinc Ltd (HZL) is part of the Vedanta conglomerate, which is recognized as one of the most successful producers of various non-ferrous metals in India. HZL is an India-based company, which is engaged in the mining and smelting of Zinc, Lead and Silver metal in India. The Company's segments are mining and smelting of Zinc, Lead and Silver and Wind energy. The Company's operations include five Zinc-Lead mines, over four Zinc Smelters, a Lead Smelter, a Zinc-Lead Smelter, a silver refinery plant and over six captive power plants in the state of Rajasthan. In addition, the Company also has a rock-phosphate mine in Maton near Udaipur in Rajasthan and Zinc, Lead, Silver processing and refining facilities in the State of Uttarakhand. The Company also has wind power plants in the States of Rajasthan, Gujarat, Karnataka, Tamil Nadu and Maharashtra. It has a metal production capacity of over one million tons per annum with its key Lead-Zinc mines in Rampura Agucha, Kayad, Sindesar Khurd, Rajpura Dariba, Zawar & smelting complexes in Debari, Chanderiya and Dariba, all in the state of Rajasthan while Silver Refinery and Lead Zinc Units at Pantnagar.

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

1.3.1 Brief Description of Nature, Size and Location of Project

Brief Description of Nature, Size and Location of the Project is given in Table - 1.3.

Table - 1.3: Brief Description of Nature, Size and Location of Project

S. NO.	PARTICULARS	DETAILS
A.	**Nature & Size of the Project**	M/s. Hindustan Zinc Limited is proposing the expansion of existing plant from 1,00,000 TPA to 1,40,000 TPA. This expansion will be carried out in 2 phases, in 1st phase the capacity expansion will be achieved upto 1,20,000 TPA (20%) through modernization with installation of state of art jumbo cell house, higher capacity reactors & thickeners in L&P section and Roaster. In the 2nd Phase, capacity will be further increased upto 1,40,000TPA (40%) by debottlenecking, improvement in current, melting efficiency & metal recovery. This will result into improvement in metal recovery, recovery of minor metals and reduction in specific power, fresh water, GHG emissions. M/s. Hindustan Zinc Limited is hereby proposing for "Proposed Expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) through modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time At Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan)" .
1.	**Total area**	
	Total Plant area	Total Plant Area: - 184.2 ha (129 ha plant area + 55.2 ha colony area)
	Greenbelt & Plantation area	Out of the total plant area of 184.2 ha, 76.28 ha (41.41%) area has already been developed under greenbelt/plantation. The same will be maintained and densed via gap plantation to achieve the plantation density @2500 trees/ ha.
B.	**Location Details**	
1.	Village	Debari and Bichhri
2.	Tehsil	Girwa
3.	District	Udaipur
4.	State	Rajasthan

S. NO.	PARTICULARS	DETAILS
5.	Latitude & Longitude	A: 24°36'28.25"N 73°48'51.06"E B: 24°36'7.67"N 73°49'26.92"E C: 24°35'30.90"N 73°49'37.68"E D: 24°36'11.89"N 73°48'32.26"E
6.	Toposheet No.	Core Zone: 45H/14(G43T14) Buffer Zone: 45H/10(G43T10), 45H/11(G43T11), & 45H/14(G43T14) & 45H/15(G43T15)

Source: Pre-Feasibility Report

1.3.2 Importance to the Country and Region

National Importance

Global Zinc consumption is expected to grow steadily by 4-5% per annum in coming years which needs to be met by higher mine & Smelter output. As India is one of the fastest growing economies in the World, adequate support from metal sector is essential to support & sustain infrastructure development & growth. Galvanized iron products play key role in infrastructure development and therefore the requirement of Zinc metal is essential, because zinc is used to prevent rusting of iron. Proposed expansion project shall augment the supply of Zinc to the domestic market for Industrial growth. The proposed expansion will generate additional direct employment of approximately 65 manpower. In addition to this 400 nos. of manpower are being used for projects and other improvement projects due to transport, workshop, garages and other services. Skill development & training programs to make local youth employable shall continue for the development of community.

Regional Importance

The demand for zinc in India is robust with 70% of it coming from galvanizing sector which is witnessing rising penetration of galvanized steel in domestic car models. The on-going restructuring of the steel industry and adherence to upcoming IS277 coating standards bodes well for zinc consumption in India. Alloys & die cast alloys have increasingly been finding applications across sectors. Zinc demand in India will be a beneficiary of higher construction spending with projects under metro rail, Smart Cities Mission and Swachh Bharat Abhiyaan (Clean India Mission) driving investments in urban infrastructure. Zinc is a very versatile non-ferrous metal. Zinc's different applications rank it as the 4th most common metal in use after iron, aluminum and copper. Global Zinc consumption has grown at a compound average annual rate of 2.4 % p.a. over the period 2016-2021. Global Zinc consumption is projected to grow to 20 Mt in 2035 representing average annual increase of 0.28 Mt.

1.4 SCOPE OF EIA STUDY

Scope of this study covers all the points given as per the reference to the Ministry's O.M. dated 11th April, 2022 regarding grant of EC under para 7(ii) of EIA Notification, 2006 for which EIA/EMP Report prepared as per Standard TOR Points. Point-wise compliance for the Standard ToRs for the project is given on Page no. 1 - 10 of this EIA/EMP Report.

Baseline Monitoring and data collection has been completed for the project during summer season (March, 2022 to May, 2022).

This EIA/EMP report includes total twelve chapters as per Appendix-III of the EIA Notification, 2006.

Chapter	Description
Chapter - 1	Introduction
Chapter - 2	Project Description
Chapter - 3	Description of the Environment
Chapter - 4	Anticipated Environmental Impacts and Mitigation Measures
Chapter - 5	Analysis of Alternatives (Technology & Site)
Chapter - 6	Environmental Monitoring Plan
Chapter - 7	Additional Studies
Chapter - 8	Project Benefits
Chapter - 9	Environment Cost Benefit Analysis
Chapter - 10	Environment Management Plan
Chapter - 11	Summary & Conclusion
Chapter - 12	Disclosure of Consultants Engaged

CHAPTER - 2

PROJECT DESCRIPTION

2.0 INTRODUCTION

This chapter deals with details of project which includes need of the project, location of the project site, size or magnitude of operation, requirements of the project, proposed schedule for approval and implementation, technology & process description, major equipment & machineries, infrastructural facilities, description of mitigation measures and assessment of new & tested technology for the risk of technological failure.

Site preparatory activities will be carried out at site (earmarked for the expansion project) within the plant premises, after obtaining all the statutory clearances/consents.

2.1 TYPE OF THE PROJECT

As mentioned in the previous chapter, the proposed project is an expansion project, which falls under Category 'A' projects as per the EIA Notification, 2006 & as amended from time to time; Project or Activity '3(a)'-Metallurgical Industries (ferrous & non–ferrous) in which the "Proposed Expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) through modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time At Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan)" by M/s. Hindustan Zinc Limited will be carried out within the existing plant premises and no additional area is required.

The expansion will be carried out in 2 phases, in 1st phase the capacity expansion will be done up to 1,20,000TPA (20%) along with Roaster installation and in the 2nd Phase, capacity will be further increased up to 1,40,000TPA (40%) by Modernization of process by installation of new state of art with latest technology equipment's to improve efficiency. Recovery, reduction in power consumption & GHG emission as well as elimination of manual activities.

This could be done by installation of New cellhouse equipped with fully automated Crane, Auto stripping machine, Anode flattening machine along with highly efficient rectifiers and transformers. To meet the requirement at electrolysis New Leaching & Purification plant will be installed equipped with series of reactors, thickeners, Spiral Heat Exchanger and automatic filter press. Further to ensure the SHG grade final finished good production, installation of new 24 TPH M&C will be done. In addition to this roaster of capacity 300000TPA calcine is proposed to be installed along with Sulphuric acid plant capacity of 289000 TPA to treat the SO_2 laden off gases from proposed roaster within the existing premises of Debari Zinc Smelter.

2.2 NEED FOR THE PROJECT

Global Zinc consumption is expected to grow steadily by 4-5% per annum in coming years which needs to be met by higher mine & Smelter output. As India is one of the fastest growing economies in the World, adequate support from metal sector is essential to support & sustain infrastructure development & growth. Galvanized iron products play key role in infrastructure development and therefore the requirement of Zinc metal is essential. The proposed expansion project shall augment the supply of Zinc

to the domestic market for Industrial growth. The proposed expansion will generate additional direct employment of approximately 65 manpower. In addition to above 400 number of manpower is being used for project and other improvement projects due to transport, workshop, garages and other services. Skill development & training programs to make local youth employable shall continue for the development of community.

The demand for zinc in India is robust with 70% of it coming from galvanizing sector which is witnessing rising penetration of galvanized steel in domestic car models. The on-going restructuring of the steel industry and adherence to upcoming IS277 coating standards bodes well for zinc consumption in India. Alloys & die cast alloys have increasingly been finding applications across sectors. Zinc demand in India will be a beneficiary of higher construction spending with projects under metro rail, Smart Cities Mission and Swachh Bharat Abhiyaan (Clean India Mission) driving investments in urban infrastructure.

Zinc is a very versatile non-ferrous metal. Zinc's different applications rank it as the 4th most common metal in use after iron, aluminum and copper. Global Zinc consumption is forecast to grow at a compound average annual rate of 2.4 % p.a. over the period 2016-2021. Global Zinc consumption is projected to grow to 20 Mt in 2035 representing average annual increase of 0.28 Mt.

Looking into the increasing demand of Zinc, M/s. Hindustan Zinc Limited is proposing Expansion within the existing premises of Zinc Smelter Complex at Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan).

2.3 LOCATION OF THE PROJECT

The plant site is located at Villages: Debari and Bichhri, Tehsil: Girwa, in the Udaipur District in the State of Rajasthan. The map showing general location of the project is shown below in the figure 2.1

2.3.1 General Location Map

The map showing general location of the plant site is as given below:

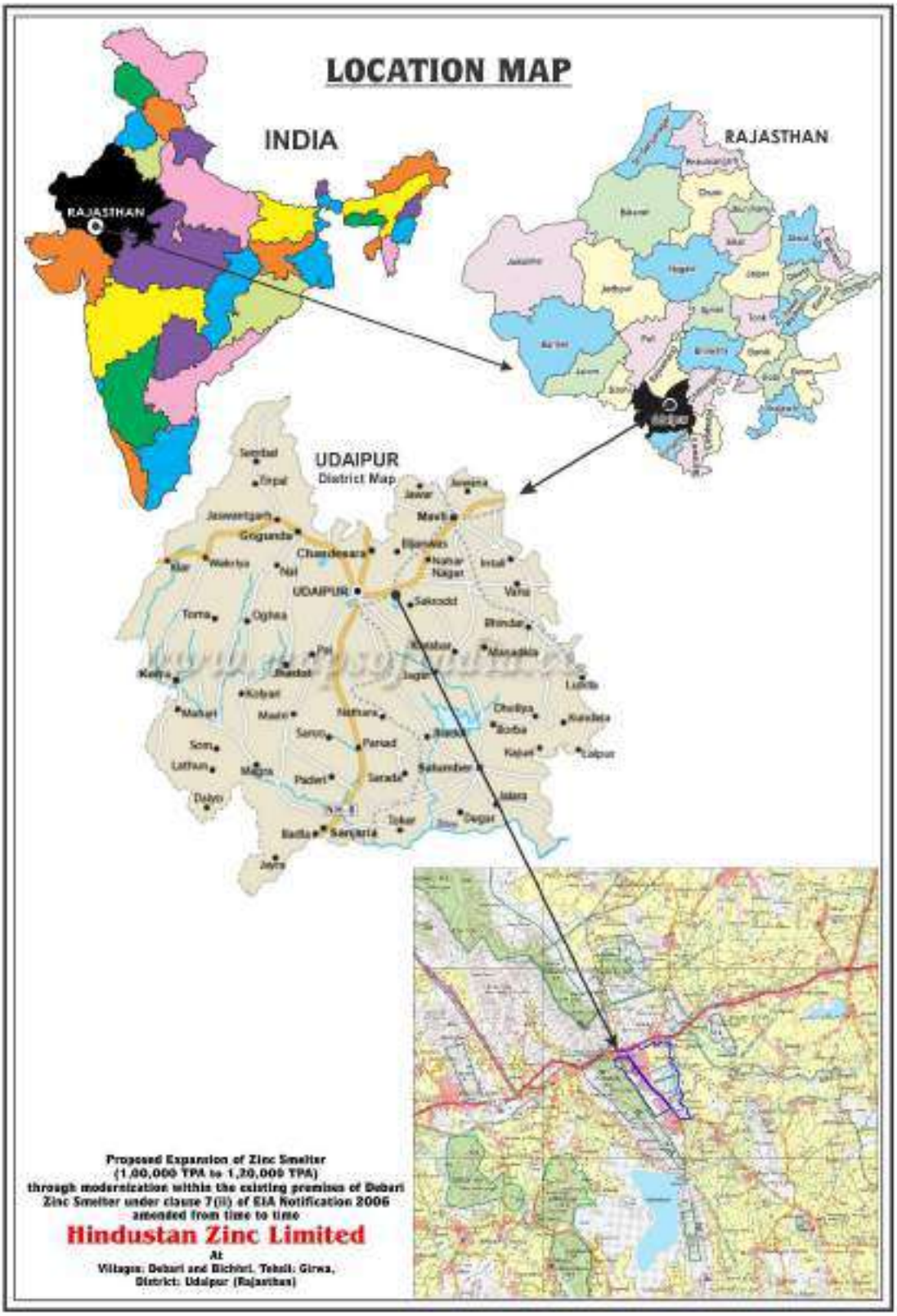


Figure 2.1: Location Map

2.3.2 Specific Location Map

The map showing specific location of the plant site along with geographical coordinates of the plant site on Google Earth is given in Figure - 2.2.

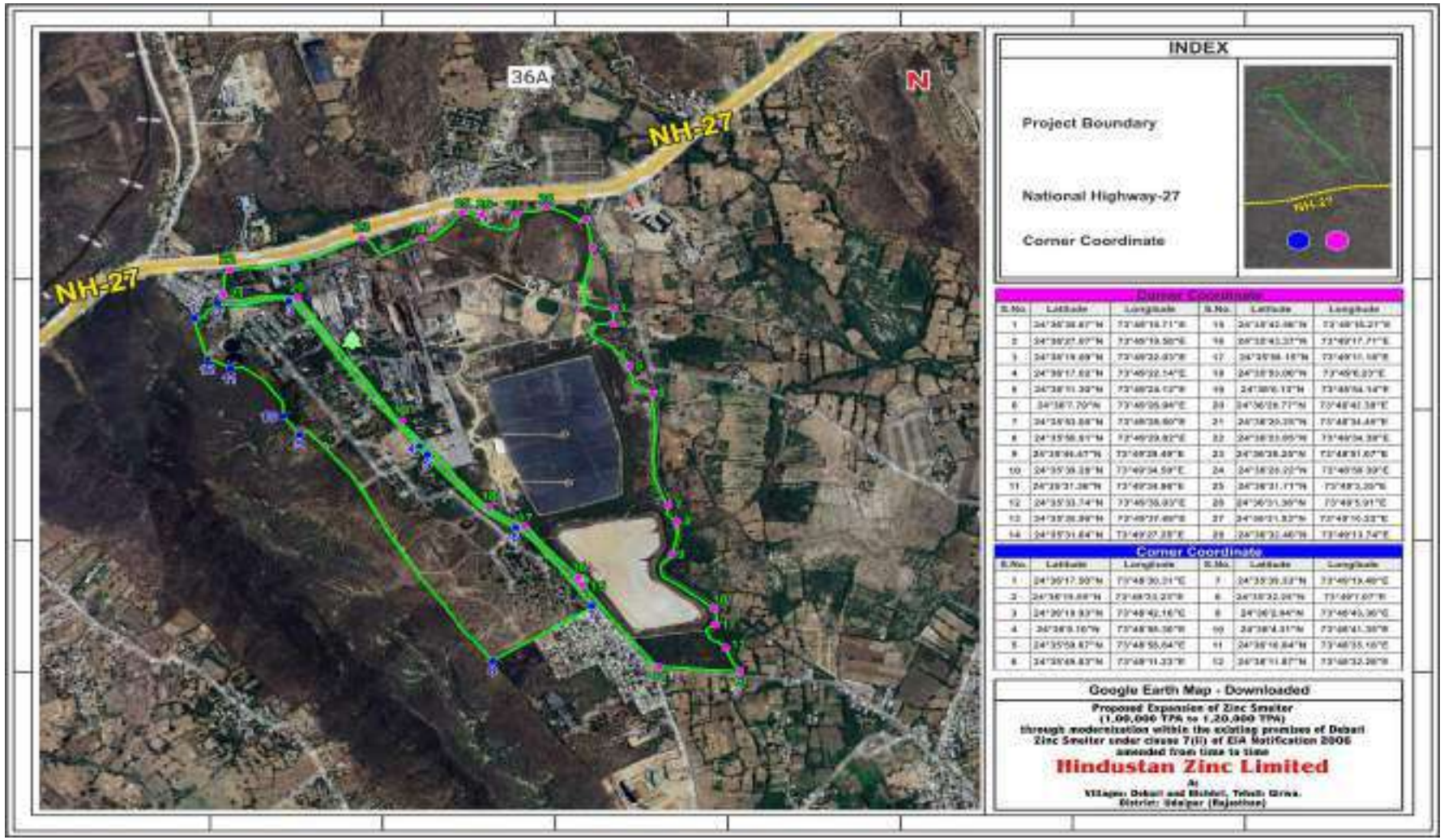


Figure 2.2: Map showing Specific Plant Location along with Corner Co-ordinates of the Plant site on Google Earth Map

2.3.3 Project Site land details & Layout

As per the EC dated 19.03.2008 the total project area is 190.05 ha out of which 5.85 ha area is falls outside the physical boundary Plant area. Hence, total plant area considered for this project is 184.2 ha. The Map showing the breakup of 190.05 ha is shown in the table 2.1(A) & figure 2.3(A).

Table 2.1(A): Plant Area Break-up for 190.05 ha

Particular	Area (Hectare)
Patch 1	0.42
Patch 2	0.54
Patch 3	0.38
Patch 4	0.12
Patch 5	2.17
Patch 6	1
Patch 7	0.12
Patch 8	1.1
Colony Area	55.2
Plant Area	129
Total	190.05

Figure 2.3(A): Map showing the breakup of 190.05 ha area

Initially, the Honourable Governor of the State of Rajasthan granted lease of 427 Acres (172.79 Ha) in 1962 for 99 years under the provisions of the Rajasthan Industrial Areas Allotment Rules, 1959, framed under Section 100 of the Rajasthan Land Revenue Act, 1956, which includes 98.74 hectares (244.01

Acres) vide lease dated 29.01.1962, 13.02 hectares (32.18 Acres) vide lease dated 26.03.1962 and 61.03 hectares (150.81 Acres) vide lease deed dated 26.03.1962 respectively. HZL commissioned the referred Zinc Smelter unit in 1968. Hindustan Zinc Limited, whilst being an erstwhile public sector undertaking, acquired additional land from nearby villages in and around the 1990s, for the purpose of its operations. Hindustan Zinc Limited (HZL) has filed a suit [Case Title: HZL vs Nandram & Ors. (Case No. 117/204)] before SDO/SDM Court, Girwa, Udaipur against Nandram & 23 others under Rajasthan Tenancy Act, 1955 for mutation and correction of revenue records.

Plant and colony was established in 1968, and being used for non-forest purpose before the Forest (Conservation) Act, 1980, came into effect, therefore Forest Clearance was not applicable for Zinc Smelter Debari.

As per Hon'ble Supreme Court orders (State Of Bihar vs Banshi Ram Modi & Ors, 7.05.1985), "forest area which is broken up or cleared before the commencement of the Act, prior approval of the Central Government in terms of Section 2 of the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 is not required and it would be required, when lease granted before the commencement of the said Act, is renewed after its coming into force. During the continuance of the lease period, the approval of the Central Government under Section 2 of the said Act is not required.

In this case also, prior approval under Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980, will only be required during renewal of Zinc Smelter Debari's lease i.e. 2061. At present, the lease of the unit is valid and in continuance.

Environment Clearance (EC) for expansion of Zinc Smelter (80,000 TPA to 1,00,000 TPA) at Village: Debari, Tehsil: Girwa, District: Udaipur (Rajasthan) was granted by MOEFCC, New Delhi vide F.No.J-11011/479/2006-IA.II(I) 19.03.2008 for total land area of 190.05 ha. CTE for the same was obtained from RSPCB vide F.No. 12(30-86) RPCB/Gr II/49 dated 5.04.2008 followed by CTO vide Letter F: 12(30-86) RPCB/Gr II/2702 dated 17.09.2008. The plant is in operation as per renewed CTO obtained from RSPCB vide Order no. 2022-2023/HDF/9282 dated 17.03.2023 (Valid upto 31.03.2027).

Subsequent to the above, M/s. Hindustan Zinc Limited proposed for the Expansion of Zinc Smelter (1,00,000 TPA to 1,40,000 TPA) through Modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time At Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan). While submitting the online application along with kml file of the Plant area on the Parivesh portal vide Proposal No. IA/RJ/IND1/457836/2024 dated 06.01.2024 withdrawn on 19.07.2024, it was found that:

some part of land covering, security colony, substation, some plantation etc. is showing under forest land. Upon observing this discrepancy, for further verification of the referred land, we consulted DCF-Udaipur (North Region) and found a reflection of the same in the Decision Support System. This is contrary to the revenue records as are in place, since in the same, this land parcel as which is part of the lease deed awarded to HZL in 1962, for 99 years, is recorded in HZL's name.

After further enquiry with the revenue and forest departments it was found that the total area of Zinc Smelter Debari complex (Plant and Colony) comes out to be 184.2 ha (instead of 190.05 Ha mentioned in the EC letter). Remaining 5.85 Ha area falls outside the physical boundary Plant area (129 Ha) & Residential colony area (55.2 Ha). Hence, 184.2 Ha area is considered as projects area for this proposal.

Out of this 129 ha of plant area, as per the information available with Forest department, 1.77 ha of Khasara No. 4522 and 5.20 ha of Khasra No. 4523 falls under Kantiya Forest (total area – 292 ha), which was notified as reserve forest by Mewar Government on 27.12.1947.

Similarly, out of 55.2 ha. of colony area, 11.60 ha of Kasara No. 4509, 2.40 Ha. of Khasara No. 4510 and 2.46 Ha of Khasara No. 4511 falls under Panwadi Forest (total area 225 ha), which was notified as reserve forest by Mewar Government on 21.02.1943.

Whereas, Old revenue records of Sanwat 2051 (Year 1994) are showing above khasras No. 4522, 4523, 4509, 4510, 4511 as factory area.

In this regard, DCF-Udaipur (North Region) vide Letter No. F()Survey/Uvas-Uttar/2023-24/6317 dated 22.09.2023 confirmed that there is no presence of forest land in the 121 Hectares of land as within Hindustan Zinc Limited's Zinc Smelter Debari, Udaipur, and that this does not fall within any forest area. It is to be noted that Hindustan Zinc Limited will maintain status quo as far as the claimed forest land is concerned, and no activities are proposed to or will be carried out in this area without obtaining requisite clarity on the discrepancy or necessary approvals for the same.

Out of the total plant area 184.2 ha, 76.28 ha (41.41 %) area has already been developed as greenbelt. The same will be maintained and enhanced by doing gap plantation to achieve the plantation density @ 2500/ha. Plant area break-up is given in Table - 2.1(B).

Table 2.1(B): Plant Area Break-up for 184.2 ha

S.No	Particulars (Ha)	Existing area (Ha)	Required Area (Ha)	Total Area (Ha)
1	Process Area	20	12.25	32.25
2	Non -Porcess	1.77	Nil	1.77
3	ETP& RO-ZLD	3.16	Nil	3.16
4	Admin Building	0.1	Nil	0.1
5	HW disposal facility	35.33	Nil	35.33
6	Open Area	31.21	-12.25	18.96
7	Green Belt	76.28	Nil	76.28
8	Colony Area Except Green Belt	16.35	Nil	16.35
	Total Area	**184.20**		**184.20**

Source: Pre-feasibility Report

The plant layout showing existing as well as proposed units, indicating storage areas, greenbelt area etc. is given as under (Figure - 2.4).

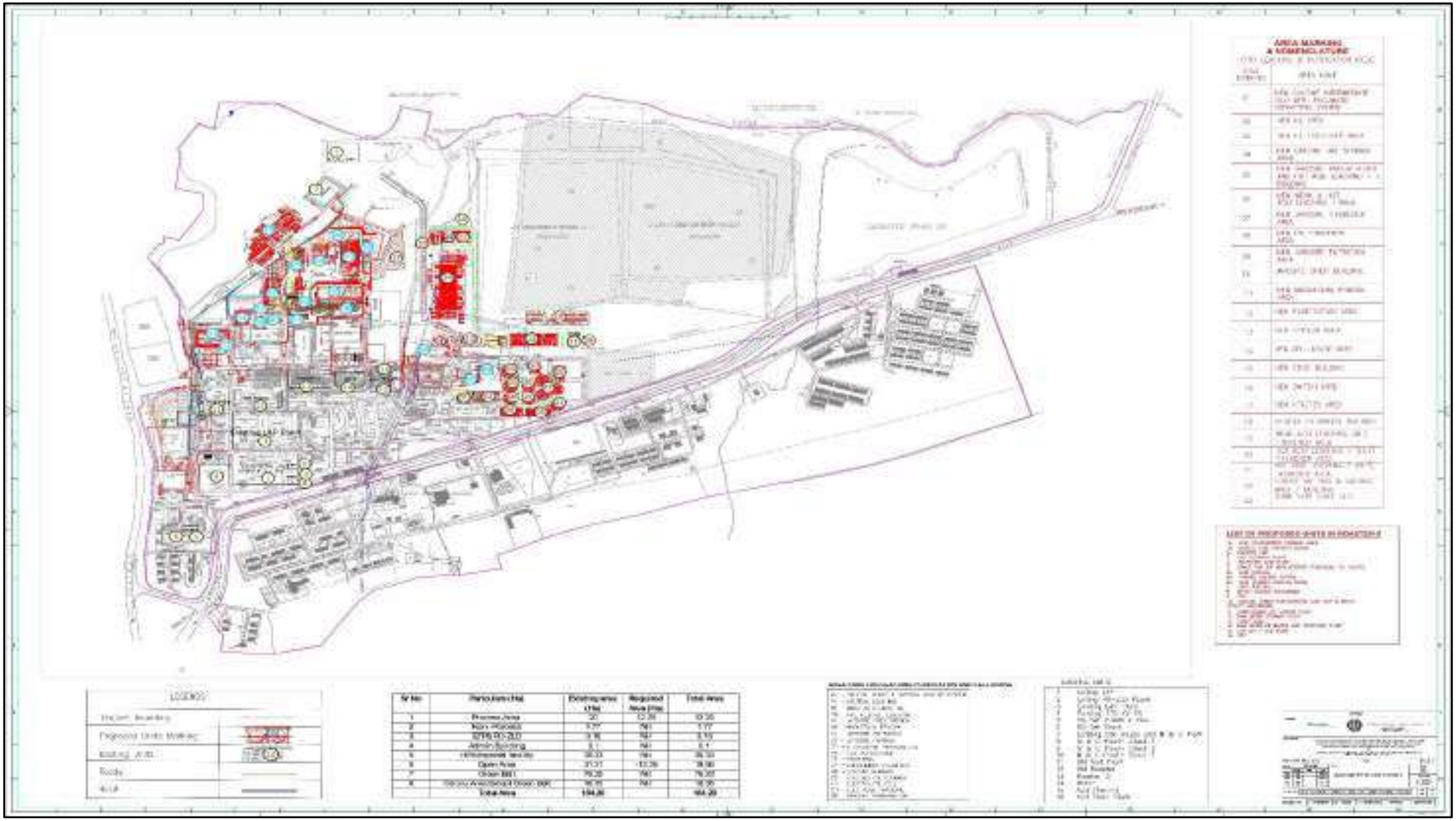


Figure 2.3(B): Plant Layout showing Plant Machinery

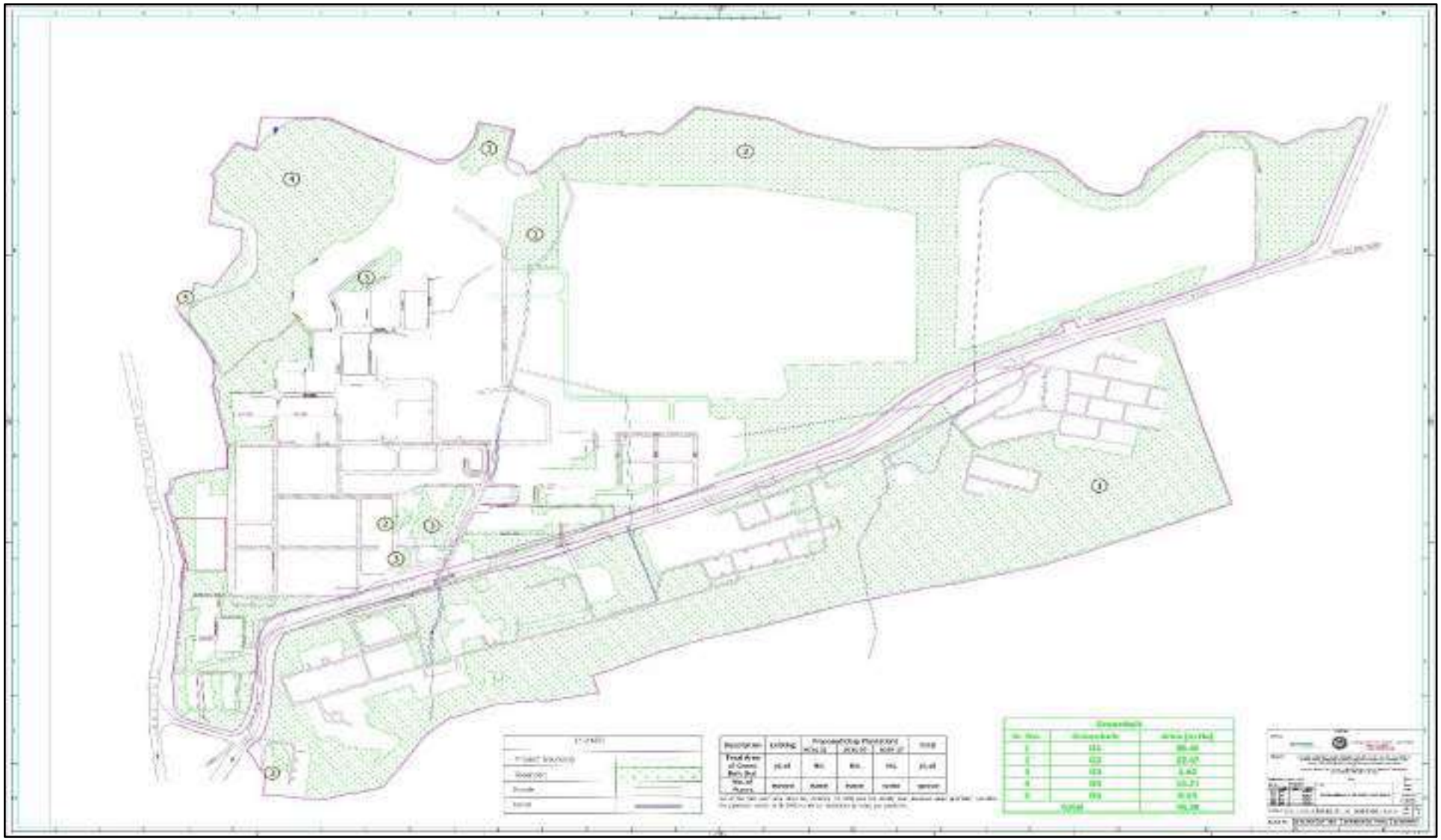


Figure 2.3(C): Plant Layout showing Greenbelt & Roads

Figure 2.3(D): Map showing contours & drainage pattern of the plant site

Bird Eye View of the Plant Site

Main Gate

Roaster and Acid Plant

Leaching and Purification

Moore Cake Treatment Plant

ZE & Melting

ETP

RO – ZLD

STP-200 KLD

Solar Panels

Figure 2.4: Plant Site photographs

2.4 SIZE OR MAGNITUDE OF OPERATION

Debari Zinc smelting plant is proposing for Expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) in two phases [in 1st phase the capacity expansion will be done up to 1,20,000TPA (20%) and in the 2nd Phase, capacity will be further increased up to 1,40,000TPA (40%)] by Modernization of process by installation of new state of art with latest technology equipment's to improve efficiency. Recovery, reduction in power consumption & GHG emission as well as elimination of manual activities.

This could be done by installation of New cellhouse equipped with fully automated Crane, Auto stripping machine, Anode flattening machine along with highly efficient rectifiers and transformers. To meet the requirement at electrolysis New Leaching & Purification plant will be installed equipped with series of reactors, thickeners, Spiral Heat Exchanger and automatic filter press. Further to ensure the SHG grade final finished good production, installation of new 24 TPH M&C will be done. In addition to this, roaster of capacity 300000TPA calcine is proposed to be installed along with Sulphuric acid plant capacity of 289000 TPA to treat the SO_2 laden off gases from proposed roaster within the existing premises of Debari Zinc Smelter.

Following activities are planned in Debari Smelter Unit:

1. Increasing existing capacity from 1,00,000 MTPA to 1,20,000 MTPA in Phase-I and then 1,20,000 MTPA to 1,40,000 MTPA in Phase II by:
   - Expansion in melting capacity section of existing melting of 10.5 TPH by adding 1 induction furnace and 1 slab casting line (24TPH).
   - Installation of New Jumbo Cellhouse equipped with Crane for improvement in Current efficiency from existing 84% to 87% and then to 92% there by reduction of power consumption.
   - Installation of Automatic cathode stripping machine.
   - Installation of Anode flattening Machine.
   - Installation of New Leaching and Purification equipped with Automatic filter press.
   - Present small cells (576 Nos') will be replaced by Jumbo cells (80 Nos').
   - Replacement of existing rectifiers from 58 MVA to 80 MVA capacity.
   - Installation of Cooling tower for Rectifier heat exchanger.
2. Installation of new Acid Leaching section having higher capacity reactors of 200 m3 and thickeners having diameter of 21 meter.
3. Installation of new Roaster of capacity 3,00,000TPA calcine is proposed to be installed along with Sulphuric acid plant capacity of 2,89,000 TPA to treat the SO_2 laden off gases from proposed roaster.
4. Installation of additional 5 nos. of reactor and 2 thickeners in leaching section equipped with calcine dosing system and bag filter to control fugitive dust emission.
5. Installation of tail gas treatment plant.
6. For Environment expects separate Ventilation system Bag filters are provided for furnace and work zone and stack has been provided.
7. Provision of dust control system/ bag filters has been provided at material transfer points.
8. Installation of additional RO-ZLD of 2000KLD capacity.

Table 2.2: Project Proposal - Product (Capacity and Configuration) for proposed expansion project

S. No.	Products	Unit	Production Capacity & Configuration										Remarks
			Existing				Additional				Total after expansion		
			As per EC		Operating		Phase I		Phase II		Capacity	Configuration	
			Capacity	Configuration	Capacity	Configuration	Capacity	Configuration	Capacity	Configuration			
1.	Zinc metal Special High Grade/High Grade Zinc Cathode/Ingot Zinc Alloys etc.	TPA	1,00,000	1 x 1,00,000	1,00,000	1 x 1,00,000	20,000 (20%)	1 x 20,000	20,000 (20%)	1 x 20,000	1,40,000	1 x 1,40,000	Expansion through Modernization of process by installation of new state of art with latest technology equipment's to improve efficiency. Recovery, reduction in power consumption & GHG emission as well as elimination of manual activities.

M/s. Hindustan Zinc Limited is proposing the expansion of existing plant from 1,00,000 TPA to 1,40,000 TPA. This expansion will be carried out in 2 phases, in 1st phase the capacity expansion will be achieved upto 1,20,000 TPA (20%) through modernization with installation of state of art jumbo cell house, higher capacity reactors & thickeners in L&P section and Roaster. In the 2nd Phase, capacity will be further increased upto 1,40,000TPA (40%) by debottlenecking, improvement in current, melting efficiency & metal recovery.

This will result into improvement in metal recovery, recovery of minor metals & reduction in specific power, fresh water, GHG emissions. This could be done by installation of New cellhouse equipped with fully automated Crane, Auto stripping machine, Anode flattening machine along with highly efficient rectifiers and transformers to meet the requirement at electrolysis New Leaching & Purification plant will be installed equipped with series of reactors, thickeners, Spiral Heat Exchanger and automatic filter press. Further to ensure the SHG grade final finished good production, installation of new 24 TPH M&C will be done. In addition to this roaster of capacity 300000 TPA calcine is proposed to be installed along with Sulphuric acid plant capacity of 289000 TPA to treat the SO_2 laden off gases from proposed roaster within the existing premises of Debari Zinc Smelter. Details of the By-products are given as under:

S. No.	Products	Unit	Production Capacity										Remarks
			Existing				Additional				Total after expansion		
			As per EC		Operating		Phase I		Phase II		Capacity	Configuration	
			Capacity	Configuration	Capacity	Configuration	Capacity	Configuration	Capacity	Configuration			
1.	Raw Zinc Oxide (RZO)	TPA	NIL	NIL	17500	1 x 17500	NIL	NIL	NIL	NIL	17500	1 x 17500	Operating as per CTO No Change
2.	Sulphuric Acid	TPA	4,19,000	1x 44474 (Roaster 1) 1 x 85526 (Roaster 2) 1 x 289000 (Roaster 3)	3,74,526	1 x 85526 (Roaster 2) 1 x 289000 (Roaster 3)	79500 (18.97%)	1 x 289000 (New Roaster)	79500 (18.97%)	NIL	578000	1 x 289000 (Roaster 3) 1 x 289000 (New Roaster)	Existing granted quantity as per EC & CTO is 419000 TPA. However, existing operating capacity is 3,74,526TPA, as the Roaster 1 has been dismantled. Roaster 2 will also be dismantled after stabilization of new Roaster
3.	Calcine	TPA	4,45,000	1 x 47902 (Roaster 1) 1 x 97098 (Roaster 2) 1 x 300000 (Roaster 3)	3,97,098	1 x 97098 (Roaster 2) 1 x 300000 (Roaster 3)	77,500 (17.42 %)	1 x 300000 (New Roaster)	77,500 (17.42 %)	NIL	6,00,000	1 x 300000 (Roaster 3) 1 x 300000 (New Roaster)	Existing granted quantity as per EC & CTO is 445000 TPA. However, existing operating capacity is 397098 TPA, as the Roaster 1 has been dismantled. Roaster 2 will also be dismantled after stabilization of new Roaster
4.	Cadmium metal / Sponge (equivalent metal)	TPA	320	1 x 320	320	1 x 320	62 19.37%)	1 x 62	62 (19.37%)	1 x 62	444	1 x 444	Increase in production capacity due to change in concentrate quality

S. No.	Products	Unit	Production Capacity										Remarks
			Existing				Additional				Total after expansion		
			As per EC		Operating		Phase I		Phase II		Capacity	Configuration	
			Capacity	Configuration	Capacity	Configuration	Capacity	Configuration	Capacity	Configuration			
5.	Calomel	TPA	NIL	NIL	15	1 x15	3 (20%)	1 x 6	3 (20%)	Nil	21	1 x 21	Increase in production capacity for waste utilization
6.	Sodium Sulphate/ Chloride/ Compound	TPA	NIL	NIL	18500	18500	2500 (13.51%)	1 x 6700 R3 TGT 1 x 8400 New Roaster TGT1 x 8400	2500 (13.51%)	NIL	23500	1 x 6700 R3 TGT 1 x 8400 New Roaster TGT1 x 8400	Increase in production capacity for waste utilization

Table 2.3: Magnitude of Operation in terms of Cost

S. No.	Particular	Details
A.	**Cost Details**	
1.	Total Cost for the Project	Rs. 2500 crores (Phase I Rs. 2200 Cr. & Phase II Rs. 300 Cr.)
2.	Cost for Environmental Protection Measures	Capital Cost: Rs. 600.628 Crores/-
		Recurring Cost: Rs. 70 Crores/annum
B	**No. of working days**	Working days are 365 days/annum. However, production days are 355 days/ annum

Facilities / Activities Proposed

The major facilities and associated activities proposed as a part of expansion project are given below:

Table 2.4: Scope of Proposed Expansion Project

Details	Unit	Major facilities and associated activities proposed	
		Configuration	Capacity
Zinc Smelter	TPA	1 x 40000	40000
Roaster	TPA	1 x 300000	300000
Acid Plant	TPA	1 x 289000	289000
Solar Power Plant	MW	7.5	7.5
WHRB	MW	1 x 10	10
MCTP	MW	NIL	NIL
DG Set	MW	1 x 1.2	1.2
Melting & Casting	TPH	1 x 24	24
Cell House	Number	Existing 576 small cells will be replaced by 80 nos of Jumbo cells	Phase I: 20000 Phase II: 20000
ETP	KLD	Nil. Revamping of Equipment	Nil. Revamping of Equipment
RO-ZLD	KLD	1 x 2000	2000

2.5 REQUIREMENTS FOR THE PROJECT

The project requirements such as raw materials, fuel, water, power, manpower with source of supply is described in the sections below.

2.5.1 Raw Material Requirement

Details regarding quantity of raw materials, their source along with distance and mode of transportation are given in Table - 2.5.

Table 2.5: Raw Material & Additives Requirement

S. No.	Particular	UNIT	Quantity					Probable transportation	
			Existing	Additional		Total Additional	Total After expansion	Source	Distance and mode
				Phase I	Phase II				
1.	Zinc concentrate/Calcine	TPA	491000	107919	88094	196013	687013	HZL Mines	50 km to 310 Kms
2.	Zinc Secondaries - Zinc Dross/ Ash/ Zinc bearing waste	TPA	5250	1183	1072	2255	7505	HZL Smelter	Within same premises

S. No.	Particular	UNIT	Quantity					Probable transportation	
			Existing	Additional		Total Additional	Total After expansion	Source	Distance and mode
				Phase I	Phase II				
3.	High Silver Lead (HSL)	TPA	0	1500	0	1500	1500	HZL Smelter	By covered truck DSC- 80 Km CLZS- 110 km
4.	Zinc dust	TPA	0	4800	700	5500	5500	HZL Smelter	By covered truck DSC- 80 Km CLZS- 110 km
5.	Zinc Sulphate	TPA	-	9283	1111	10394	10394	Ancillary	By covered truck DSC- 80 Km CLZS- 110 km
6.	Pyro metallurgical Slag	TPA	Nil	60,000	0	60,000	60,000	HZL Smelter	By covered truck DSC- 80 Km CLZS- 110 km
7.	Moore Cake	TPA	Nil	50,000	0	50,000	50,000	HZL Smelter	Stock of HZL & By covered truck DSC- 80 Km CLZS- 110 km
8.	Coke fines	TPA	Nil	25,200	0	25200	25200	Indigenous /imported	Approx. 1500kms Through Trucks
9.	LGLC (low grade silver crust/cake)	TPA	Nil	0	30,000	30000	30000	HZLs DSC & CLZS Smelter	By covered truck DSC- 80 Km CLZS- 110 km

Source: Pre-feasibility Report

Mass Balance Diagram

The mass balance for the existing & proposed plant is given in the Table below: -

Table 2.6: Mass and Material balance for Debari Zinc Smelter (Phase-I)

ZSD Balance		Material Balance	Cumulative upto Phase-1			Cumulative upto Phase-2		
			Qty	Grade %	Metal	Qty	Grade %	Metal
A	Input	Zn Concentrate	593919	50%	296960	682013	50%	341006
B	Input	Calcine Receipt from other Unit	5000	56.80%	2840	5000	56.80%	2840
C	Input	Zinc sulphate solution (Ancillary)	9283	10.10%	938	10394	10.10%	1050
Total Input					**300737**			**344896**
Total Output Zinc					**300461**			**398084**
A	Output	FG Salable	120000	100%	120000	140000	100%	140000
B	Output	Calcine Dispatch to Other Unit	310688	56.80%	176471	352902	56.80%	253530
C	Output	Losses			3990			4554
a	Waste	Jarosite	105756	2.50%	2644	123383	2.50%	3085
b	Waste	PF Cake	2511	28%	703	2929	28%	820
c	Waste	ETP Cake	6789	8.10%	550	6789	8.10%	550
d	Waste	Anode Mud	1599	3.50%	56	1902	3.00%	57
e	Waste	Cooler Cake	1221	3.00%	37	1416	3.00%	42

Table 2.7: Mass and Material balance for Debari Zinc Smelter (Phase II)

Material Balance	Cumulative upto Phase-1			Cumulative upto Phase-2		
	Qty	Grade %	Metal	Qty	Grade %	Metal
Metal Recovery			96.78%			96.8%
Jarosite to salable ratio	88.1%			88.1%		
PF Cake to salable ratio	2.1%			2.1%		
ETP cake to salable ratio	5.7%			4.8%		
Anode Mud to salable ratio	1.3%			1.4%		
Cooler Cake to salable ratio	1.0%			1.0%		

2.5.2 Fuel Requirement

Details regarding quantity of fuel required, their source along with distance & mode of transportation for expansion project are given in Table - 2.9.

Table 2.8: Fuel Requirement

S. No.	Particular	Unit	Quantity Total After expansion	Probable transportation	
				Source	Distance and mode
1.	Fuel HSD/LDO/LPG/ CNG/PNG	KLA	1450	IOCL / Reliance, Gujarat Based Refinery/Oil Depot	Approx. 1000 km
2.	Fuel LPG at Melting	MTA	87	Indane Depot	Approx 5 Km to 50 Km
3.	Fuel HSD/LDO at MCTP	KLA	960	IOCL / Reliance, Gujarat Based Refinery/Oil Depot	Approx. 1000 km

Source: Pre-feasibility Report

2.5.3 Other Basic Requirement

Other basic requirements for the proposed expansion project are given in Table - 2.10.

Table - 2.9: Basic Requirements for the Project

Particular	Requirement					Source
	Existing	Proposed		Total Additional	Total after expansion	
		Phase I	Phase II			
Water (KLD)	8000	1046	0	1046	9046	Mansi Wakal Dam/ STP Udaipur; Water required for process (1046 KLD) will be continue sourced from STP-Udaipur
Power (MW)	90	20	0	20	110	WHRB & Solar Power Plant at site; CPPs from sister units at Zawar, Dariba & Chanderiya & AVVNL. DG Sets (2x7.4 MW & 1x1.2 MW) for emergency power back up
Steam (TPH)	24	4	4	8	32	Roaster 2, 3 and New Roaster
Manpower (No. of Persons)	784	65	0	65	849	Local/Outside

Source: Pre-feasibility Report

2.5.3.1 Water Requirement

Existing Water requirement for the project is 8000 KLD, in which 7100 KLD (6950- Industrial + 150 KLD for Domestic purpose) inside the plant and 900 KLD water is being used in residential colony.

As per the Application for EC submitted for the expansion project on 19.07.2024, the additional water requirement for the proposed expansion project was considered as 3800 KLD, making the total water requirement after proposed expansion as 11800 KLD.

In line with the ADS Point number 3 raised by EAC (Industry 1) on23.10.2024, the additional water requirement for the proposed expansion project has been reassessed and reduced from 3800 KLD to 1046 KLD, resulting in total water requirement after the proposed expansion as 9046 KLD.

The additional water requirement has been reduced by considering the following measures proposed for the expansion project:

- ✓ Air Cooled Condenser,
- ✓ Seal water recirculation system,
- ✓ Condensate recovery system in L&P,
- ✓ Replacement of fresh water by process solution in flocculant & Classifier,
- ✓ Membrane type element in FP.

Water requirements will be met by Mansi Wakal Dam and 40 MLD STP Plant & 20 MLD STP Udaipur installed to treat the sewage generated from Udaipur city. No additional fresh water is required for proposed expansion as 1046 KLD of additional water will be sourced from Udaipur STP. No ground water abstraction is being done and will not be done for the proposed expansion project.

Details of the permissions obtained for supply of water for Debari Zinc Smelter are given as under:

- Letter of acceptance from Udaipur Smart City Limited vide letter no. USCL/2017-18/71 dated 22.06.2017 for Supply of 50% of the treated water of Proposed STPs (25 MLD + 10 MLD + 5 MLD) of Udaipur Town **(Annexure 9a).**
- MoU between Government of Rajasthan and HZL for Mansi Wakal Dam dated 11.02.1997 **(Annexure 9b).**
- 20 MLD STP agreement (Municipal Council Udaipur (UMC)- Urban Improvement Trust (UIT-HZL) (Capacty-20MLD) dated 09.05.2012**(Annexure 9c).**

Break-up of the water requirement is given in Table - 2.11 and Water Balance Diagram is given in Figure - 2.6.

Table 2.10: Water Requirement Break-up (in KLD)

Unit	Water Requirement (KLD)					Source
	Existing	Additional		Total Additional	Total after expansion	
		Phase I	Phase II			
Industrial	6950	1046	0	1046	7996	Mansi Wakal Dam and 40 MLD STP Plant & 20 MLD STP Udaipur through pipelines. No additional water abstraction permission will be required for the proposed expansion project
Domestic	150	0	0	0	150	
Colony	900	0	0	0	900	
Total	**8000**	**1046**	**0**	**1046**	**9046**	

Source: Pre-feasibility Report

Water Balance Diagram for total water requirement after expansion is given as Figure No. 2.6

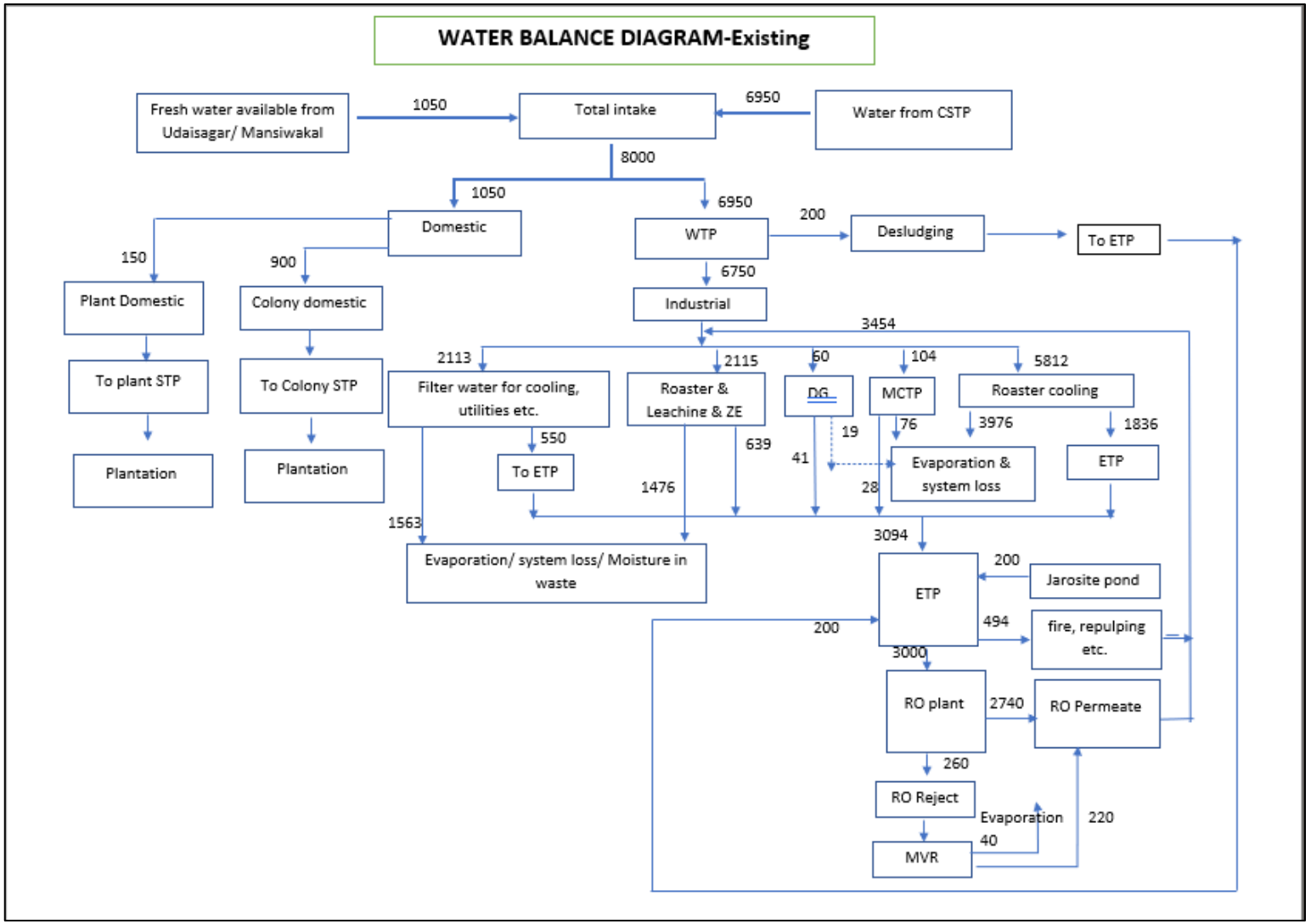


Figure 2.5 (A): Existing Water Balance Diagram

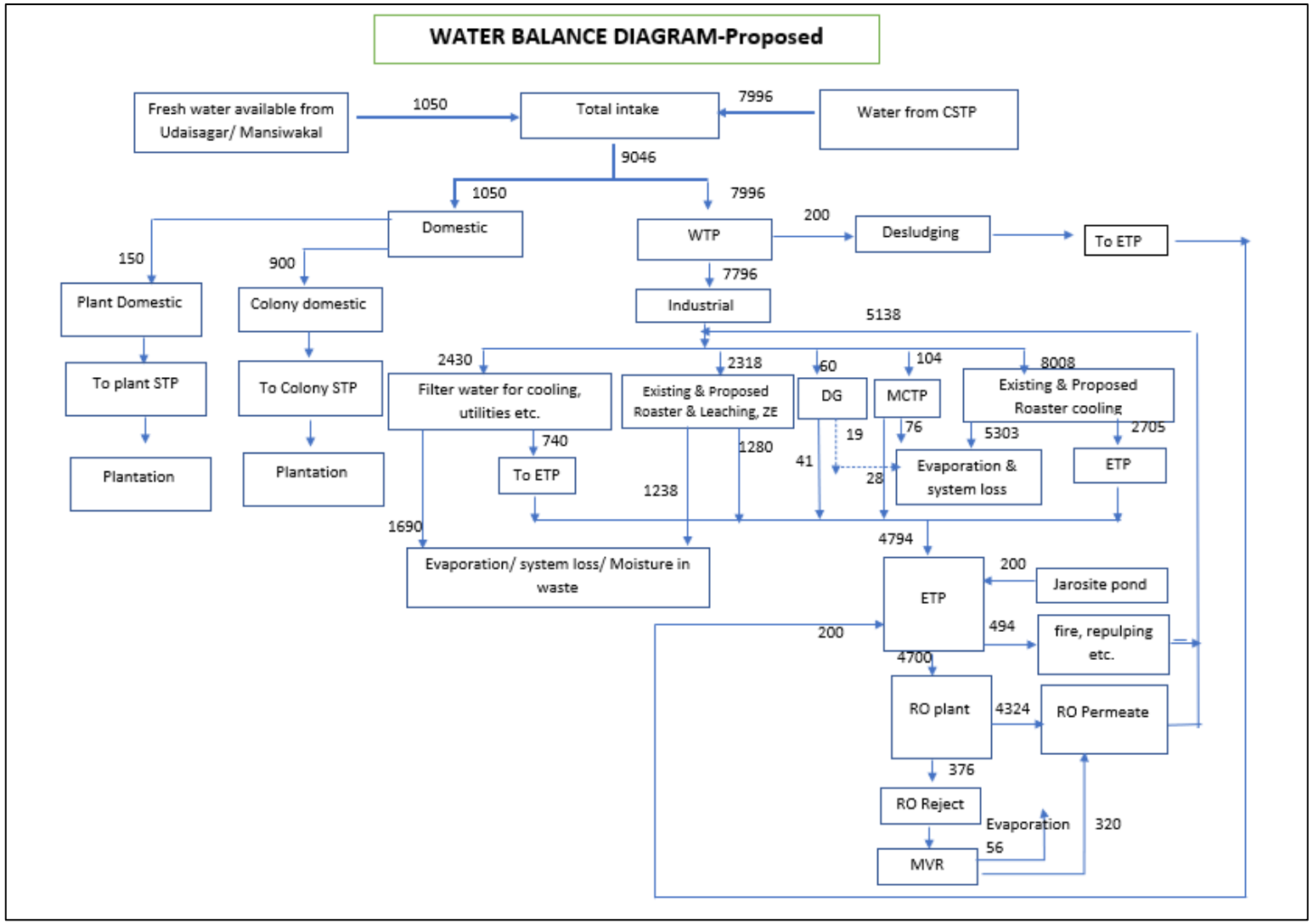


Figure 2.5 (B): Proposed Water Balance of Debari Zinc Smelter

2.5.4 Power Requirement

Existing Total Power requirement of the Debari Zinc Smelter is 90 MW. The same is being sourced from existing WHRB (8 MW), Solar Power Plant (12.5 MW) and from sister units of CPP at Zawar, Dariba & Chanderiya. 2 DG Sets are available for back up and emergency purpose with capacity as 14.80 MW at plant. Additional power of 20 MW will be required after the expansion project, which will be fulfilled from the new waste heat recovery boiler (WHRB) installed with the proposed roaster (300000 TPA) which generate 10 MW of energy, further through capacity enhancement of solar plant by 7.5 MW and 1 D.G. set of 1.2 MW.

Details reg. power requirement is given in Table - 2.12.

Table 2.11: Power Requirement and Source

Unit	Power Requirement (MW)			Source
	Existing	Additional	Total after expansion	
MW	90	20	110	Captive Power Plants of sister units/WHRB/ Solar Power plant/AVVNL

Source: Pre-feasibility Report

Power Source

Unit	Power Requirement (MW)			Source
	Existing	Additional	Total after expansion	
Solar Power Plant	12.5	7.5	20	Additional 7.5 MW by debottlenecking
WHRB	8	10	18	Proposed 1x10 MW WHRB in new roaster
DG Set	14.80	1.2	16	Proposed 1.2 MW DG Set

Energy Balance

Energy balance for the exiting & proposed power requirement is given in Table - 2.13 (a) & Table - 2.13 (b).

Table 2.12: Energy Balance - Existing Capacity

S.No.	Description	Capacity (MW)	Working Day	Actual Gen./consumption (MW)	Running Hrs.
1	AVVNL	47	365	47	24 hrs. per day
2	CPP- HZL	30	365	30	
3	Captive Power Plant	NA	NA	NA	
4	WHRB	8	350	7.0	
5	Solar	12.5	365	3.3	
6	DG Set	14.8		Emergency purpose	

Table 2.13: Energy Balance – Proposed Expansion

S. No.	Description	Capacity (MW)	Working Day	Gen./Consumption (MW)	Running Hrs.
1	AVVNL	53	365	53	24 hrs. per day
2	CPP- HZL	30	365	30	
3	Captive Power Plant	NA	NA	NA	
4	WHRB	18	350	18	24 Hrs
6	Solar	20	365	5	12 Hrs
5	DG Set	16	Emergency purpose		

2.5.5 Manpower Requirement

Existing Manpower of the Debari Smelter is 295 (Permanent) & 489 (Contractual). The break of

Manpower requirement is given in Table - 2.14.

Table 2.14: Manpower Requirement

Employment Type	Existing	Additional		Total Additional	Total after Expansion	Remarks
		Phase I	Phase II			
Executive	295	15	0	15	310	Manpower will be sourced locally from nearby area as per eligibility criteria
Contract	489	50	0	50	539	

Source: Pre-feasibility Report

2.5.6 Steam Requirement

Existing Total steam requirement of the plant is 32 TPH. The same is being sourced from WHRB.

Table 2.15: Steam Requirement and Source

Unit	Steam Requirement (TPH)			Source
	Existing	Additional	Total after expansion	
ZSD	24	8*	32	Roaster 2, 3 and New Roaster

In Phase 1 (4 TPH) steam will be required and in Phase 2 (4 TPH) steam will be required

INTERLINKED PROJECTS

Details of the interlinked projects are given as under:

Table 2.16: Interlinked Projects

S. No.	Name of the Interlinked projects of Hindustan Zinc Ltd.	Purpose	EC details
1.	Rampura Agucha Lead and Zinc Opencast and Underground Mining Project (Expansion from 5.0 MTPA to 6.15 MTPA & beneficiation capacity of beneficiation plant from 5.0 MTPA to 6.50 MTPA (ML area- 1200 ha) at Village Agucha, Tehsil Hurda, District- Bhilwara, Rajasthan	Supplying Zinc Concentrate to the plant	Vide letter no. J-11015/267/2008-IA.II (M) dated 11.12.2009; amended on 05.03.2012, 22.08.2014, 12.12.2014, 28.12.2015 & 28.02.2020
2.	Rajpura Dariba Underground Mine (Expansion in production of Lead-Zinc ore from 1.08 MTPA to 2.0 MTPA (Total Excavation 2.48 MTPA) & Lead-Zinc Ore beneficiation from 1.2 MTPA to 2.5 MTPA from Rajpura Dariba Underground mine (ML Area- 1142.2106 ha) at Tehsil- Relmagra, Dsitrict Rajsamand, Rajasthan		Vide letter no. J-11015/84/2018-IA.II (M) dated 13.04.2020)
3.	Zawar group of underground Lead-Zinc Mines (Enhancement of production capacity from 4.0 MPTA to 4.8 MTPA of Zinc Ore and ore beneficiation from 4.0 MTPA to 4.8 MTPA (ML Area- 3620 ha) at village-Zawar, Tehsil- Girwa and Sarada, District-Udaipur, Rajasthan		Vide letter no. J-11015/259/2012-IA.II(M) dated 16.10.2020)

4.	Sindesar Khurd underground mine (Enhancement of production capacity from 4.5 MTPA to 6.0 MTPA of Lead-Zinc Ore (ROM) & expansion of ore beneficiation from 5.0 MTPA to 6.5 MTPA (ROM) (ML Area- 199.84 ha) at village- Sindesar khurd, Tehsil Relmagra, District Rajsamand, Rajasthan		Vide letter no. J-11015/7/2017-IA/II (M) dated 31.05.2018).
5.	Dariba Smelter Complex {Zinc Smelter (5,00,000 TPA), Lead Smelter (1,25,000 TPA), Captive Power Plant (255 MW) at Village & Post Dariba, Tehsil Relmagra, District Rajsamand, Rajasthan by Hindustan Zinc Ltd.	Exchange of Calcine & Zinc Secondaries for reprocessing / metal recovery.	Vide Letter No. J-11011/380/2008-IA II (I) dated 4.11.2009.
6.	Chanderiya Lead Zinc Smelter Complex comprises of Pyro Metallurgic Smelter (1,05,000 TPA Zinc and 35,000 TPA Lead), Ausmelt Lead Smelter (60,000 TPA) and Hydro Metallurgic Zinc Smelter (5,04,000 TPA).		Vide letter no. J-11011/279/2006-IA II (I) dated 14.10.2020 & 29.12.2023
7.	4,65,000 TPA Zinc Metal & 1,50,000 TPA Lead Metal Melting & Casting unit at Plot No. -2, Sector -14, Sidcul (Industrial area), District- Pantnagar, Uttarakhand by Hindustan Zinc Ltd.	Zinc Cathode/Ingot, High Grade Metal / Refinery Mud are sent to Pantnagar Plant.	Vide letter no. J-11011/327/2010-IA-II (I) dated 26.04.2011.
	Expansion of Refined Silver production from 600 TPA to 800 TPA at Plot No. -2 & 3, Sector -14, IIE, Sidcul, Pantnagar, District-Udham Singh Nagar	Zinc Secondaries supplied to the Debari Complex (if any)	Vide letter no. 10-9(10)/2018 dated 08.02.2019.
8.	Proposed Ammonium Phosphate Fertilizer Complex of 1.02 MTPA (2 x 0.51 MTPA) at village Biliya, Tehsil & District Chittorgarh, Rajasthan	Supply of acid in future	Vide letter F.No. J-11011/350/2016-IA.II (I) dated 05.01.2021.

2.6 PROPOSED SCHEDULE FOR APPROVAL AND IMPLEMENTATION

The project will start only after obtaining Environmental Clearance and other clearances from statutory authorities. The project is for installation of new roaster and increasing production capacity from 1,00,000 MTPA to 1, 40,000 MTPA in two phases after getting all the regulatory approvals. Completion of construction work will be about December, 2025.

2.7 TECHNOLOGY AND PROCESS DESCRIPTION

At present Debari Zinc Smelter is having a capacity of 1,00,000 TPA of Zinc refinery. HZL wants to increase this capacity to 1,40,000 TPA at Debari Zinc Smelter in two phases. In 1st phase the capacity expansion will be done up to 1,20,000TPA (20%) along with Roaster installation and in the 2nd Phase, capacity will be further increased up to 1,40,000TPA (40%) by Modernization of process by installation of new state of art with latest technology equipment's to improve efficiency. Recovery, reduction in power consumption & GHG emission as well as elimination of manual activities.

This could be done by installation of New cellhouse equipped with fully automated Crane, Auto stripping machine, Anode flattening machine along with highly efficient rectifiers and transformers. To meet the requirement at electrolysis New Leaching & Purification plant will be installed equipped with series of reactors, thickeners, Spiral Heat Exchanger and automatic filter press. Further to ensure the SHG grade

final finished good production, installation of new 24 TPH M&C will be done. In addition to this roaster of capacity 300000TPA calcine is proposed to be installed along with Sulphuric acid plant capacity of 289000 TPA to treat the SO2 laden off gases from proposed roaster within the existing premises of Debari Zinc Smelter.

Modernization of Technology

HZL is improving its previous technology for sustainable use of natural resources and conservation of environment for the existing Debari Zinc Smelter. This could be achieved by installation of New cellhouse equipped with fully automated Crane, Auto stripping machine, Anode flattening machine along with highly efficient rectifiers and transformers to meet the requirement at electrolysis New Leaching & Purification plant will be installed equipped with series of reactors, thickeners, Spiral Heat Exchanger and automatic filter press. Further to ensure the SHG grade final finished good production, installation of new 24 TPH M&C will be done. In addition to this roaster of capacity 300000TPA calcine is proposed to be installed along with Sulphuric acid plant capacity of 289000 TPA to treat the SO_2 laden off gases from proposed roaster within the existing premises of Debari Zinc Smelter.

Following upgradation will be done in technology to improve efficiency:

- **Improvement in power rating:** At present, existing cells are smaller and as per cell design the gap between anode and cathode is 37 mm is being maintained, where's as in proposed jumbo cells, the same gap will be of 45-48 mm. Hence, lower distance between anode to cathode is resulted in shorts and ultimately resulting of power loss. Such power loss will be reduced and current saved from the same will be utilized to produce metal.

  At present the power rating varies from 6.46 to 7.04 MT/MW. FY 22-23 the power Rating was 7.04 MT/MW. After the revamping the estimated power rating in Phase-1 will be 7.15 by above changes in cell house. Further, power rating of 7.30 MT/MW will be achieved by operational excellence in Leaching & Purification section which is By optimizing impurity like Fe, Cu, Cd, Sb level electrolyte i.e, by improving process CpK.
- **Improvement in Recovery:** At present the existing Zinc recovery is 95.5% and Estimated Zinc recovery will be 96.8%. This will be achieved through following:
  I. Reduction of Zn loss in Jarosite:
  II. Increased retention time in all the sections of Leaching. to prevent losses of Zn in Jarosite (from 4.0% to 2.8%).
  III. Technological upgradation in leaching reactors design.
  IV. Installation of Hydrofoil agitator in all the leaching reactors.
  V. Installation of calcine dosing weigh-feeders for online weighment tracking and pH analyzers.
  VI. Reduction in losses through ETP cake (from 10.0 % to 8.1 %):
  VII. By introducing online cell cleaning, anode flattening, Magnesium removal circuit.

- **Sustainable Waste Management**
  - ✓ Increase in PF cake generation is envisaged due to increase in the concentration of elements like Cu:0.09 to 0.10 % and Cd: 0.17 to 0.18 %. The same will be sent to registered recyclers to further recovery of metal.
  - ✓ Anode mud generated from the process will reduce from 1.6% to 1.4% of zinc metal production. The anode mud will be recycled in process to maintained required level Mn is electrolyte and Zinc. The remaining will be sent to registered recyclers for further recovery of metals.
  - ✓ Generation of ETP cake will be reduced by circulating volume of process in system in proposed expansion which is now going to ETP for treatment. Filtrate generated from Jarosite filtration will be recycled in process, which will be either recycled in MCTP for recovery of zinc or sent to TSDF for sustainable disposal.
  - ✓ Increase in Jarosite generation is envisaged due to increase in Fe: 8.3 to 8.8 %, Pb: 1.7 to 2.5 %, Silica: 1.8 to 3.0 % in raw material. 100 % Jarosite continued to be sent to cement industries as part of circular economy which will reduce environmental liability /concerns of leachate and PM emission due to handling and storage in the from Jarofix.
  - ✓ Zero procurement of lime & cement for stabilization (3 % of lime and 10 % of cement) hereby avoids consumption of natural resources.
- **Reduction in GHG Emission**
  - ✓ Power consumption will be reduced by installing new jumbo cell house. Power rating will be improved.
  - ✓ Dependency on fossil fuel for power generation will be reduced and power will be generated from renewable energy sources like solar power & waste heat recovery boiler (WHRB).
  - ✓ 8 MW of energy is already generated through WHRB and a new waste heat recovery boiler will be installed which will generate 10 MW of energy.
  - ✓ 20 MW power will be generated through Solar power plant (12.5 existing & 7.5 additional after expansion).
  - ✓ Total contribution of renewable energy will be 34.5 % after proposed expansion project.

The process description of the Zinc Smelter Complex includes the following units:

A. Zinc Smelter
   a. Roasting Plant
   b. Gas Cleaning
   c. Sulphuric Acid Plant
   d. Tail Gas Treatment Plant
   e. Leaching Plant
   f. Purification Plant
   g. Cell House
   h. Melting and Casting Plant

B. Power Generation

a. WHRB
b. Solar Power Plant
c. DG Set

C. Other associate Facilities

a. ETP
b. STP
c. RO-ZLD with MVR
d. MCTP

A. <u>ZINC SMELTER</u>

a. ROASTING PLANT

The Zinc concentrate, which is in Zinc sulphide form along with other sulphides, is not leachable at normal temperature and acidity. It is therefore necessary to convert this sulphide material to acid leachable form. The purpose of Roasting is to convert the Zinc sulphide to Zinc oxide (Calcine) by burning with air in a fluo-solid Roaster thereby expelling the sulphur as SO_2 gas and subsequently recovering as sulphuric acid in acid plant.

The Zinc concentrate to be treated is stored in a surge bin, with a holding capacity for more than one shift. The concentrate is discharged from the bin by means of a slow running rubber belt. The capacity of Roaster furnace is 954 Tons of concentrate per day (Dry) with a hearth area of 123 m^2.

The principal roasting reactions are as follows.

$$2ZnS + 3O_2 = => 2ZnO + 2SO_2 + 223.6 \text{ Kcal}$$

$$4FeS + 7O_2 = => 2Fe_2O_3 + 4SO_2 + \text{Heat}$$

$$ZnO + Fe_2O_3 = => ZnOFe_2O_3 \text{ (Zinc ferrite)}$$

In order to avoid any gas leakage, in particular through the charge openings, the furnace is maintained under a slight negative pressure. This draught is provided by the SO_2 gas blower and controlled by a louver type damper. The roasting gas at the furnace exit has a temperature of about 950 to 1000°C and a SO_2 content of approximately 9% (Vol.). In a waste heat boiler, the gas is cooled to about 350°C.

The waste heat boiler is of the forced circulation type. It is designed to produce superheated steam at ~40 bar / 400°C. The boiler design provides for tube lined walls and the use of evaporator bundles. All the bundles are suspended at the boiler roof. To avoid any air ingress, the roof is tight welded. A part of the flue dust may adhere on the tube surface; all the bundles are equipped with an effective rapping device, controlled by a timer to make this adhering calcine to fall. The rapping periods may be set as required to optimize operation.

Only de-aerated and treated feed water will be used for the boiler. This water is prepared in the de-mineralized water treatment plant. It is fed into the boiler drum by means of a boiler feed pump. From the drum, the circulating pump delivers the water into the evaporator bundles and wall tubes and the cooling coils of the roaster.

The calcine, collected in the waste heat boiler, drops into a longitudinal hopper arranged underneath the boiler and is discharged by a continuous air-cooled chain conveyor and water-cooled rotary valve. The calcine, collected from the roaster and waste heat boiler, passes through a rotating drum cooler, to be cooled to a temperature below 150°C.

The cooler discharge then passes through a ball mill. The mill discharge and the fine dust coming from the cyclone and hot gas precipitator are combined and transported to an intermediate bin. From the intermediate bin the calcine is pneumatically transported to the leaching plant. A bag filter is provided to ensure de-dusting of the calcine handling system.

Before the first start-up, as well as for start-ups after long shutdowns, the fluid bed furnace and the waste heat boiler have to be preheated. For this purpose, the roaster is equipped with a preheating unit for starting-up purposes, which consists of an oil tank with a pump, oil burners and oil lances. The necessary combustion air is taken from an air blower. Start-up gases are withdrawn by a start-up fan and vented via a start-up stack to the atmosphere provided after gas cleaning section.

b. GAS CLEANING

The purpose of gas cleaning is to clean the gases of dust particles, saturated with water vapour, cooling and making it optically clear by removing the mist particles, thereby making it suitable for feed to the acid plant. The gas cleaning section consists of the following units:

1. Hot gas cleaning
2. Wet gas cooling/condensing
3. Acid mist precipitator
4. Mercury removal system

1. Hot Gas Cleaning

The dust loaded SO_2 gases from the waste heat boiler are de-dusted in one single line three field hot ESP. The hot gas electrostatic precipitator comprises of three separate electrostatic fields arranged in series. The dust particles are charged and separated on the collecting electrodes by the influence of the electrostatic fields. A gas distribution plate located at the electrostatic precipitator inlet ensures the even gas distribution over the sectional area of the electrostatic precipitator. The dust adhering to the collecting electrodes, discharge electrodes and gas distribution plate is removed at certain intervals by motorized rappers.

The removed dust drops into a longitudinal hopper arranged below the electrostatic precipitator casing and is discharged by a continuously operating dust conveyor and two rotary valves arranged in series. The collecting electrodes consist of cold-rolled strips of steel plate. They are arranged in passages. The discharge electrodes of large cross section are rigidly fixed into pipe frames, which are vertically suspended between the collecting electrodes. This rigid frame design is highly efficient.

Both electrode system – collecting electrodes and discharge electrodes – are equipped with highly efficient motorized rapping systems. Hot purge air will be injected to prevent any condensation of Sulphuric acid mists on the surface of the supporting insulators of the discharge electrode systems.

The casing of the electrostatic precipitator will be fabricated from steel sheet and welded gas tight. It has to be fitted with particularly carefully designed heat insulation to avoid condensation of Sulphuric acid and corrosion. Each transformer rectifier is controlled by an automatic high voltage control system.

2. **Wet Gas Cleaning**

Washing Tower

After pre-cleaning in the hot-gas cleaning system, the gas is routed to the wet gas section equipped with a washing tower, which cools the gas adiabatically to a temperature of about 60°C by means of circulating liquid. The washing tower also serves to wash out the bulk of the solids entering from the hot gas ESPs, as well as condensed volatile impurities. Excess liquid will be discharged to a stripper for SO_2 removal.

Cooling Tower

The cooling of the SO_2 gas is done in a packed gas-cooling tower. In counter current flow, cooling liquid (weak acid) is sprayed into the tower and flows downward through packing. By direct contact between the warm gases and the cooling liquid, heat is transferred. Flue gas cools down, gaseous water condenses, and the cooling liquid is heated. The condensate leaving the cooling tower is collected in its sump from where it is delivered to the nozzles by means of a gas cooler flushing pump. The surplus of condensate is withdrawn by gravity from the sump to the washing tower weak acid circuit.

3. **Acid Mist Precipitator**

From the washing and cooling section, the gases are forwarded into two wet gas ESPs for mist elimination arranged in two stages. These ESPs are of the proven tubular type and are constructed mainly of plastic with high mechanical strength and a high chemical resistance. All parts in contact with the gas are of plastic or homogeneously Lead-lined steel. The materials are selected according to the operating environment and stresses acting on the various components. The gases pass through the ESP tubes in a vertical direction, in the first stage flowing upwards and in the second stage flowing downwards. Spike design of discharge electrodes ensure that the mist particles are charged and separated on the tubes. The discharged condensate flows as a film along the tube surface to be collected in the bottom section of the ESP from where it is drained. The condensate stream is combined with the wash acid in the washing tower.

4. **Mercury Removal System (Calomel Process)**

The mercury contained in Zinc concentrate is transferred mainly into metallic mercury vapor during roasting. Some of the mercury may condense or re-combine with other components in the gas to form insoluble compounds. These particles or compounds may be separated in the conventional unit for gas cleaning and cooling before the gases enter the Sulphuric acid plant. But some amount of mercury vapour passes the conventional gas cooling and cleaning system as metallic vapor that must be removed from the gas before feeding to sulphuric acid plant.

Description of Mercury Removal System

The calomel process was originally developed for the purpose of removing mercury vapor from Zinc concentrates roaster gases, after these gases have been treated in the conventional cleaning, washing and cooling plant.

The reactor for removal of mercury treats gases at a temperature of 38°C. The reactor is a counter current absorption tower made of glass fiber reinforced plastic. The tower is packed with plastic rings made of polypropylene. The HgCl2 solution is sprayed over the packing by nozzles. The mercury vapor comes in contact with mercuric chloride solution and transforms to mercurous chloride. When mercury content in circulating water increases, some of the mercurous chloride is taken to a chlorination tank to convert mercurous chloride to mercuric chloride, which is used as make-up in circulating water. The mercurous chloride (calomel) is withdrawn periodically and stored for sale to interested buyers. The main reactions are as follows:

$$HgCl_2\ (l) + Hg0\ (gas) \Longrightarrow Hg_2Cl_2\ (s)$$

$$Hg2Cl_2\ (s) + Cl_2\ (gas) \Longrightarrow 2HgCl_2\ (l)$$

The towers are furnished with demisters in order to prevent drops leaving the tower with the purified gases. The clean gas then goes to sulphuric acid plant for production of H_2SO_4.

c. SULPHURIC ACID PLANT

The SO_2 gas from the gas cleaning section is converted to sulphuric acid by first converting the SO_2 to SO_3 in converter in presence of V_2O_5 as catalyst. The converter has four layers of V_2O_5 catalyst. After 3rd mass, the gas is withdrawn and passed on to intermediate absorption tower where the SO_3 gas is absorbed to produce sulphuric acid. The residual SO_2 is further converted to SO_3 gas in 4th mass in order to achieve maximum conversion efficiency. The withdrawal of SO_3 gas after 3rd mass and converting it to H_2SO_4 accelerates conversion of SO_2 to SO_3 in fourth mass. Conversion of SO_2 to SO_3 in two stages and absorbing SO_3 in two stages is known as double conversion and double absorption (DCDA). In this process, the conversion of SO_2 to SO_3 gas is very high (more than 99.7%) thus allowing very low SO_2 emission (less than 1.5 kg/t of acid production).

The Sulphuric acid plant mainly consists of 3 plant sections:

- The drying and absorption section
- The converter section with the gas-to-gas heat exchangers
- The product acid tank farm

1. Drying and Absorption Section

The drying and absorption section mainly consists of the drying tower, the intermediate absorber, the final absorber, the acid pumps, the acid pump tanks, the acid coolers and the acid piping.

The gas flow through the towers is counter-current to the acid flow, i.e., the gas flows from the bottom to the top of the tower. From the bottom of the tower(s) the acid flows to the pump tank and is pumped from there by the acid pumps (via the acid coolers) back to the spray system.

Acid transfer lines between the drying tower, the intermediate absorber and the final absorber and injection lines for dilution water at the intermediate absorber and final absorber allow control of the

necessary acid concentration for each of the towers.

The Sulphuric acid is produced as +98% H_2SO_4 and the product acid is taken from the final absorber pump tank. The acid is then cooled in the product acid cooler and pumped to the existing acid storage tanks.

a. Converter System

In the converter, the SO_2 bearing gas is converted to SO_3 (sulphur trioxide) in the presence of Vanadium Pentoxide as catalyst, which is subsequently absorbed in acid towers to convert into sulphuric acid.

The converter system consists of a four-layer central tube converter. The intermediate absorption is the following outlet of the 3rd layer. The converter itself is an insulated, vertical and cylindrical vessel divided in four sections called layers or trays with a central tube. The catalyst required for the conversion of SO_2 to SO_3 is arranged on these layers. The SO_2 gas flows up stream through layer 1 and downstream through layer 2, 3, 4.

Three gas-to-gas heat exchangers II, III and IV are designed as mixed cross flow/counter flow shell and tube heat exchangers. These heat exchangers mainly consist of inlet and outlet chambers, tube sheets, the tubes and baffles. Heat exchanger III ensures the optimum gas temperature for the intermediate absorber as well as for the inlet of layer 4.

Another heat exchanger I, inside the converter, arranged in the bottom of the central tube between layer 1 and 2, is designed as counter flow for preheating SO_2 gas to the inlet temperature of layer 1.

b. SO_2 Gas Blower

The SO_2 gas blower is arranged downstream of the drying tower and routes the gas from the Zinc roaster section via the gas cleaning plant through the Sulphuric acid plant. The blower will be provided with an electric motor.

c. Pre-heater

A pre-heater is needed to preheat the converter system from cold condition to operating temperature, whereas during normal operation of the plant the heat released within the process allows auto-thermal operation of the plant. In addition, lower or varying SO2-concentrations can be compensated. The separate pre-heater preheats air or, in the start phases, SO2-gas to the required temperature.

d. Process Criteria for the Acid Plant

For the production of the sulphuric acid, SO_2 containing gases from the Zinc concentrate roasting are used. There are four main process criteria in the production of these kinds of gases by the contact/converter process. They are

- Gas drying
- Water balance
- Heat balance
- Conversion of SO_2 to SO_3 at the required O_2/SO_2 ratio.

<u>Gas Drying</u>

Gas drying is an important process in this type of contact plant. Gas drying protects cooler parts of the plant, such as heat exchangers, against corrosion by acid condensation. It safeguards against the formation of acid mist, which can be very difficult to absorb at a later stage of the process. It also protects the catalyst from acid condensation during plant shutdowns. Therefore, the life of the plant and also the tail gas purity largely depend on appropriate gas drying.

The substantial amount of heat, not just the heat of dilution of the sulphuric acid but also the heat of condensation of the water, is liberated in the gas drying stage. For that reason, the circulated acid is generally cooled by indirect heat exchanger before being recycled to the dryer.

Water Balance

The water balance of sulphuric acid plants in general may simply be defined by the specific amount of process water required for achieving the desired product acid strength from the amount of SO_2 converted to SO_3.

In the case of acid gas plants (like roaster plants) the process water requirements are usually balanced nearly completely by the water vapour content of the SO_2 feed gases entering in the drying tower except for a small margin necessary for the automatic acid strength control.

Thus, at a given SO_2 gas concentration and SO_2 conversion rate and at a fixed product acid strength, the only variable that can and has to be controlled or limited is water vapour content of the feed gasses entering the drying tower in order not to exceed the water balance of the whole system. This is done in the wet gas purification system by cooling the SO_2 gases down to the dew point temperature corresponding to the maximum allowable water vapour content. For determination of the required dew point temperature, it is important not only to consider the negative pressure, for which the gas purification system is designed, but also the external barometric pressure, which depends largely on the elevation of the plant above sea level.

Absorption of SO_3

Sulphur trioxide formed by catalytic oxidation of sulphur dioxide is absorbed in sulphuric acid of at least 98% concentration, in which it reacts with existing or added water to form more sulphuric acid. The process gas leaving the converter system is cooled, first in a gas-to-gas heat exchanger to a temperature of about 160°C before entering the absorber. The gas entering the absorber is therefore not completely cold and it transfers heat to absorber acid as it passes through absorber, by the time it reaches the outlet it is virtually at the same temperature as the incoming absorber acid.

A substantial amount of heat is also generated in the absorber acid from the absorption of sulphur trioxide and the formation of sulphuric acid, and the acid temperature rises as a result by a margin, which depends on the acid circulation rate. The acid concentration is maintained constant by adding process water to the acid leaving the absorber and the acid cross flow from the dryer (to the intermediate absorber only) at a rate controlled by a concentration measuring device. The circulated acid is cooled by indirect cooling.

Heat Balance

The SO_2 gases leaving the wet gas cleaning system enter the acid plant at a temperature of 350-400C (depending on the SO_2 concentration). After removing the residual water content in the dryer, the process

gases must be heated up to the required converter inlet temperature of 440° C. This is achieved by indirect heat exchange with the available sensible gas heat released by SO_2 oxidation in the converter. The main objective of designing such a cold gas plant is to attain auto thermal operating conditions, which becomes primarily a question of the required gas heat exchanger surface, depending on the feed gas SO_2 concentration.

The reaction heat in a double catalysis plant based on roaster gases is released from

- Catalytic oxidation

  $SO_2 + ½O_2 \Longrightarrow SO_3 + 23.45$ Kcal (1)

- Sulphur trioxide absorption and sulphuric acid formation

  $SO_3 + H_2O = \Longrightarrow H_2SO_4$ (2)

- Dilution to the acid production strength of 98.5% H_2SO_4

Condensation heat for water content of the gases entering the drying tower system.

Conversion of SO_2 to SO_3

The catalytic oxidation of sulphur dioxide with atmospheric oxygen in the presence of a solid catalyst to form sulphur trioxide can be described as the classical example of an exothermal, reversible reaction.

$$SO_2 (g) + ½ O_2 (g) \Longrightarrow SO_3 (g) + 23.45 \text{ Kcal}$$

The decisive factor for conversion is in each case also the O_2 concentration of the feed gas. Although, from stoichiometric aspects, a SO_2/O_2 ratio of 1:0.5 would be sufficient, it results already from the consideration of the chemical equilibrium that oxygen in excess will have a favorable influence on SO_3 formation.

In practice, the O_2 content of the gas entering the converter corresponds to 1.0 up to 1.8 times the SO_2 content, this being especially due to the influence of SO_2/O_2 ratio on the activity of the catalyst.

The heat of reaction liberated by SO_2 oxidation (1) Leads to a temperature rise of the gas on its adiabatic passage through the catalyst layer so that the conversion is limited in accordance with the temperature equilibrium curve. With respect to obtaining a maximum SO_2 conversion efficiency to perform the catalytic SO_2 oxidation in several steps and to cool the gas to the most favorable temperature before it enters the next catalyst layer.

The theoretical basis of the double catalysis process is relatively simple and can be derived from the law of mass action. After a defined preliminary SO_2 conversion, after 3rd catalyst layer, the SO_3 formed at this stage is removed from the chemical equilibrium by intermediate absorption so that the equilibrium is shifted in favour of SO_3 formation.

On the basis of the corresponding temperature/conversion equilibrium it is possible to note already qualitatively that with the same number of contact layers as compared to the normal catalyst process, an essentially higher final SO_2 conversion is achievable which is more than 99.7 % in practice.

A decisive advantage of the double catalysis process is the possibility of feeding gases of higher SO_2 concentration than with the normal catalysis process and this means smaller gas volumes and consequently smaller equipment dimensions at comparable production capacities.

O2/SO2 Ratio

For the conversion of SO_2 to SO_3 the proportion of O_2 volume in the feed gas to the converter called SO_2/O_2 ratio, is an important factor for the conversion rate.

Product Acid Storage Tank

The total acid production received in the intermediate and the final absorber is pumped from the final absorber pump tank via the product acid cooler to the acid storage tanks.

d. TAIL GAS TREATMENT PLANT

Off gas from Acid gas will have residual SO_2 and SO_3 which will be further scrubbed off at Tail Gas treatment plant.

The off gas will be treated with NaOH solution in a single or double scrubbing towers. The gas is contacted by the circulating scrubbing liquid and exits from the tower. Most of the liquid falls to the sump while the gas is turned to flow up the vessel. Entrained liquid in the gas is removed by demister pad. This demister pad is accompanied by an automatic water wash system to prevent build-up of solids and pressure drop. The clean process gas is drawn through the ID fan and is discharged to the stack. The caustic soda scrubbing reagent is added under automatic pH control. The caustic reacts with the absorbed SO_2 to form dissolved salts in a fast acid-base reaction. Two pH meters measure the system pH and the control system adjusts the caustic feed accordingly to maintain pH between 6, 5 to 7.

The reaction produces a mixture of sodium sulphite/bisulphite/sulphate salts. These salts must be removed from the scrubber or they will concentrate to levels that would cause precipitation of solids or salting out. The salts are continuously discharged from the scrubber by controlling the density of the circulating liquid. As the concentration of slat builds up, the density of the liquid increases. A density meter monitors the liquid density and modulates a blowdown or discharge valve. The valve will open as the density increases and will close as the density decreases. The solution density is controlled 1070 kg/m^2. This corresponds to approximately 10 wt% of dissolved solids.

The mail reactions of SO2 with the sodium hydroxide are summarized below:

SO_2 (g) + NaOH (aq) $\longrightarrow$ $NaOHSO_3$ (aq)

SO_2 (g) + 2NaOH (aq) $\longrightarrow$ Na_2SO_3 (aq) + H_2O (l)

To reduce the chemical oxygen demand (COD) of the effluent, oxygen is added to the scrubber sump. The oxygen is supplied by the oxidation air blower that supplies air to the oxidation sparger in the sump. The oxidation reaction can be simplified as follows:

$NaHSO_3$ (aq) + ½ O_2 (g) + NaOH (aq) $\longrightarrow$ Na_2SO_4(aq) + H_2O (l)

Na_2SO_3 (aq) + ½ O_2 $\longrightarrow$ Na_2SO_4 (aq)

The liquid level in the scrubber is maintained by controlling the flow of process water to the vessel. As the overall volume of liquid in the vessel decreases due to vessel blowdown and evaporation, process water is added to the vessel to replace the lost liquid volume and maintain liquid level.

The effluent from the scrubber which will contain sodium sulphate will be treated in MEE/MVR process to produce sodium sulphate salt out of that.

e. LEACHING PLANT

The Calcine produced in the roaster and the calcine procured from the other Smelters is stored in the silos. This calcine is conveyed to hopper situated where the leaching plant tanks are located. From there it is distributed throughout the different stages of the process by variable speed screw feeders and conveyors, which are regulated by pH meters that control the process variables.

Neutral Leaching (NL)

The slurry that comes from the cells cleaning and the spent from the Electrolysis area, are pumped into the Head Tank, where Iron content is adjusted in order to improve impurities removal. During the Neutral Leaching stage, the solution contained in the Head tank is pumped to the first tank. The control room predetermines the flow rates. Calcine from the hopper is fed into this tank. The stream from the first tank passes through the tanks successively.

The stream from the last tank flows by gravity to neutral thickeners after adding flocculant. The neutral overflow, free of solids, is pumped into the Purification Plant. The Underflow is pumped into the Weak Acid Leaching tanks.

Weak Acid Leaching (WAL)

The Underflow from the Neutral Leaching and Pre-Neutralization thickener is fed into the first of a series of tanks, together with spent electrolyte, as required. In these tanks, remaining Zinc oxide and some Zinc ferrites are leached. After leaving the last tank flocculent is added to the stream before it enters the Weak Acid Leaching thickeners. The Underflow from the thickener is pumped to Jarosite precipitation section and the overflow pumped to Pre-Neutralization section.

Jarosite Precipitation (JP)

The jarosite precipitation process main function is to simultaneously leach the zinc ferrite and precipitate the iron as sodium jarosite.

The jarosite tanks are arranged in a cascade and are interconnected with an overflow launder. The solution flows by gravity from the first tank down the cascade through all leaching tanks into the first thickener of the CCD system without the need of pumping. Each tank is covered and equipped with an agitator, a vent stack, and steam heating elements. As mentioned above the Weak acid leaching underflow is pumped through a flow indicator and controller into the launder before the first conversion tank in operation. In addition to the spent acid coming from cellhouse, dosed to maintain the free acid level in the process step, concentrated sulphuric acid is also pumped to the jarosite process in order to compensate for the sulphate losses, when jarosite is precipitated and filtered out from the process. The process conditions for the formation of jarosite are:

- ✓ The acidity in the last reactor in operation should be in the range 30 - 40 g/l.
- ✓ All the iron must be in ferric (Fe^{3+}) form.
- ✓ The Na+ ion concentration should be in the range 1 - 3 g/l.
- ✓ The solution temperature must be above 96°C.
- ✓ Long retention time.
- ✓ Presence of jarosite seed material.

The required amount of MnO_2 and Na_2SO_4 will depend on the appearance of the ferrous iron and the Na+ content in the first CCD thickener overflow solution. Temperature controllers installed in each tank automatically hold the desired temperature of 95 - 100°C by automatically controlling steam flow to the heating elements.

The condensates from the jarosite reactors, are collected into the condensate tank. The hot condensate collected in this tank will be used mainly as wash water on the jarosite vacuum belt filters to reduce the zinc content in the final jarosite cake moisture. Should the produced condensate not be sufficient for the filter cake washing, process water will be automatically added to always maintain a minimum water level in the condensate tank.

The main chemical reactions in the conversion process will be:

$$2FeSO_4 + 2H_2SO_4 + MnO_2 \rightarrow Fe_2(SO_4)_3 + MnSO_4 + 2H_2O$$

$$ZnO + H_2SO_4 \rightarrow ZnSO_4 + H_2O$$

$$FeO + H_2SO_4 \rightarrow FeSO_4 + H_2O$$

$$CaO + H_2SO_4 \rightarrow CaSO_4 + H_2O$$

$$PbO + H_2SO_4 \rightarrow PbSO_4 + H_2O$$

$$MeO + H_2SO_4 \rightarrow MeSO_4 + H_2O$$

$$Fe_2O_3 + 3H_2SO_4 \rightarrow Fe_2(SO_4) + 3H_2O$$

$$2FeSO_4 + 2H_2SO_4 + MnO2 \rightarrow Fe_2(SO_4)_3 + MnSO_4 + 2H_2O$$

$$ZnO \cdot Fe_2O_3 + 4H_2SO_4 \rightarrow Fe_2(SO_4)_3 + ZnSO_4 + 4H_2O$$

$$CdO \cdot Fe_2O_3 + 4H_2SO_4 \rightarrow Fe_2(SO_4) + CdSO_4 + 4H_2O$$

$$CuO \cdot Fe_2O_3 + 4H_2SO_4 \rightarrow Fe_2(SO_4)_3 + CuSO_4 + 4H_2O$$

The formation of jarosite will occur as shown in the following reaction.

$$3Fe_2(SO_4)_3 + 12H_2O + Na_2SO_4 \rightarrow 2Na\,[Fe_3(SO_4)2(OH)_6] + 6H_2SO_4$$

The suspension from the last tank will flow via the launder to the CCD thickener for solid-liquid separation. - The CCD thickener system consists of two thickeners - In order to improve the solid-liquid separation, flocculant solution is added to the respective thickener feed launder. The separation thickener overflow is collected in the overflow tank from where it is then pumped to the pre-neutral leaching. The thickener underflow is pumped directly from the thickener under flow cone to the feed launder of the CCD thickener O2 acting as a wash thickener. Flocculant solution is added to the thickener feed launders to improve solid sedimentation rate. In order to improve and accelerate the jarosite formation, a manually adjusted small thickener underflow stream from thickener-01 is recycled to the beginning of the launder before the first jarosite tank. These solids will act as seed material accelerating the jarosite formation.

The jarosite slurry collected in the wash thickener underflow cone is pumped with speed-controlled thickener underflow pumps directly to the feeding boxes of the two horizontal vacuum belt filters in operation.

<u>Jarosite Filtration</u>

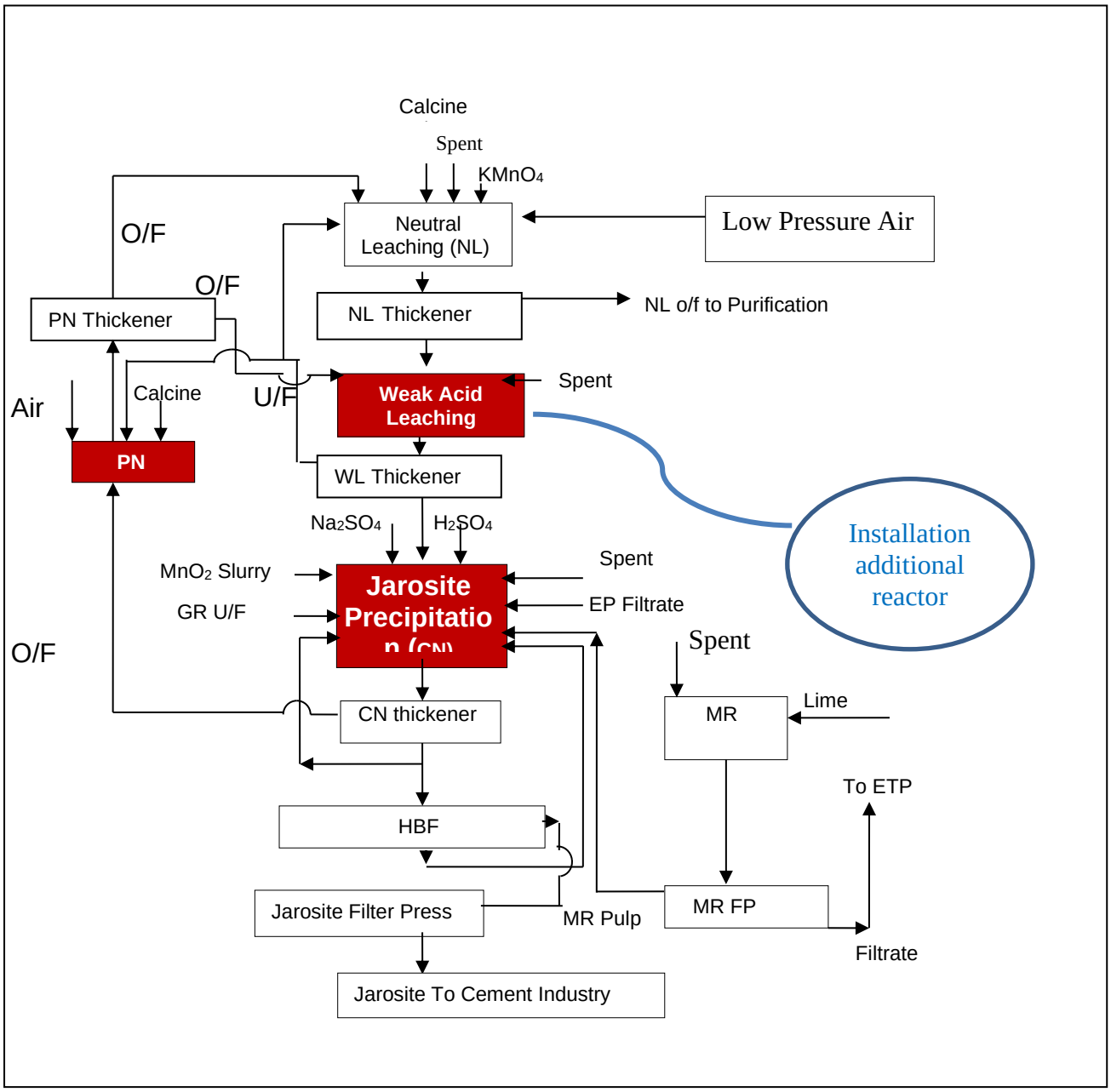
In the jarosite filtration section, the jarosite slurry is filtered and washed on horizontal vacuum belt filters to maximize water-soluble zinc recovery. The underflow from the last conversion CCD thickener is pumped via the speed-controlled thickener underflow pumps to the feed boxes of the vacuum belt filters. The filter separates the supplied slurry into filter cake (moisture content about 35 %) and the liquor. To minimize the soluble zinc content in the final residue, the cake is washed on both filters in two counter current washing steps. The expected water-soluble zinc content in the dry jarosite cake can be reduced to 0.2 % with an estimated wash water ratio of 1.5 m^3 wash water per ton of dry cake. For proper vacuum control each horizontal belt filter will be equipped with its own water-ring type vacuum pump system.

The cake discharge from the filters is transported with conveyor to the repulping tank, where it is mixed with a constant flow of water from ETP treated to obtain a diluted suspension of solids. This suspension (about 300 g/l solids) is then pumped to Jarosite filter press area. At Jarosite filter press area further lime slurry/milk is added to maintain the pH of slurry to 7.0 and then the slurry pumped to Filter press to obtain the less moisture jarosite cake.

In turn the cake is sent to Cement industry for their usage.

Debottlenecking in Leaching:

- Installation of additional Reactors in Weak Acid Leaching section for retention time.
- Modification in Jarosite section agitators to Hydrofoil type.
- Installation of calcine dosing system with online weighment system.
- Modification in Pre-Neutralization section.
- Installation of online pH measurement.
- Installation of bag filter at calcine conveying area for fugitive emission.



f. PURIFICATION PLANT

The neutral overflow is pumped to the Purification Section where impurities are removed until levels drop to the point which facilitates the best possible results in the Electrolysis Section. Special considerations in the design of this plant are:

- The plant has to produce the best quality purified solution
- Minimum Zinc dust consumption
- To obtain the best by-products quality
- The plant has to be fully automated
- The control philosophy for the plant design is to be integrated in a Distributed Control System, managing at the same time Leaching and Purification Plants. Main instrumentation in the file is:
- Frequency speed drives

- pH meters
- Flow meters, regulation and control
- Automatic reagents feeding as a function of the flow
- Temperature measurement, regulation and control
- Density meters, regulation and control (thickeners' Underflow)
- Torque measurement, regulation and control (thickeners)
- Zn, Cu, Co, Cd, analyzers

The Purification Section consists in the following stages:

- Pre-filtration
- Cu removal
- Hot purification/Cobalt Removal
- Polishing/Gypsum removal
- Copper Cement leaching
- Cadmium recovery

The neutral solution that is fed into the Purification Section shall comply with the following requirements:

Solid matter	<0.2 g/l
Zn	140 – 150 g/l
As	<0.200 mg/l
Sb	<0.200 mg/l
Ge	<0.100 mg/l
Fe	<10 mg/l
Mn	2 – 5 g/l
Mg	<10 g/l
Cl	<300 mg/l
F	<10 mg/l

Pre-Filtration

In the Pre-filtration section, neutral overflow solution (containing app. 150 gpl of Zn as Zinc sulphate) produced in the leaching plant at >65°C temperature is sent to pre filtration to remove any cake or mica etc.

Copper Removal

The Neutral Leaching overflow is processed in a series of reactors along with Zinc dust in order to remove the copper and cadmium in the solution. The amount of Zinc dust added is adjusted according to the results obtained from the control analysis every hour. The solution flows by gravity in reactors, from there it flows by gravity by means of a launder into a new thickener where solids are settled.

The thickener overflow is collected in a tank where a small portion of Neutral Leaching overflow is added in order to increase the copper content up to the required level for the cobalt removal in the Hot Purification stage and finally pumped to the Hot Purification stage for further treatment.

The Copper Removal thickener underflow is treated with spent electrolyte (at controlled pH) in separate reactors to allow for the selective leaching of cadmium and excess Zinc dust. The solution flows by gravity into the second tank and then it is pumped to filter presses, where the solid matter containing the copper is retained as cake. The filtrate is collected in a tank which it is pumped to be mixed with the Copper Removal thickener overflow and finally sent to the Hot Purification stage.

Hot Purification/Cobalt Removal

The Cu removal Overflow is pumped through heat exchangers to the first of a series of tanks. The temperature at the entrance of this tank is a constant 75°C, and is regulated by controlling the supply of steam to the heat exchangers. In the first tank both a solution containing K, Sb, tartrate (premixed in the preparation tanks) and Zinc dust are added. After leaving the last tank of the series, the mixture is pumped to the automatic Filter Presses, where the solid matter containing the removed impurities, is retained.

This filtrate is further purified in polishing section by pumping to series of tanks, where Zinc dust is added for removing of any residual impurities, if any. After leaving the last tank of the series, the mixture is pumped to the Filter Presses, where the solid matter containing the removed impurities, is retained.

The working cycle of the Filter Presses is between eight to twelve hours. Once the cycle has been completed the filter press is isolated from the circuit and the cake is discharged onto re-pulping tank, and then to the first tank of the Cadmium stage for further removal of Cadmium and Cobalt. The filter cloths are also washed online to remove the solid particles adhering to them.

The pH of the solution, previously filtered through the Hot Purification stages, is adjusted by the controlled addition of spent, before the solution enters in the tank from where it is pumped up to the cooling towers.

It is proposed to recover 11.5 TPA, Cobalt as Cobalt oxide/compound (equivalent metal) from generated cobalt cake within existing plant premises.

Cadmium Recovery

It is proposed to produce the 99.995% refined Cadmium Metal from 800 TPA to 3000 TPA by the Cadmium sponge (having cadmium content of 65%, zinc content of 8%, copper content of 0.5%, hydroxide content of 14%, a sulfate compound of 8.6%, and a silica content of 1.5%).

(i) Cadmium

1. Briquetting of Sponge Cadmium

Cd Sponge is pressed into a sponge cadmium clusters by a briquetting machine. The sponge cadmium cluster contains less water, and is also convenient for storage, transportation and smelting in the later stage.

After the sponge cadmium filter press is filtered, if it is not washed in time and cooled, the cadmium is mostly oxidized within 24 hours. A large amount of heat is released, and the released heat accelerates its oxidation. The production of cadmium is low in efficiency and high in cost. This design adopts the water washing and water immersion scheme to control the oxidation problem during the production, storage and transportation of sponge cadmium. Water requirement should be provided for filter box operation during basic & detail engineering.

2. Charging for Reducing Furnace

The reducing furnace charging system adopts 1 robot + 1 heavy conveyor and 2 feeding belts to feed the briquette and NaOH bags (25 Kg). The cadmium cake, NaOH bags (25 Kg) are fed by a robot, and pulverized coal are fed by a silo + a screw feeder + an electronic belt.

3. Sponge Cd Reduction Smelting by Melting Salt at Low Temperature

Cadmium is easily oxidized in the air. Sponge cadmium produced by wet smelting of zinc has oxidized problems after storage and briquetting. It is necessary to reduce cadmium oxide formation to produce metal cadmium. Using sodium hydroxide as an anaerobic agent, a heat transfer agent and a slagging agent, the sponge cadmium cake is reduced to crude cadmium by using carbon as a reducing agent under anaerobic conditions and at 500-550°C. In this process, zinc is also involved in the thermal reduction of metal, and finally remains in the form of sodium zincate in the cadmium alkali residue. The cadmium alkali residue contains about 20% of zinc, and the zinc content of the obtained crude cadmium is less than 0.02%.

4. Continuous Vacuum Distillation Purification of Crude Cadmium

The crude cadmium is vaporized under vacuum condition of 570-590°C and 50 Pa, and then partially refluxed and condensed. The pure cadmium vapor is condensed at 450°C to obtain refined cadmium with a cadmium content of 99.995%.

5. Refined Cadmium Ingot Casting

One intelligent robot for each die-casting line is used for picking, trimming, coding and palletizing. The ingot casting process has a good working environment, low labor intensity, and no waste water discharge.

6. Cadmium Alkali Residue Treatment

Cd Sponge reduction will produce a certain amount of cadmium alkali slag. The main components of cadmium alkali slag are sodium hydroxide, sodium carbonate, cadmium oxide and sodium zincate. Since the amount of cadmium oxide is variable, the ratio of sodium hydroxide to sodium carbonate will be different, and the cadmium alkali slag is highly soluble in water. It is directly cut into a crushed alkali block of less than 50 mm, which is used for neutralizing waste acid or into the rotary kiln to volatilize zinc and cadmium therein.

7. Cadmium Flue Gas (with Dust) Treatment

The emission standard for flue gas of cadmium and cadmium compounds needs to be discharged at 0.85 mg/Nm^3. This design uses a dust removal of sintered plate dust collector. Before the cadmium flue gas enters the sintered plate dust collector, the cyclone dust removal is used to remove alkali (fog), and then cooled by a surface cooler. At last, the fly ash (particle size 100-200 mesh) is fluidized, and then it enters the sintered plate dust collector. Cadmium compounds and Cadmium are removed. The collected cadmium oxide soot is returned to the reduction furnace for reduction and smelting to produce crude cadmium.

(ii) <u>Copper</u>

Copper is one of the few metals that can occur in nature in a directly usable metallic form (native metals). Copper, silver, and gold are in group 11 of the periodic table. These three metals have one s-orbital electron on top of a filled d-electron shell and are characterized by high ductility, and electrical and thermal conductivity.

Copper is found as an impurity in the Zinc Concentrate which is removed in the purification process in the form of purification cake and further leached to Copper Residues which is recovered as Copper Compound.

(iii) <u>Cobalt</u>

Cobalt cake is generated during treatment of Purification cake. This cobalt cake is washed with water to remove manganese ions. Then the cake is leached. The leachate is oxidized to remove iron and arsenic. Using Zinc dust Copper, Cadmium present are cemented and removed. The filtrate is then treated with oxidant to remove Cobalt as cobalt concentrate. Remaining Zinc sulphate solution is recycled back to the main plant.

(iv) <u>Nickel</u>

Nickel is recovered through extractive metallurgy: it is extracted from its ores by conventional roasting and reduction processes that yield a metal of greater than 75% purity. In many stainless-steel applications, 75% pure nickel can be used without further purification, depending on the composition of the impurities.

Most sulfide ores have traditionally been processed using pyro-metallurgical techniques to produce a matte for further refining. Recent advances in hydrometallurgical techniques have resulted in significant nickel purification using these processes. Most sulfide deposits have traditionally been processed by concentration through a froth flotation process followed by pyro-metallurgical extraction. In hydrometallurgical processes, nickel sulfide ores undergo flotation (differential flotation if Ni/Fe ratio is too low) and then smelted. After producing the nickel matte, further processing is done via the Sherritt-Gordon process. First, copper is removed by adding hydrogen sulfide, leaving a concentrate of only cobalt and nickel. Then, solvent extraction is used to separate the cobalt and nickel, with the final nickel concentration greater than 99%.

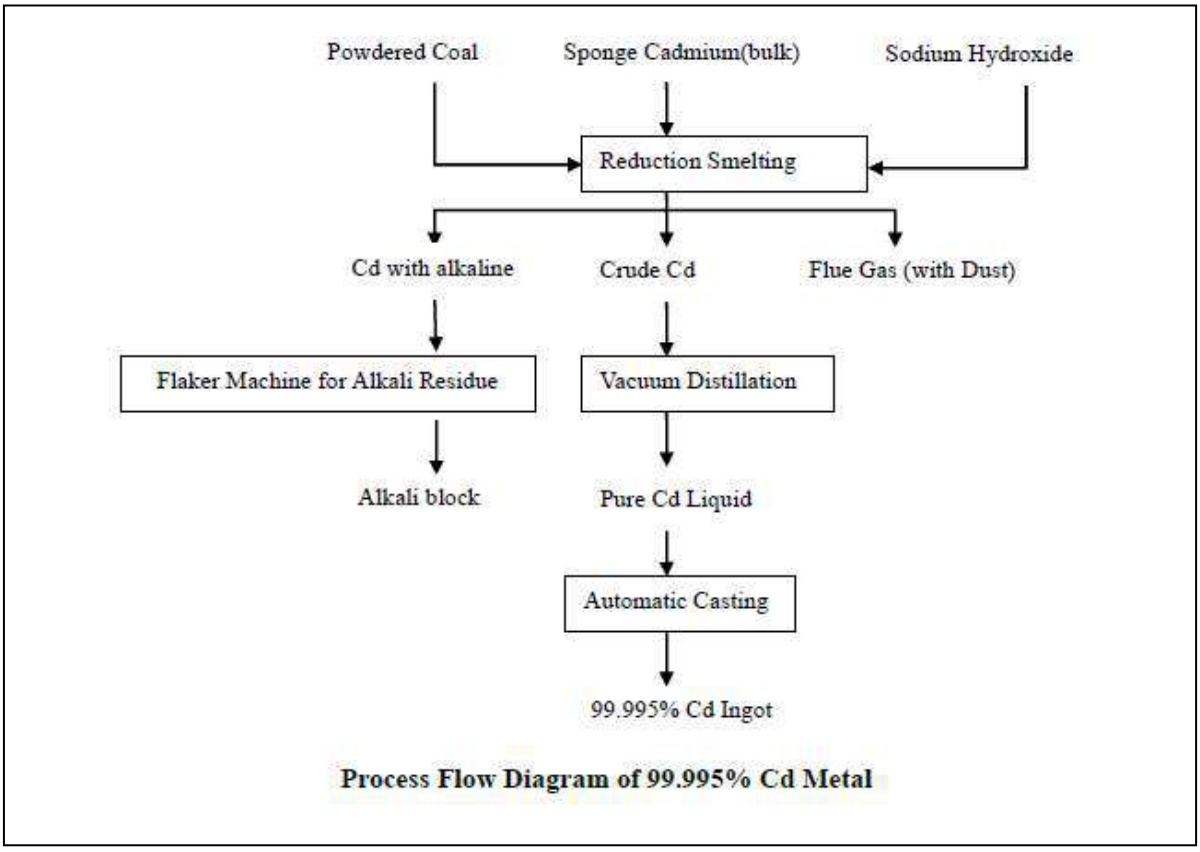


Figure 2.6: (A): Process Flow Chart of 99.995% Cd Metal

Cooling and Basic Salt Separation (Gypsum Removal)

The purified solution from the polishing stage of purification section must be cooled down from 75°C to approx. 35°C prior to being fed to the electrolyte cycle. During this cooling operation, basic Zinc salts as well as gypsum crystals together with some impurities are partly precipitated in line with the temperature-dependent solubility limits in aqueous Zinc sulphate solutions.

Cooling is achieved in atmospheric cooling towers, where the solution is contacted with air in counter current flow. The cooled solution is collected in a launder system and flows to a settler where the solids, mainly basic Zinc salts and gypsum crystals, will settle. The settler overflow is fed to the spent electrolyte. The cooler cake obtained while periodical cleaning of cooling tower is discarded.

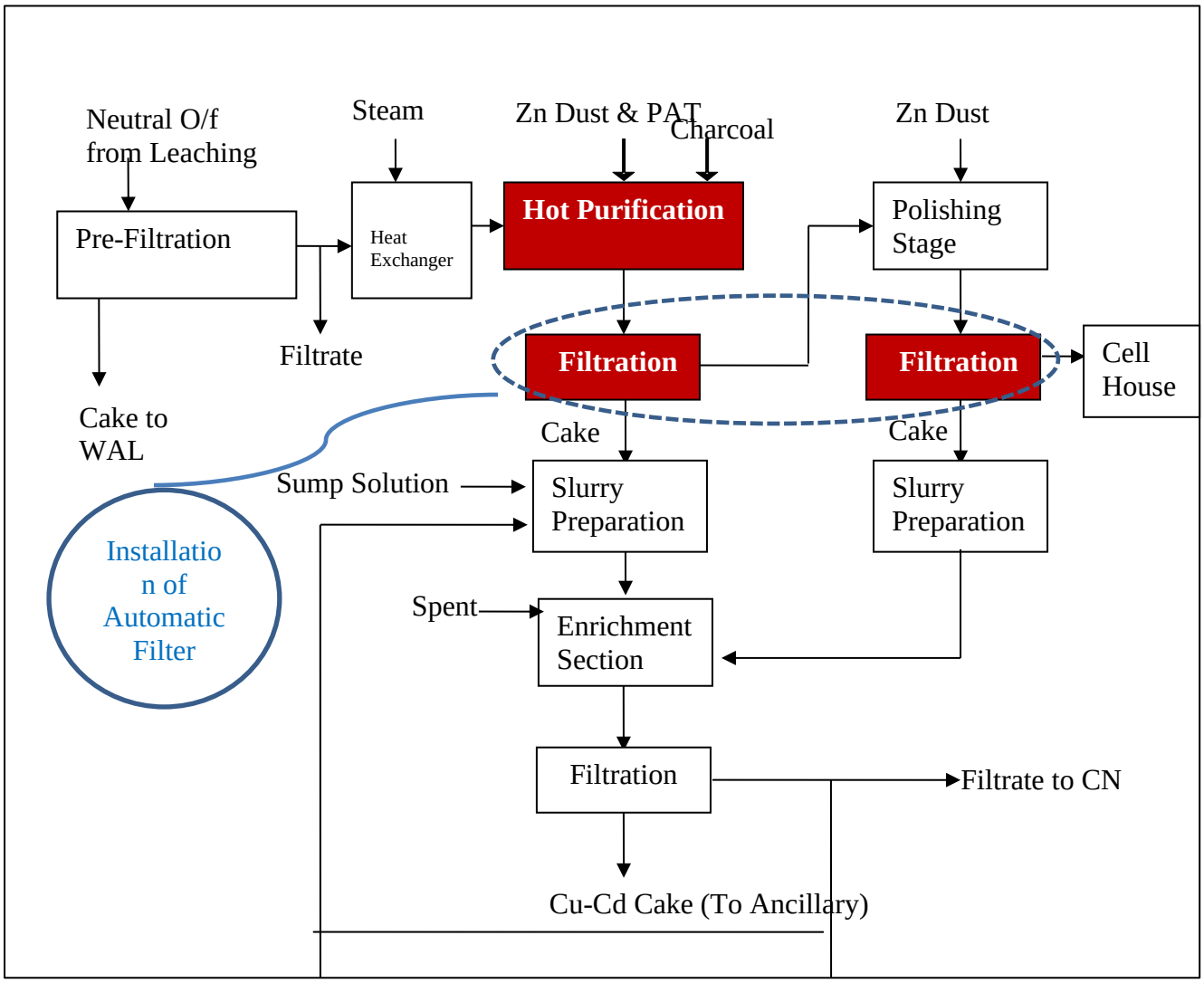


Figure 2.6(B): Process Flow Chart of Gypsum Removal

g. CELL HOUSE

The purified solution, after having been treated for basic salt, is stored in the purified solution tank. The tank house designed according to the commercial technology using 3.6 m^2 cathodes.

Spent electrolyte discharged from the tank house via the main collecting launder is collected in spent electrolyte storage tanks. From there a certain amount of spent electrolyte is pumped directly to the neutral leaching plant.

The major portion of the spent electrolyte is pumped to atmospheric cooling towers, where the spent electrolyte is cooled down to approximately 35°C. The cooling towers are of the same design as those for the neutral solution. The mixing of neutral leach solution and spent electrolyte takes place in the collecting launder under the influence of turbulence.

The electrolytic recovery of Zinc is brought about by passing continuously electric current through the aqueous Zinc sulphate electrolyte acidified with H_2SO_4 and the insoluble electrodes. The electrodes are of two types, Aluminum cathode and High silver Lead Anodes. The high silver Lead Anode is made of Lead metal containing silver received from another sister unit. Here the electro winning takes place causing the

decomposition of the Zinc sulphate and the water. The metallic Zinc settles on the cathode and the oxygen on the anode, thereby recovering Sulphuric acid from the hydrogen of the water.

This process takes place in poly-concrete, concrete with HDPE lined, and insulated cells equipped with 31 anodes and 30 cathodes each. The tank house contains 576 cells. The electrodes of each cell are coupled in series by bus bar.

The electrolyte is supplied to the individual cells via distributing launder and pipes. Reagents, such as strontium carbonate, Arabic gum, are added to improve deposit quality, increase current efficiency and suppress acid mist formation.

The direct current is fed from the rectifiers to the individual cells via bus bars mounted on isolators, which rest on special supports. The basic reaction in electrolysis is as follows.

$ZnSO_4$ + electricity ==> Zn++ + SO_4^{--}

$Zn^{++} + 2e^{-}$ = => Zn

Stripping of Cathodes

During the electrolysis process as already mentioned the Zinc is deposited on aluminum cathodes, which in a cycle of 24 to 48 hours have to be taken out from the cells in order to remove the Zinc deposit. The cathodes will be auto stripped with the help of auto stripping machine after electrolysis process.

The stripped Zinc sheets are stacked, weighed and transported by forklift to the storage platform inside the melting and casting plant.

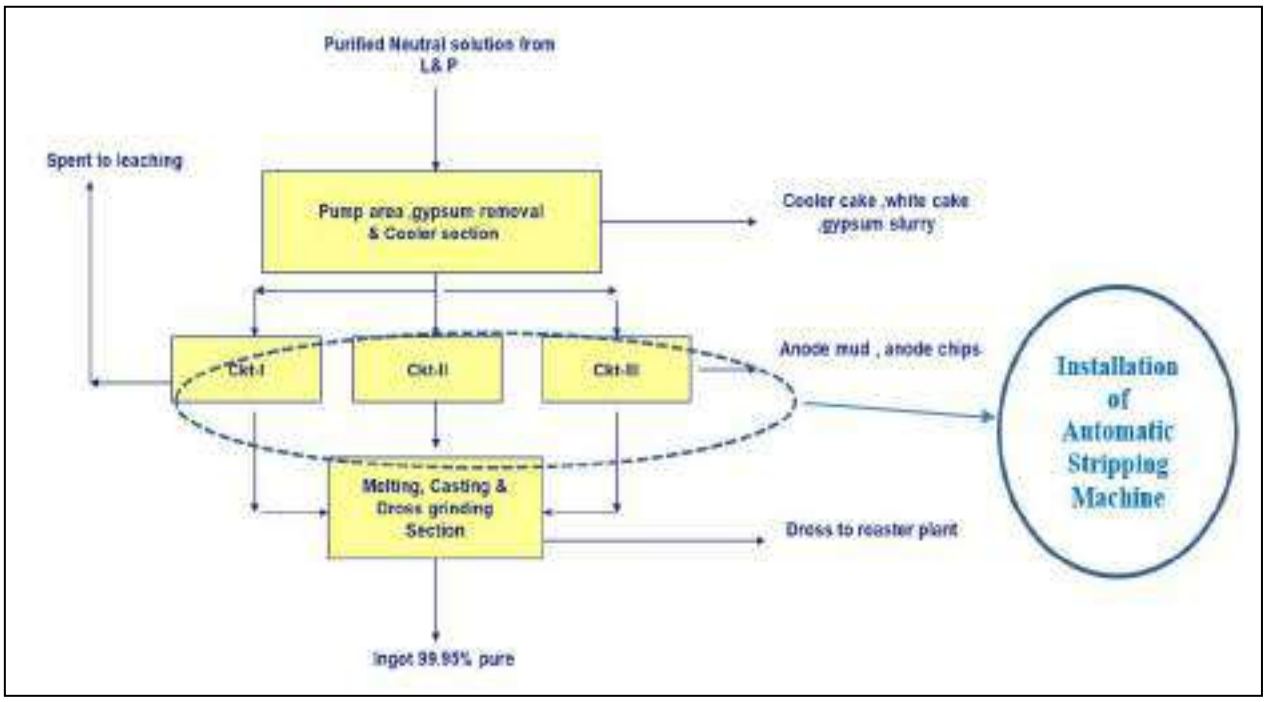


Figure 2.6(C): Process Flow Chart Cell House Operations of Stripping of Cathodes

h. Melting and Casting Plant

The Zinc sheets are first stored on the storage platform to ensure that they are dry prior to feeding them into the melting furnaces.

1. **Melting of Zinc Cathodes**

The Zinc sheets are fed into the induction furnaces. The Zinc sheets are melted down under a layer of ammonium chloride which serves the purpose to destroy the oxide film that may be formed during the melting operation, thus ensuring that the amount of Zinc going into the dross is kept relatively low.

The molten Zinc is pumped from the furnace's sump by graphite made vertical pumps through steel launders lined with heat resistant materials to the slab/jumbo casting machines

2. **Casting of Zinc Slabs**

The Zinc ingot production will be cast into standard 25 kg slabs / 600-1000 kg Zinc blocks. The molten Zinc is pumped from the induction furnace through the launders to the casting machine. The casting machine is provided with automatic Zinc pouring that ensure the proper filling of each casting mould with the required amount of molten Zinc. The Zinc slabs/blocks are cooled down inside the casting machine by water sprays. Afterwards, the slabs are automatically stacked in the stacking device and weighed on a scale. The bundles of Zinc slabs with a weight of 1050 kg are collected on magazine conveyors from where they are transported to the storage section by forklift and finally strapped.

3. **Dross Treatment Section**

The dross from the Zinc cathode melting furnaces, which contains approximately up to 90% of Zinc, is firstly stored and cooled down in the transport containers.

The dross mills are discontinuously charged with dross produced at the main induction furnaces. During the grinding operation a suction fan continuously withdraws the fine dross particles mainly consisting of Zinc oxides and ammonium chloride. The mixture of air and dust passes through a cyclone and afterwards the bag filter. The clean air is discharged to atmosphere; whist the fine dust is collected and conveyed to the raw-material storage. The metallic Zinc is sent to the Zinc dust plant for melting/ charging in the induction furnace.

The completely new Jumbo Cell house equipped with following equipment will be installed

Full automized electrode handling

- Full automized cathode stripping
- Full mechanized anode cleaning
- Jumbo cell with 114 cathodes & 115 anodes
- Effective cathode area:3.5 m^2
- Nominal current density:400 A/m^2
- Stripping cycle:48 h
- Zinc and Acid Content in Spent Electrolyte
- Zn 50 g/l
- H_2SO_4 80 g/l
- Cathode Melting & Casting Plant
- The melting and casting plant consists of the following sections:
- Two 2,4 MW cathode zinc smelting induction furnaces

- One 22 t/h zinc slab casting machine
- One 22 t/h 1 ton zinc block casting machine
- Dross treatment plant

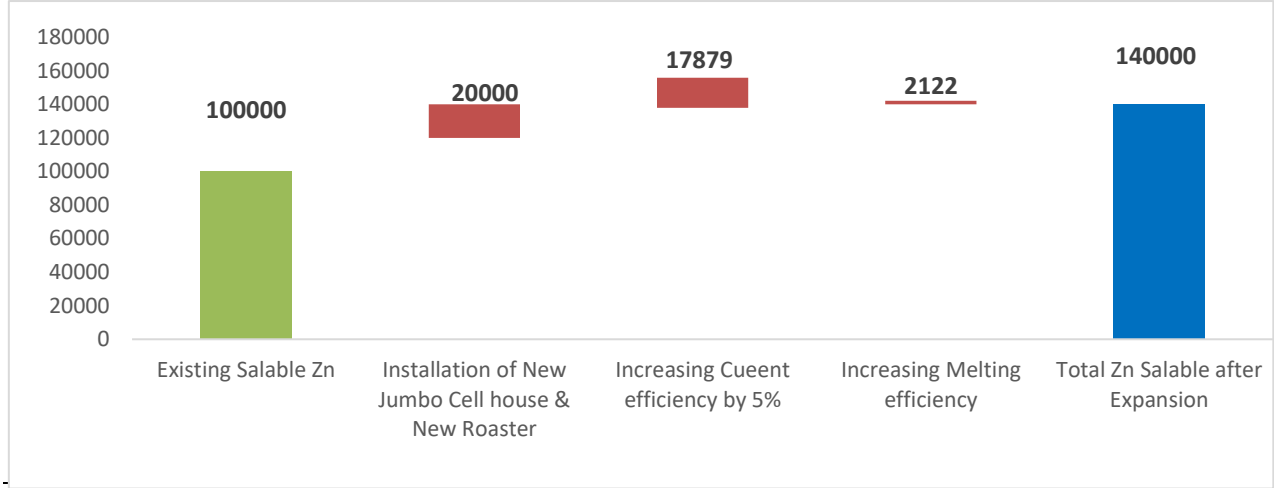


Figure 2.6(D): Bar Graph showing Zn production from 1,00,000 TPA to 1,40,000 TPA by Debottlenecking in Cell House & Melting-Casting:

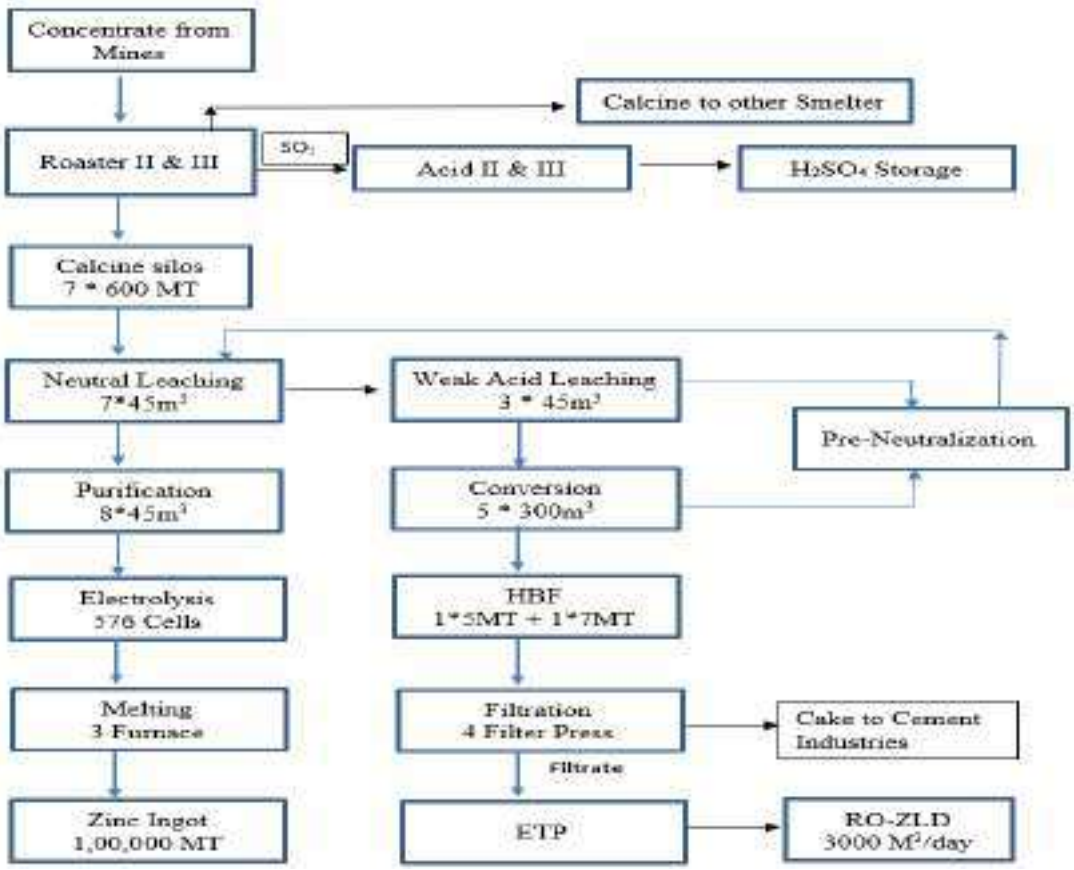


Figure-2.6(E): EXISTING PROCESS FLOW DIAGRAM

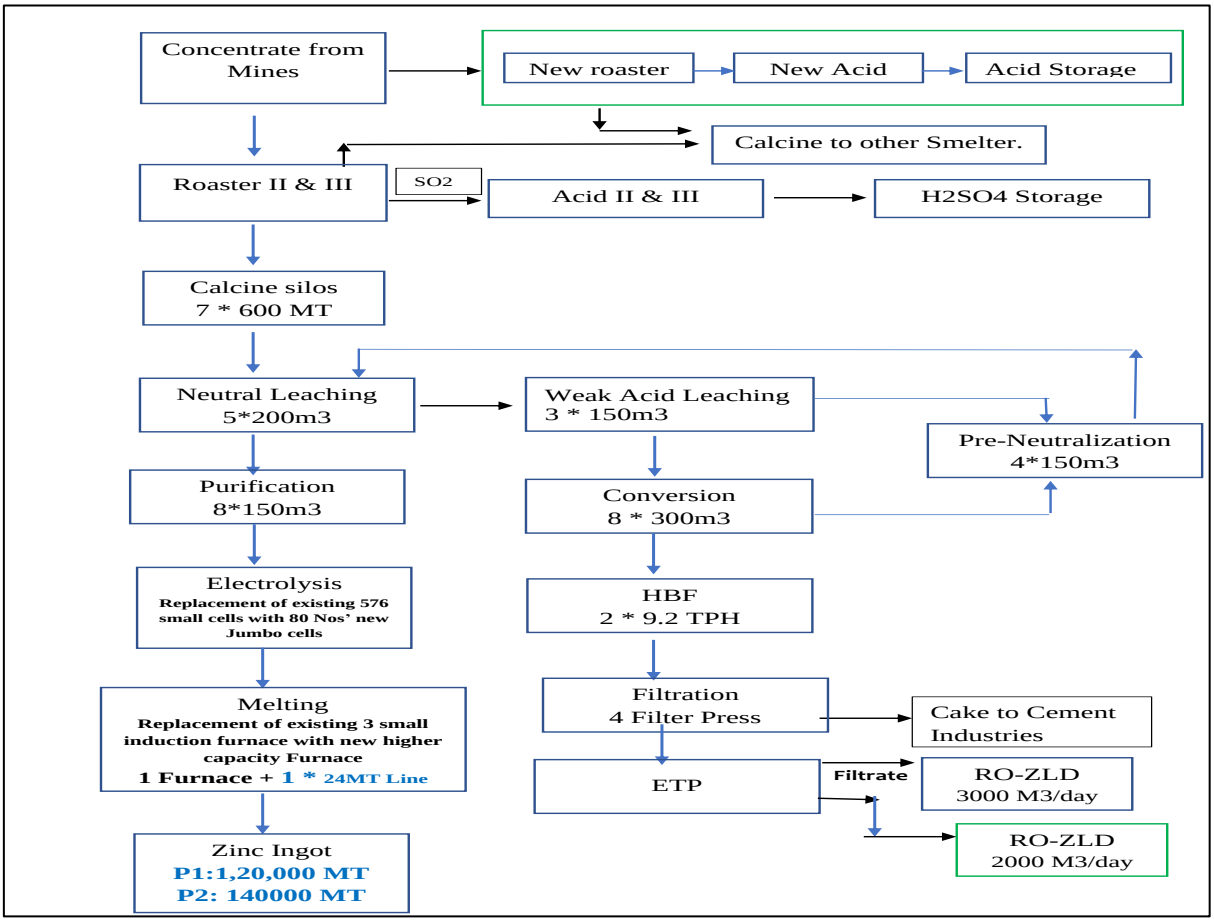


Figure-2.6(E): EXISTING PROCESS FLOW DIAGRAM

Power Generation

a. WHRB (Waste Heat Recovery Boiler)

Waste heat recovery boiler turbo generator is utilizing Heat energy of Steam provided by the WHRB to generate the power output steam is depend upon type of turbine used weather it is Condensing type or Back pressure or condensing cum back pressure. Back pressure turbine or condensing turbine are designed according to steam requirement for process. The difference between the input & Output Supply of steam with respect to pressure & temperature that much work will be done through Turbo generator according to that we are getting power. Total existing power generation capacity of waste heat recovery is of 8 MW. A new waste heat recovery boiler (WHRB) will be installed with the proposed roaster (300000 TPA) which will generate 10 MW of energy.

b. D.G. Sets

The fuel oil is heated for free flow to D.G. Set. It is transferred for settling-to-settling tank to remove unwanted material. Fuel oil is further centrifuged. After centrifuging, the fuel oil is transferred to another service tank, heated, filtered and injected into engine for combustion.

The engine generates power and produces electricity. Total 2 Emergency DG sets are available for back up and emergency purpose with capacity of 14.80 MW at Existing Debari Zinc Smelter plant.

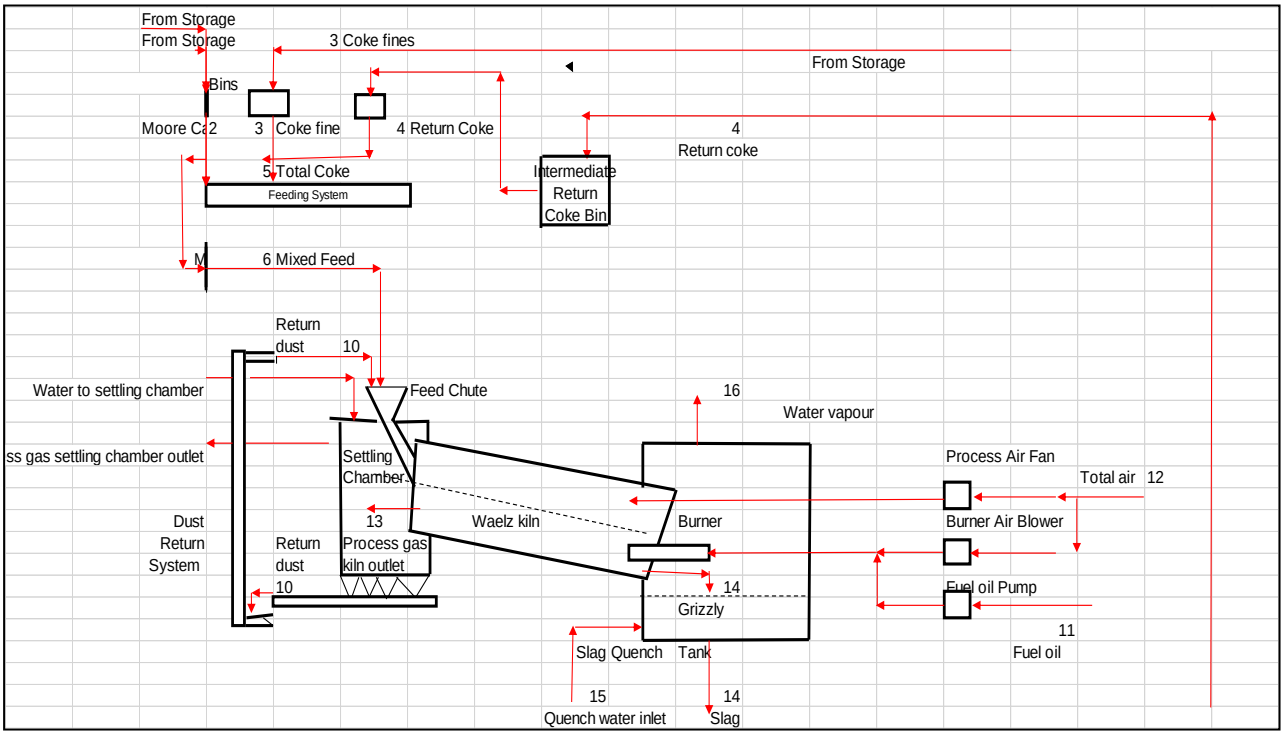
One DG set of 1.2 MW capacity is proposed in this project additionally for Emergency Back-up purpose only.

c. Solar Power plant

Industrial Solar Power Systems have gained popularity in India with major industries resorting to solar power for avoiding grid outage situations. Solar technologies convert sunlight into electrical energy through photovoltaic (PV) panels that concentrate solar radiation. This energy can be used to generate electricity or be stored in batteries. When the sun shines onto a solar panel, energy from the sunlight is absorbed by the PV cells in the panel. This energy creates electrical charges that move in response to an internal electrical field in the cell, causing electricity to flow. Total existing power generation capacity of Solar power Plant is 12.5 MW which will be increased to a total of 20 MW through capacity enhancement of solar plant by 7.5MW.

B. Other associated Facilities

a. MCTP



The plant flowsheet of the DZS Waelz kiln operation is very simple.

It consists of the following process steps:

1. MC Reclaiming

Reclaiming of the Moore Cake from the adjacent dump and charging it into an intermediate hopper. Large lump of foreign material are retained by a screen and manually discarded.

2. Feed Preparation

MC and coke fines are mixed from the feed bins onto a belt conveyor and the mixed charge to the Waelz kiln is weighed by means of a belt weigher. The proportioning of the coke fines to the MC is not measured. No flux is added to the feed. The moisture of the charge is "as received".

3. **Waelz kiln**

The Waelz kiln is a rotary kiln, having a length 47 m, inside diameter 3.8m and free diameter 3.4 m, with inclination of 3° (5.24%). The diameter of the discharge opening is 2.3 m. The kiln is lined with refractory brick of 0.2 m thickness. A fuel oil burner for burning auxiliary fuel and a process air fan are provided at the discharge end of the kiln. The rotational speed is variable between 0.4 and 1.2 rpm.

4. **Slag Treatment**

The dry slag is discharged into a water quench bath and removed from the rectangular inclined base by a wet slag scraper, which discharges into a conveyor belt system transporting the wet slag to the slag yard. Unburnt coke is not recovered from the slag.

5. **Process gas treatment: First Stage Solids removal**

The process gas treatment exiting the Waelz kiln at the feed end enters the settling chamber, in which the gas velocity is substantially lowered in order to separate the coarse, inert entrained material from the fine fumed ZnO and PbO by settling. The settling dust is collected in hoppers at the bottom and returned and admixed to the feed entering the kiln.

6. **Process gas treatment: First Stage Gas Cooling**

The process gas is cooled down from 600°C to 200°C in a radiant heat cooler consisting of 8 parallel rows of 2 U-tubes in series. The total radiation surface is 1260 m^2. Dust collected in the cooler is returned to the feed or to the product, depending on grade.

7. **Process gas treatment: Direct gas cooling by air injection**

The process gas exiting the U-tube cooler at about 200°C is further cooled to 100°C by direct admixing of air by means of two dampers, manipulated by hand for the regulation of air inflow.

8. **Process treatment: Bag filter filtration**

Two bag filters with a total capacity for filtering 152,000 m^3/h process gas, using a filter area of 1,642 m^2, are provided for the separation of the mixed ZnO/PbO fumes from the process gas. The operating temperature is 100°C. The collected fumes are pneumatically transferred to the W.O. product bin.

9. **Induced draft Fan**

The ID fan regulates the negative pressure of the entire Waelz kiln system. It operates at a fixed speed and has a capacity of 166,000 m^3/h at a pressure drop 455 mm WG. The suction capacity is lowered by a throttling device to a suction pressure of about 150 mm WG.

10. **Stack**

The process gas is exhausted through the stack of 50 m high.

11. **Process Control**

The available process control equipment is reduced to a minimum:

- Feed Belt weigher: * Only one
- Temperature measurements: * Kiln burner zone
  * Process gas treatment: different points
- Pressure drop measurements: * Kiln discharge end

* Bagfilter pressure drop

* ID fan suction

Table 2.17: Equipment Details

S. No.	Description	UOM	Existing Qty	Proposed Additional
1	Roasting furnace	Nos	2	1
2	RAB	Nos	2	1
3	WHRB	Nos	1	1
4	GCP	Nos	2	1
5	Quenching tower	Nos	2	1
6	SO2 Blowers	Nos	2	1
6	Converter	Nos	2	1
7	Acid Plant	Nos	2	1
8	Reactors/Tanks	NOs	60	1
9	Clarifier /thickeners	Nos	8	2
10	Coolers	Nos	11	1
11	Electrowinning Cells	NOs	576	Replaced with Jumbo cells of 80 Nos'
12	Rectifier	Nos	3	Replaced with higher capacity 80 MVA recftifier
13	DG sets	Nos	2	1
14	Melting Furnace	Nos	3	1
15	ETP with 2 stage RO	NOs	1	Nil
16	Casting line	Nos	1	1
17	3000 KLD (RO-ZLD /MVR unit with 2 stages RO)	NOs	1	1

b. ETP with RO-ZLD /MVR system

ETP Process Details: ZSD

Zinc Smelter Debari has the Effluent Treatment Plant (ETP) with the capacity of 5760 KLD to treat effluent generated from various step of process. All the trade effluent is treated in ETP with the following steps: -

- The pH of the effluent is being maintained by lime slurry dosing in the inlet channel of D-01 A/B through control valve.
- After proper agitation in the tank, the overflow of D-01A/B goes into Thickener F-01 for Flocculant addition is requires for settling of precipitated solids.
- The overflow of F-01 passes into D-02 A/B to increase retention time and overflow of this tank passes into F-02 thickener for final settling of solids.
- The overflow of F-02 is the treated water which is being send to the storage tank D-06 & F-04. Furter the ETP treated water is being send to RO-ZLD plant (Capacity 3000 KLD) to ensure the unit as Zero Liquid Discharge (ZLD) and to improve quality & quantity of treated water. All the treated water is being used in process.

- Underflow of F-01 and F-02 goes to filter press for removing the solids containing heavy metals in the form of cake and the filtrate water is recycled to storage tanks.

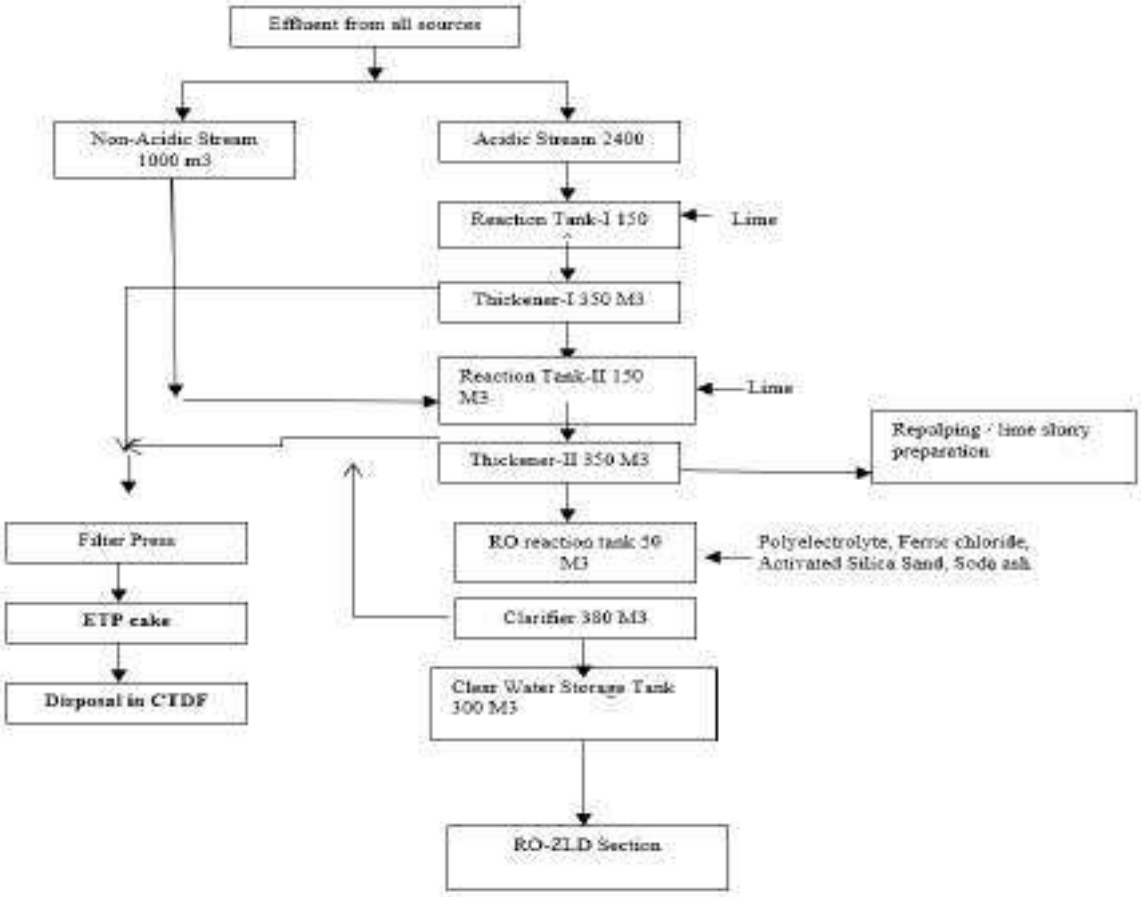


Figure 2.7: Schematic Diagram of Effluent Treatment Plant-ZSD

c. 3 MLD RO-ZLD Plant- ZSD

Zinc Smelter Debari has the RO-ZLD plant with the capacity of 3 MLD. RO-ZLD

- The treated water of ETP comes in an Equalization tank as RO inlet to uniform the water quality and then goes into the pretreatment section. Where the lime-soda softening was done to reduce the hardness.
- Treated water process through the SUF (Submerged ultrafilter). SUF membranes are polyvinylidene fluoride (PVDF) hollow fibers with a nominal pore size of 0.04 microns. SUF permeate goes for R0-1 as feed.
- RO-1 is 3 stages with an Array configuration of 16:8:4 with 85 % Recovery. RO-1 Reject goes in RO-2 feed tank.
- RO-2 is a single stage with an Array configuration of 3 with 40 % Recovery. RO-2 Reject transferred in Crystallizer Feed tank and Both RO permeate goes to Final permeate tank.
- In the Crystallizers feed tank, the RO reject water is being concentrate by using heat to evaporate water from the effluent.
- After that a gas blower recompresses (MVR) increased the pressure and temperature of Crystallizer Vapor and fed into the Heat Exchanger.
- The components dissolved in water are turned into a solid material (crystals) by evaporation and removing the water. Solids as a RO-ZLD salt is collected from Centrifuge for reuse in leaching process.
- Steam Condensate came into the Distillate tank and transferred to the final permeate tank for further reuse in plant process.

Figure 2.8: RO ZLD Plant

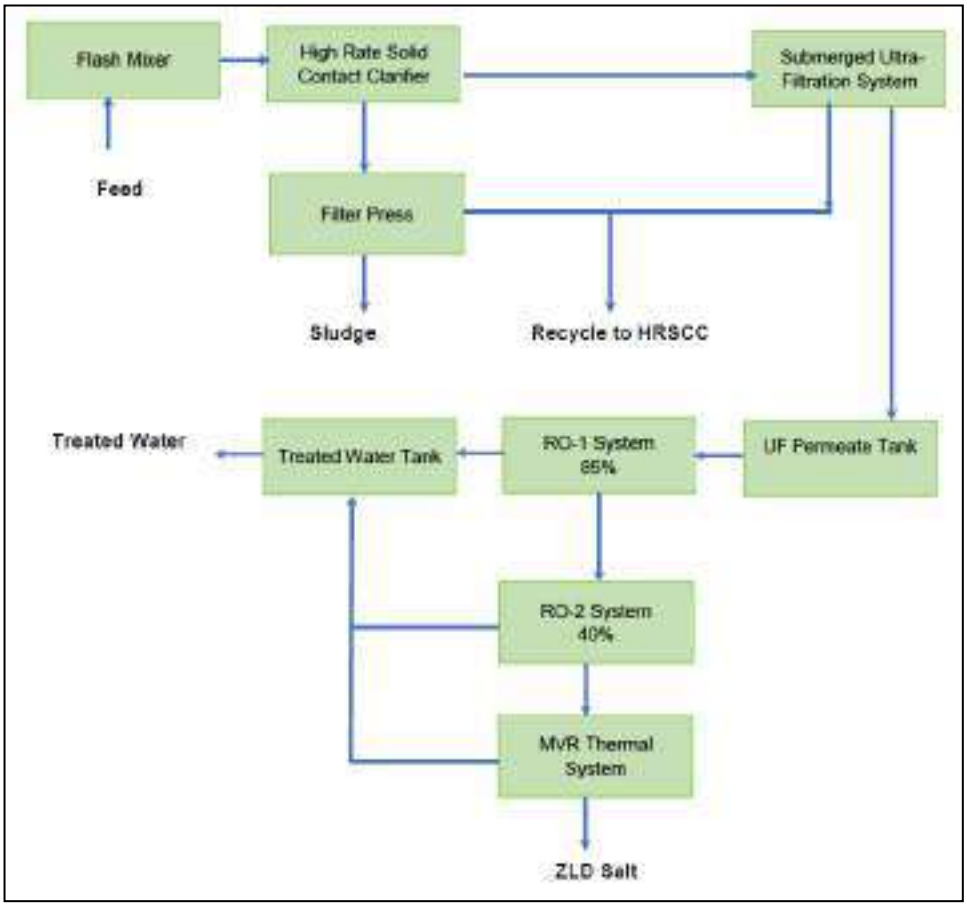


Figure 2.9: Schematic Diagram of RO-ZLD unit-ZSD

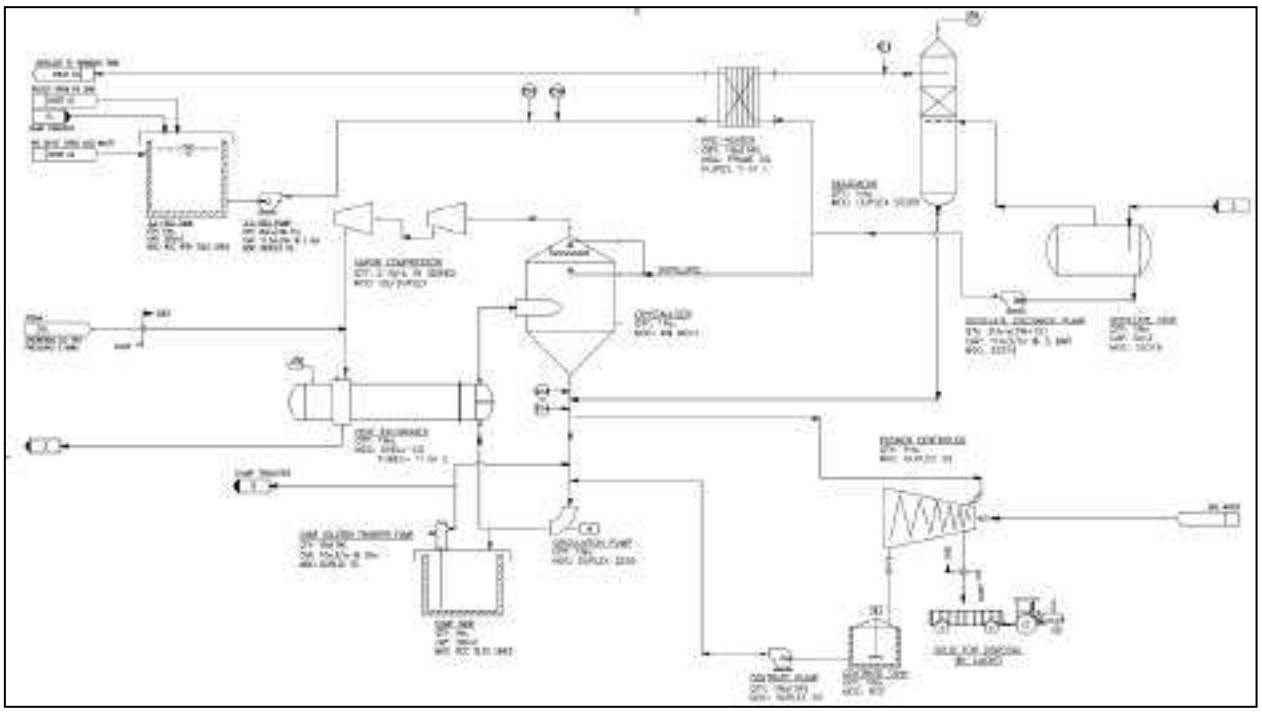


Figure 2.10: Process Flow Sheet RO-ZLD unit

d. STP (200 KLD) Treatment Process Manual

1. **Solid Separation Zone:** This is the primary treatment process that could separate coarse solid, scum, oil & grease from Sewage Water.
2. **Aeration Zone:** The clear water flow into this stage. Oxygen supplied by air blowers is required for the digestion of the bacteria cultures thriving in and around the media inside the aerated zone, thus reducing the amount of contaminants while generating more contacts with the bacteria cultures on the surface area of the media. The quality of Sewage Water becomes better.
3. **Sedimentation Zone:** The next step of treatment involves the sedimentation where organic wastes are settled in the sedimentation zone. The settled waste in the bottom of the tank can then be pumped back to the solid separation as a return sludge. To ensure that quality of sewage would pass the standard norms after passing thru filtration unit. Chlorine disinfection is offered before discharging the water into further usages.

Follow the following steps to start & run the system –

System Components:

1. Bar Screen Pit
2. Oil & Grease Chamber
3. Equalization Tank
4. Air Blowers
5. Aeration system – FAB
6. Tube Settler
7. Sludge recycling pump
8. Filtration System – DFM & ACF
9. Treated Water Storage Tank

Methodology

Fluidized Aerobic Bed Reactor (FAB)

This process is the aerobic biological treatment technology. FBR employs RING PAC MEDIA, neutrally buoyant bio film carrier elements, to achieve outstanding BOD/COD removal productivity from a compact bioreactor. In Fluidized Bed Reactors, the liquid to be treated is pumped through a bed of small media at a sufficient velocity to cause fluidization. In the fluidized state the media provide a large specific surface for attached biological growth and allow biomass concentrations to develop.

TUBE SETTLER

Tube Settler are used in water treatment plants to settle out suspended solids. Application is Depending on the suspended solids loading, when the solid settling force is higher as all drag forces, solids will settle down on the channel surface of the tube settler, accumulate with other solids and slide down as sludge.

Tube settlers increase the settling capacity of circular clarifiers and/or rectangular sedimentation basins by reducing the vertical distance. The floc particles would settle before agglomerating to form larger particles. The settlers use multiple tubular channels sloped at an angle of 60° and adjacent to each other, which combine to form an increased effective settling area. This provides for a particle settling depth that is significantly less than the settling depth of a conventional clarifier, reducing settling times. Tube settlers capture the settle able fine floc that escapes the clarification zone beneath the tube settlers and allows the larger floc to travel to the tank bottom in a more settle able form. The settler's channel collects solids into a compact mass which promotes the solids to slide.

Dual Media Filter (DMF)

A DMF consists of vertical or horizontal pressure sand filters that contain two layers of coarse and fine sand (pebbles and gravels) in a fixed proportion. It is a kind of a deep filter bed with adequate pore dimensions for retaining both large and small suspended solids and un-dissolved impurities.

The working principle of a DMF is quite straight forward. In a DMF or pressure sand filter, water is passed through multi layers of filter media consisting graded sand, pebbles and gravels layers. The contaminants in the water are captured in the media bed and filtered water passes into the discharge manifold at the bottom of the tanks. The next and last step is backwashing, a process of effectively removal of captured contaminants from the media bed. After backwashing the filter is rinsed with raw water and after the required quality of water is achieved the filter is put back into service.

Activated carbon filter (ACF)

The treated water is free from chloramines (chlorine and ammonia mixture) and organic compounds; therefore, best for discharge and production use. Activated Carbon Filter is utilized in pretreatment as the treated water keeps these systems safe from oxidation or organic fouling. An activated carbon filter (ACF) works on the principle of adsorption; filter medium adsorbs or reacts with a pollutant molecule then filtered water is drained out. Activated carbon which is used as medium to remove contaminants is natural material derived from coconut shell, lignite, bituminous coal etc.

Chlorination

Chlorine disinfection is reliable and effective against a wide spectrum of organisms. Chlorine is effective in oxidizing certain organic and inorganic compounds.

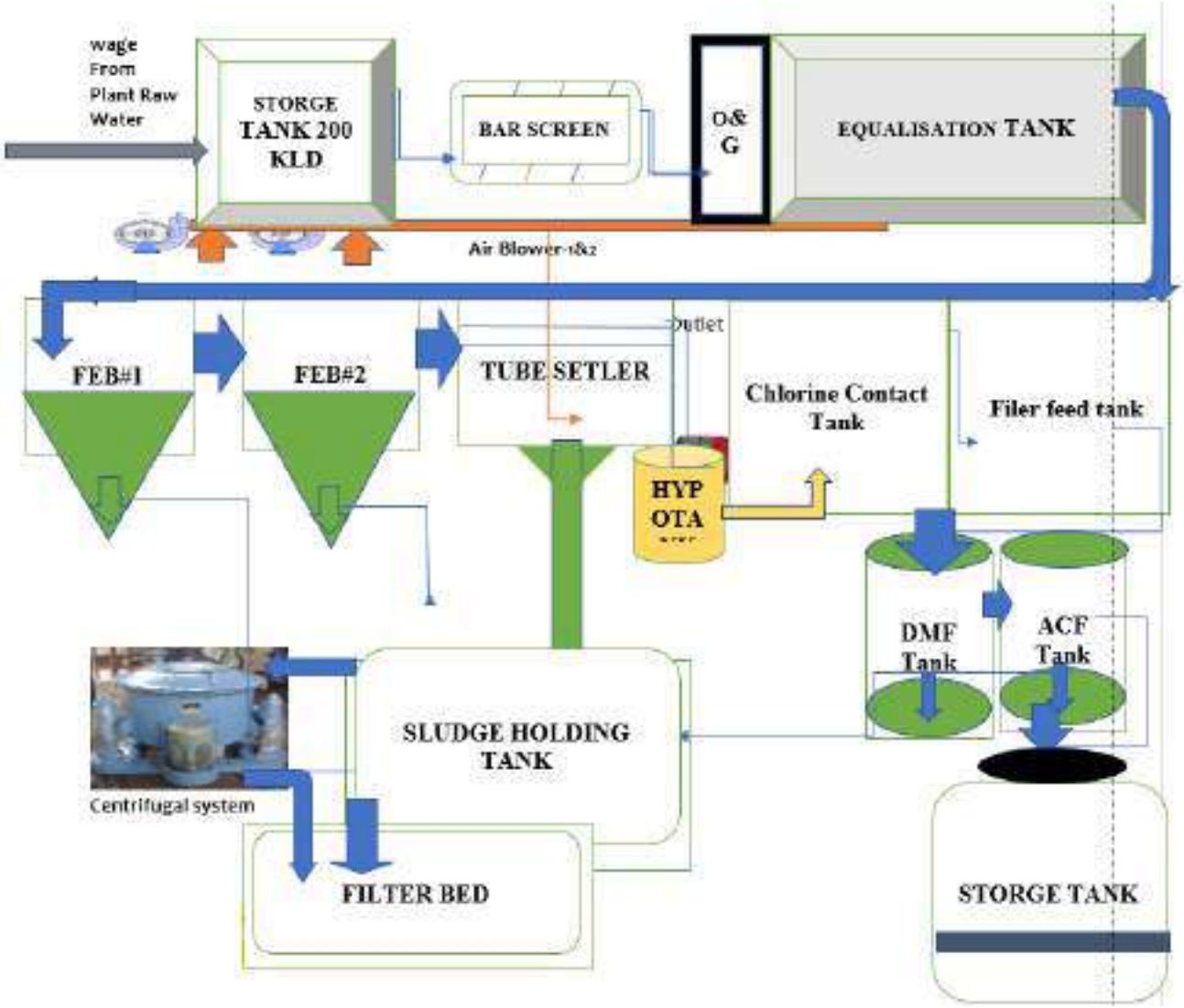


Figure 2.11: Process Flow sheet of STP

2.8 DETAILS OF STP AND ETP

Table 2.18: Details of ETP and STP

Type / Source	Treatment Capacity (KLD)	Treatment Method	Mode of Disposal	Existing		Total After Expansion	
				Quantity of Waste Water Generated (KLD)	Quantity of Treated Water Recycled / Reused (KLD)	Quantity of Waste Water Generated (KLD)	Quantity of Treated Water Recycling / Reuse (KLD)
Industrial	ETP (5760 KLD)	ETP	Zero liquid discharge	3494 KLD (3425 KLD from Zinc Smelter, 41 KLD from DG cooling tower & 28 KLD from MCTP)	Total Recycled water after treatment for existing complex is 3454 KLD and Loss due to Evaporation is 40 KLD. Recycled water	5194 KLD (5125 KLD from Zinc Smelter, 41 KLD from DG cooling tower & 28 KLD from MCTP)	Total Recycled water after treatment for total plant complex after expansion is 5138 KLD. Recycled water is further used in

Type / Source	Treatment Capacity (KLD)	Treatment Method	Mode of Disposal	Existing		Total After Expansion	
				Quantity of Waste Water Generated (KLD)	Quantity of Treated Water Recycled / Reused (KLD)	Quantity of Waste Water Generated (KLD)	Quantity of Treated Water Recycling / Reuse (KLD)
					is further used in industrial processes.		industrial processes.
Domestic & Drinking	200 KLD & 600 KLD	STP		150 KLD (Plant) 300 KLD (Colony)	Plantation purpose, Horticulture purpose	150 KLD (Plant) 300 KLD (Colony) (No change after expansion)	Plantation purpose, Horticulture purpose

Table 2.19: Characteristic of effluent at inlet and after treatment at outlet

S. No.	Parameters	ETP Inlet	ETP Outlet	Standard
1.	pH	1.5-4.5	6.0-9.0	5.5-9.0
2.	Total Suspended Solids (TSS) in mg/l	30-60	54.33	100mg/l
3.	Biochemical Oxygen Demand (BOD) in mg/l	15-25	9.55	30mg/l
4.	Chemical Oxygen Demand (COD) in mg/l	150-220	67.87	250 mg/l
5.	Oil & Grease in mg/l	5-15	3	10 mg/l

Source: Compliance Reports of CTO

2.9 STORAGE FACILITIES

Adequate storage facilities have already been provided within the plant premises separately for raw materials and fuel. Details of existing & Additional storage facilities are given in table below: -

Table- 2.20: Storage Facilities

S. No.	Material	Unit	Type of storage	Storage Capacity		
				Existing	Total Additional	Total After proposed expansion
Raw material						
1.	Concentrate	MT	Covered Shed	13000	2000	15000
2.	fuel	MT	Tanks	2300	Nil	2300
3.	Chemicals lime, Soda etc.	MT	Covered Shed	500	250	750
Products						
4.	Zinc Metal	MT	Covered Shed	500	250	750
5.	Sulphuric Acid	MT	Tanks	5800	5000	10800

6.	Raw Zinc Oxide	MT	Covered Shed	5000	Nil	5000
By-products						
7.	Calomel	MT	Covered Shed	Nil	Nil	5
8.	Cadmium metal /Sponge (Equivalent metal	MT	Covered Shed	100	200	300
9.	Sodium Sulphate /RO-ZLD salts	MT	Covered Shed	Nil	6000	6000
Solid and Hazardous waste:						
10.	Jarosite	MT	Covered Shed	6500	6500	13000
11.	PF cake	MT	Covered Shed	100	400	500
12.	Anode mud	MT	Covered Shed	100	500	600
13.	Cooler cake	MT	Covered Shed	25	100	125
14.	Clarifier cake/calcium salts	MT	Covered Shed	Nil	100	100

2.10 DESCRIPTION OF MITIGATION MEASURES

The mitigation measures given in this section are for management of the emissions, effluents, solid and hazardous waste generation from the plant to meet the environmental standards and environmental operating conditions.

2.10.1 Air Quality Management

The major air pollutants in a Zinc Smelter Complex are PM, SO_2, Acid Mist, NO_x, NMHC & CO from various stacks.

- Emissions generated from production process as well as the prescribed limits from CPCB & MOEFCC are as PM (3 Zinc melting furnaces: 50 mg/Nm3, 2 oil fired Boilers: 600 mg/Nm^3, Slag grinding Plant: 50 mg/Nm3 and DG Sets: 75 mg/Nm^3), SO_2 (Sulphuric acid Plant II and III: 950 mg/Nm^3, 1.5 kg/ton of acid production and oil fired boiler: 600 mg/Nm^3), Acid Mist (Sulphuric acid Plant II and III: 50 mg/Nm^3), NO_x (2 oil fired boilers: 450 mg/Nm^3, DG Sets: 710 mg/Nm^3), NMHC (DG Sets: 100mg/Nm^3) & CO (DG Sets: 150mg/Nm^3).
- Double Conversion Double Absorption (DCDA) Acid Plant to maintain SO_2 emission within the prescribed norms of 1.5 kg/T of acid production.

- Additional Tail Gas Treatment (TGT) is proposed to minimize SO_2 emissions from 1.5 to 1.0 Kg /MT of Sulphuric Acid production in 2nd roaster and proposed roaster
- Demister pad in acid plant is better designed to reduce the emission of acid mist.
- In process, material is being transferred in closed conveyors.
- Extensive dust extraction network consisting of Venturi Scrubbers and Bag Filters are provided.
- Ventilation systems followed by bag filters, are provided in the metal tapping area to control work zone emissions
- State-of-The-Art DCDA Acid Plants & Tail Gas Treatment Plant in roaster.
- Concentrate shed, raw material storage yard, concentrate unloading point area, Belt conveyors and other material transfer points etc. are provided with water sprinklers to arrest the dust and fugitive sources of dust.
- In order to minimize fugitive emissions Zn concentrate containing 8-10% moisture is being handled.
- All existing Stacks are installed with online analysers and connected to CPCB & RSPCB Server.
- Mobile vacuum dust sweeping system on industrial roads and vacuum dust cleaning system for plant area are exist at smelter to control airborne dust due to the vehicles movement. Regular road washing is being done on internal roads.
- Vehicular emissions are maintained as per standard.
- Avenue plantation is ensured along with internal roads to control dust emissions.
- 4 no's of CAAQMS (Continuous Ambient Air Quality Monitoring Stations) are installed with consultation of RSPCB.
- 41.41 % of the area has already been covered with greenbelt / plantation at site.
- DG sets are installed to provide power back up during emergency.
- Emissions from DG set are /will be dispersed through the stack. Adequate stack height has been maintained for the existing DG set as per CPCB guideline.

2.10.1.1 Air Pollution Control Measures

Table - 2.21: Air Pollution Control Measures

S. No.	Section	Name of the Pollutant	Control Systems
1.	Slag Grinding	PM	Bag Filters attached with stack are provided to trap Particulate matter to meet the stipulated limit of 50 mg/Nm^3. The existing system will be utilized.
2.	Sulphuric Acid plant II & III	SO2 Acid Mist	Double Conversion Double Absorption (DCDA), Demister, Absorption towers, ESP, Gas Conditioning Plant, Scrubbers has been already installed to capture SO2 and Acid Mist. Same practice will be continued after proposed expansion.
3.	Zinc melting and Casting furnaces	PM	These units are provided with Bag Filters stacks to trap Particulate matter to meet the stipulated limit of 50 mg/Nm^3. The existing system will be utilized.
4.	Roaster	PM	Ventilation system has been provided in the Roaster Calcine handling and storage section followed by bag filters to maintain stack emissions less than 30 mg/Nm^3 of PM

S. No.	Section	Name of the Pollutant	Control Systems
5.	Leaching Plant	-	Leaching operations are carried out at elevated temperatures and to ensure atmospheric pressure, steam is not widely distributed in the working area. All vessels are equipped with proper venting system.
6.	Moore Cake Treatment Plant	PM and Lead	Bag Filters provided in the section are adequate to handle the expected load. The ventilation air discharge from the bag filter stack will meet the stipulated limit of 50 Mg/Nm^3.
7.	Fugitive Emissions	PM	Concentrate shed, concentrate unloading area shall be provided with water sprinklers to arrest the fugitive dust emissions.

2.10.2 Water Quality Management

The company will take following measures for water quality management: -

- The existing total water requirement of the plant is 8000 KLD. Which included 6950 KLD industrial & 1050 KLD Domestic water.
- Total wastewater generated from the plant is 3494 KLD (3425 KLD from Zinc Smelter, 41 KLD from DG cooling tower & 28 KLD from MCTP) which is being treated in existing ETPs (5760 KLD) out of which 494 KLD of treated water is being used in process and remaining 3000 KLD of effluent is further treated in RO-ZLD/MVR unit. Additional 1700 KLD of effluent is envisaged from proposed projects and for which capacity of existing 3000 KLD RO-ZLD/MVR unit will be increased to 5000 KLD by expansion.
- All trade effluent is being & will be treated in ETP followed by RO- ZLD with MVR unit and zero discharge is being & will be ensured.
- Domestic wastewater (150 KLD) generated from the Plant is being/will be treated in existing STP (200 KLD) and treated water is being /will be used in plantation purpose within the plant premises.
- Domestic sewage generated from Colony (300 KLD) is treated in 600 KLD STP. Treated water is being used in plantation and horticulture purpose.
- No wastewater is being discharged outside the plant. The Plant will remain "Zero Liquid Discharge" Unit after the proposed expansion.

2.10.3 Noise Management

The company will take following measures for noise Mitigation: -

- All the design/installation precautions as specified by the manufacturers with respect to noise control will be strictly adhered to for the expansion project too.
- High noise generating sources are insulated adequately by providing suitable enclosures.
- Design and layout of building to minimize transmission of noise, segregation of particular items of plant to avoid reverberant areas.
- Use of lagging with attenuation properties on plant components / installation of sound attenuation panels around the equipment.
- Equipment producing high noise are designed and procured with acoustic enclosures.

- Other than the regular maintenance of the various equipment, ear plugs/muffs are recommended for the personnel working close to the noise generating units.
- Provision of Inlet and outlet mufflers; easy to design and construct.
- Noise control system designed to form an integral part of the plant.
- The existing greenbelt with rich canopy helps to attenuate the noise emitted by the various sources in the plant.

2.10.4 Quantity of waste to be generated (liquid and solid) and scheme for their management/disposal

2.10.4.1 Details of Solid and Hazardous Waste Generation and their mitigation

The type of solid & hazardous waste generated in Debari Zinc Smelter is tabulated below:

Table 2.22: Solid and Hazardous Waste Generation

S. No.	Material	Schedule	Category	UOM	Existing	Proposed		Total Additional	Total after expansion	Management Practice
						Phase I	Phase II			
1	Spent catalyst	I	17.2	TPA	27	41	0	41	68	CTDF Udaipur/ Registered recycler/ Reprocessing
2	Empty barrels / containers / liners contaminated with hazardous chemicals/ wastes	I	33.1	TPA	10	3	2	5	15	CTDF Udaipur/Registered Recycler/Reuse after decontamination
3	Chemical sludge from water treatment (ETP Cake)	I	35.3	TPA	18000	6789	0	6789	24789	CTDF Udaipur/ Coprocessing in cement plant /Registered recycler/Reprocessing
4	Used Oil/spent oil	I	5.1	TPA	55	-	-	-	55	Sales to registered recycler
5	Filters contaminated with oil	I	5.2	TPA	2	-	-	-	2	CTDF Udaipur/Utilization for co processing in cement plant/Registered Recycler
6	Anode Mud	I	7.2	TPA	1500	99	303	402	1902	Co processing in cement plant /Registered

S. No.	Material	Schedule	Category	UOM	Existing	Proposed		Total Additional	Total after expansion	Management Practice
						Phase I	Phase II			
										recycler/Reprocessing / CTDF Udaipur
7	Cooler Cake	I	7.2	TPA	1017	204	195	399	1416	CTDF Udaipur/Co processing in cement plant /Registered recycler/Reprocessing
8	Purification Cake	I	7.2	TPA	1569	942	418	1360	2929	Reuse in process/sales to registered recyclers / CTDF Udaipur
9	Process Residue	I	7.2	TPA	1200	450	350	800	2000	CTDF Udaipur/Co processing in cement plant /Registered recycler/Reprocessing
10	Resin from water purification	I	35.2	TPA	2	0	0	-	2	Sales to registered recyclers/CTDF Udaipur
11	Zinc Ash skimming /dross	IV	14	TPA	5250	1183	1072	2255	7505	Reuse in process/sales to registered recyclers
12	Clarifier cake /Calcium salts from RO-ZLD	I	35.3	TPA	-	7300	0	7300	7300	CTDF Udaipur/ Reuse in process/sales to registered recyclers/ Co processing in cement plant
13	Jarosite (OW)	Other waste		TPA	84661	21095	17627	38722	123383	Co processing in cement plant/Reprocessing /Recycling
14	Discarded Asbestos sheet	I	15.2	TPA	-	350	0	350	350	CTDF Udaipur
15	Insulation Waste/glass wool	I		TPA	-	100	-	100	100	CTDF Udaipur
16	Slag generated	Other Waste		TPA	-	50000	-	50,000	50,000	Road construction

S. No.	Material	Schedule	Category	UOM	Existing	Proposed		Total Additional	Total after expansion	Management Practice
						Phase I	Phase II			
	from MCTP									and levelling of surface.
17	Wastes or residues containing oil	I	5.2	TPA	970	-	-	-	970	CTDF Udaipur
18	Zinc Dross/Zinc fines or dust or ash or skimmings in dispersible form	I	6.2	TPA	5250	2255		2255	7505	Sale to registered recycler

Source:- Hazardous Waste authorization obtained vide authorization no. F(HSW)/Udaipur (Girwa)/7034(1)/2022-2023/7463-7465 dated 17.03.2023 valid up to (31.12.2027) attached as Annexure 5.

2.10.4.2 Liquid Waste Generation

- No wastewater is being/ will be discharged outside the plant.
- The existing water requirement of the plant is 8000 KLD.
- Total wastewater generated from plant is 3494 KLD out of which 3000 KLD is being treated in RO-ZLD unit and remaining 494 KLD is being used in process after treatment in existing ETPs (5760 KLD).
- Domestic Waste water (150 KLD) generated from the plant is being/will be treated in existing STP (200 KLD) and treated water is being /will be used in plantation purpose within the plant premises.
- Additional 1700 KLD of effluent is envisaged from proposed projects and for which capacity of existing 3000 KLD RO-ZLD/MVR unit will be increased to 5000 KLD by expansion.
- Total effluent generation after expansion will 5194 KLD. For which, Debottlenecking to improve Efficiency of existing ETP is envisaged and additional capacity of 2000 KLD RO-ZLD unit will be installed to treat effluent.
- Mist evaporators are already installed at site. The same will be noting in used after installation of new RO-ZLD unit with MVR system to trade the reject generated from process.
- Effluent treatment plant followed with three stage RO Plant with Mechanized Vapor Recompression (MVR) Plant is already commissioned at site.
- No wastewater is being discharged outside the plant. The Plant will remain "Zero Liquid Discharge" Unit after the proposed expansion.

2.11 ASSESSMENT OF NEW & TESTED TECHNOLOGY FOR THE RISK OF TECHNOLOGICAL FAILURE

Hindustan Zinc Limited is using one of the best and proven technologies for the existing Debari Zinc Smelter Complex. For this project no new or untested technology will be used. The whole process will

be based on proven technology for the units. No technology failure is envisaged as proper maintenance and servicing of equipment and machineries is being/will be carried out with proper risk and hazard assessment in order to handle failure of any machinery.

2.12 CONCLUSION

Hindustan Zinc Limited is using one of the best and proven technologies for the existing Debari Zinc Smelter Complex; looking at the best integration of economic and environmental considerations.

CHAPTER - 3

DESCRIPTION OF THE ENVIRONMENT

3.1 INTRODUCTION

To predict and evaluate the impacts of the proposed expansion project on the surrounding area, it is vital to assess the baseline status of the environmental quality in the vicinity of the project site. An exhaustive attempt has been made in the current chapter to disclose all possible baseline status of environmental quality in the vicinity of the project, which further serves as the basis for identification, prediction, and assessment of impacts. To assess the baseline environmental quality of the area, field assessment has been conducted in the study area concerning the components of the environment, viz. land, meteorology, air, noise, water, soil, biological and socio-economic. The baseline monitoring has been conducted during Summer Season (March, 2022 to May, 2022) covering an area of 10 km radius from the plant site in accordance with the guidelines of MoEF&CC and approved Standard Terms of Reference granted for the expansion project for preparation of EIA/EMP report.

3.2 STUDY PERIOD

The relevant information and data (both primary and secondary) were collected in core as well as buffer zone (10 km distance from the plant boundary) during Summer Season (March, 2022 to May, 2022) in accordance with the guidelines for preparation of EIA studies in order to assess the impacts of expansion project on existing physical, biological and social environment.

3.3 STUDY AREA

The baseline information is collected for the identified study area, where plant site is considered as the core zone and area within 10 km radius of the plant site is considered as buffer zone. The study area for the project falls in Tehsil: Girwa, Vallabhnagar, Mavli and Gogunda, District: Udaipur (Rajasthan).

Environmental Settings within 10 km radius of the plant site (i.e., study area) is given in Table - 3.1 and shown in Figure - 3.1(a). The environmental sensitive areas falling within 1 Km of the plant site are shown in figure 3.1(b). The major industries falling in the study area and the digital toposheet of 10 km radius of the plant site is shown in figure 3.1(c) & 3.1(d), respectively.

Table - 3.1: Environmental Setting Details

S. No.	PARTICULARS	DETAILS *(with approximate aerial distance & direction from the nearest* plant *boundary)*
1.	Nearest Villages	• Bichhri (~0.75 Km in SE direction) • Debari (~1.0 Km in NE direction) • Gowla (~0.4 Km in North direction)
2.	Nearest Town/City	• Udaipur (~5.6 km in WSW direction from plant site)

S. No.	PARTICULARS	DETAILS *(with approximate aerial distance & direction from the nearest* plant *boundary)*
3.	Nearest Railway Station	• Debari RS (~1.5 km in NNW direction from plant site) • Rana Pratapnagar RS (~7.0 km in WSW direction from plant site) • Khemli RS (~9.5 in NNE direction from plant site)
4.	National Highway	• NH-27 (Near to Plant Boundary in North direction from plant site) • NH-48 (~2.5 km in West direction from plant site) • SH-9 (~5.0 km in NE direction from plant site) • MDR- 36A (~0.3 in North direction from plant site)
5.	Nearest Airport	Maharana Pratap Airport – Udaipur (~5.8 km in East direction from plant site)
6.	National Park, Wildlife Sanctuary, Biosphere Reserve, Tiger Reserve, Wildlife Corridors, Reserved / Protected Forest (PF)etc. within 10 km radius	• Panwari RF (Khasara No. 4509, 4510 and 4511 of plant area falls under Panwari Forest) • RF (~1.0 km in ENE direction from plant site) • Kantia RF (Khasara No. 4522 and 4523 of plant area falls under Kantia Forest) • Kamlodia RF (~2.0 km in SW direction from plant site) • RF (~2.0 km in South direction from Plant site) • Bara Magra RF (~1.0 km in NNW direction from plant site) • Bhainsra RF (~3.5 km in NNW direction from plant site) • Segria RF (~3.5km in West direction from plant site) • Hinglashia RF (~3.5 km in SW direction from plant site) • Bordi RF (~3.5 km in WSW direction from plant site) • Dhenkli RF (~4.5 km in NW direction from plant site) • Gugla RF (~5.5 km in West direction from plant site) • Umra RF (~6.5 km in SW direction from plant site) • Bagdara RF (~8.0 km in SSW direction from plant site) • Santu RF (~6.5 km in SSE direction from plant site) • Nahar Magra RF (~6.5 km in NE direction from plant site) • Amberi PF (~8.5 km in NW direction from plant site) • Amarbir RF (~7.0 km in SSE direction from plant site) • Nauva RF (~8.0 km in NNW direction from plant site) • Hora RF (~8.5 km in SW direction from Plant site) • Kheradi RF (~8.5 km in NNW direction from plant site) • Chirwa Ka Ghata (~9.0 Km in NNW direction from plant site)

S. No.	PARTICULARS	DETAILS *(with approximate aerial distance & direction from the nearest* plant *boundary)*
7.	Water Body within 10 km radius	• Udaisagar Lake (~1.0 km in SSW direction from Plant site) • Berach River (~1.5 km in SE direction from Plant site) • Udai Sagar Left Canal (~5.5 km in NE direction from Plant site) • Udai Sagar Right Canal (~1.5 km in ESE direction from Plant site) • Udai Sagar Middle Canal (~0.5 km in East direction from Plant site) • Karget Canal (~2.5 km in SSE direction from Plant site) • Dabok Pond (~3.0 km in ENE direction from Plant site) • Ahar Nadi (~3.5 km in SW direction from Plant site) • Vela Nala (~6.5 km in ENE direction from Plant site) • Khemlitalav (~8.0 km in NNE direction from Plant site) • Bagdara Talav (~8.0 km in SSW direction from Plant site) • Ganeshpura pond (~8.5 km in West direction from Plant site) • Gadela Nadi (~9.0 km in NNE direction from Plant site) There are three seasonal nallahas passing through the plant site, which have run off water from the nearby hill in west direction during rains only Apart from the above, study area is having many seasonal ponds, nallahs, water channels which are active during rainy season.
8.	Wetlands within the study area as per State Wetland Authority	No Wetland site notified under Ramsar Convention, is falling within 10 km radius study area. However, Udai Sagar Lake (~1.0 km in SSW direction from Plant site) has been listed as Wetland by State Wetland Authority, Rajasthan. (***Source:***https://environment.rajasthan.gov.in/content/environment/en/state-wetland-authority/list-of-identified-wetlands.html)
9.	Seismic Zone	Zone - II [as per IS 1893 (Part-I): 2002] i.e., Low Damage Risk Zone

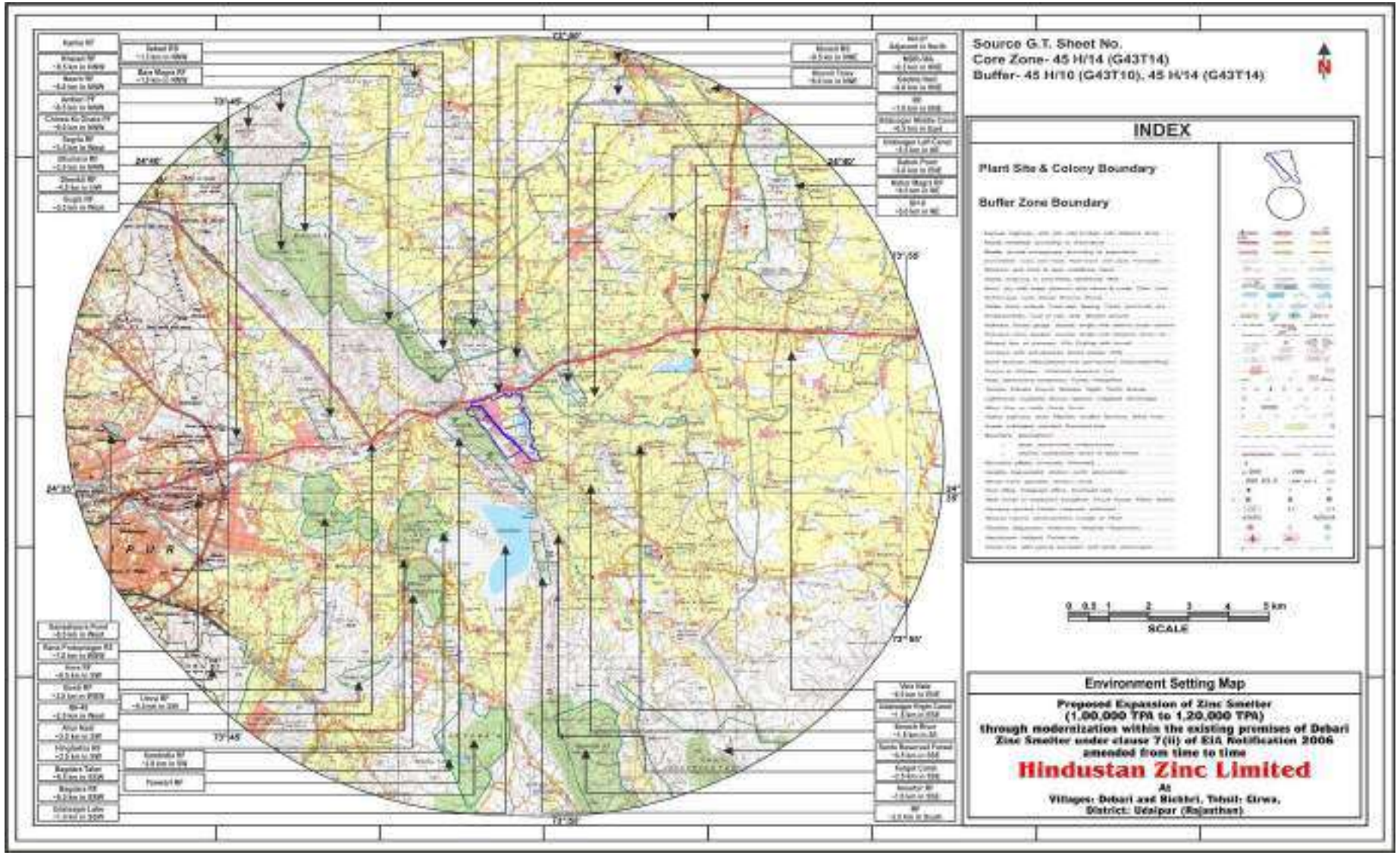


Figure 3.1(a): Map Showing Environmental Settings of 10 km radius Study Area

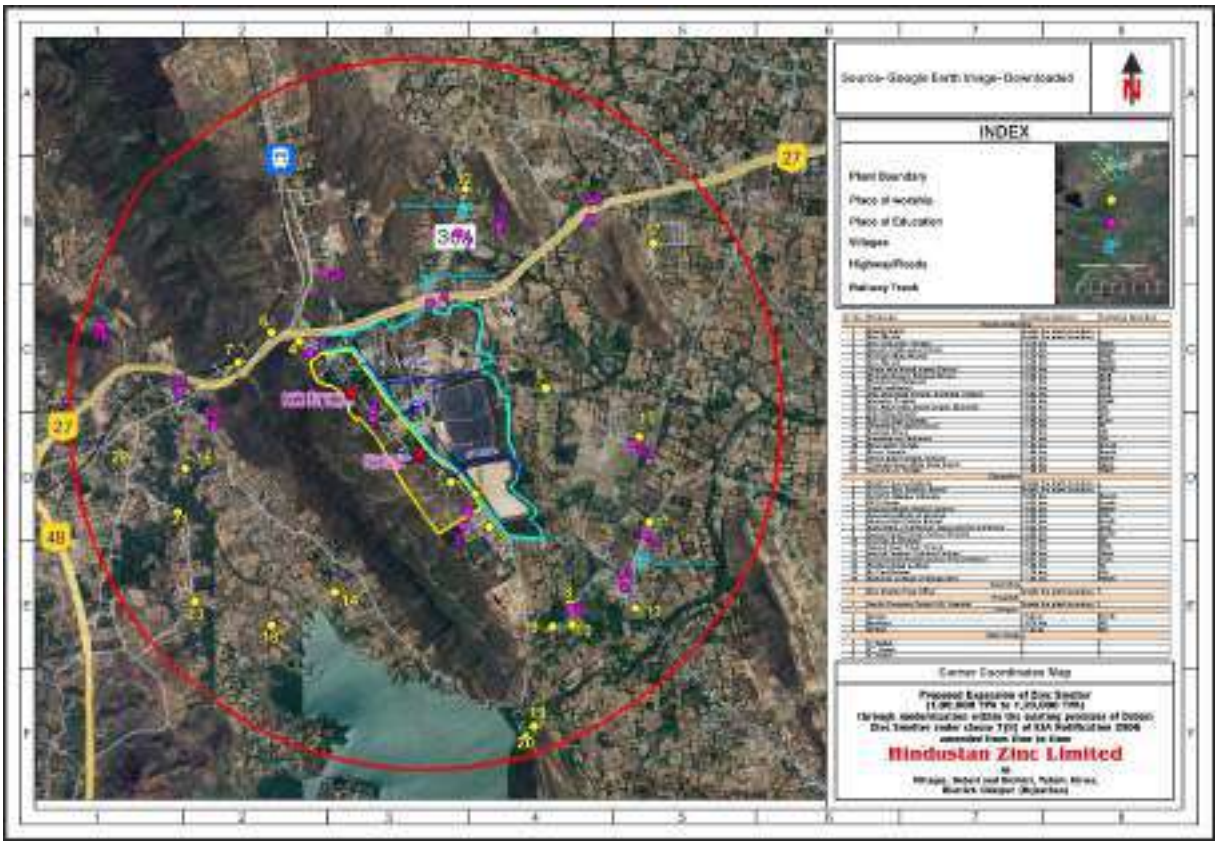


Figure 3.1(b): Map showing Environmental Sensitive Areas present within 02 Km radius of the Plant site

There are total 23 worship places, 16 school/education institutions, & 3 villages within 2 km radius of the project site. 1 post office, I hospital & 3 nalas are there within the project site. Further details regarding the same are given in the chapter 4.

Table 3.2: List of major industry falling within the 10 km radius study area

S. No.	Name of location	Type of industry	Approx. Distance from the project boundary (km)	Direction from centre of the project site
1.	Kitchen Basket manufacturing	Steelwork manufacturer	2.3 km	North
2.	A to Z sheet metal works	Manufacturer of Storage Tank	4.5 km	North
3.	RIICO industry, Gudli	Industrial area	4.3 km	NNE
4.	Mewar Industrial Area	Industrial area	6.0 km	WSW
5.	Patel Enterprises	Manufacturing disposal glass and cups	0.12 km	NNW
6.	Reliance Chemotex Industries Limited	Manufacturing & Industrial Consultant	6.5 km	WSW

Source: Google Earth and field survey

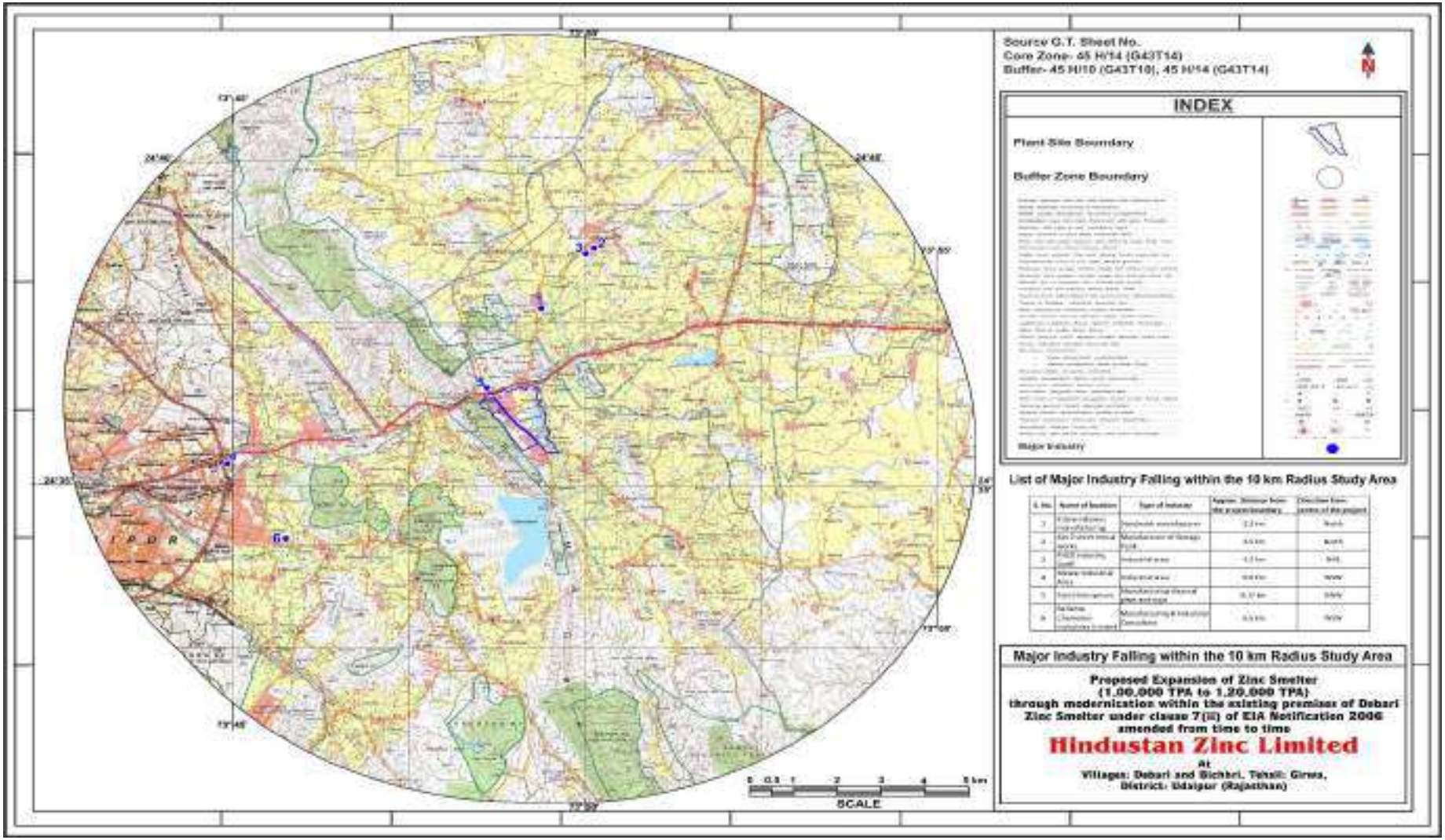


Figure 3.1(c): Map Showing List of Major Industries falling within the 10 km radius Study Area

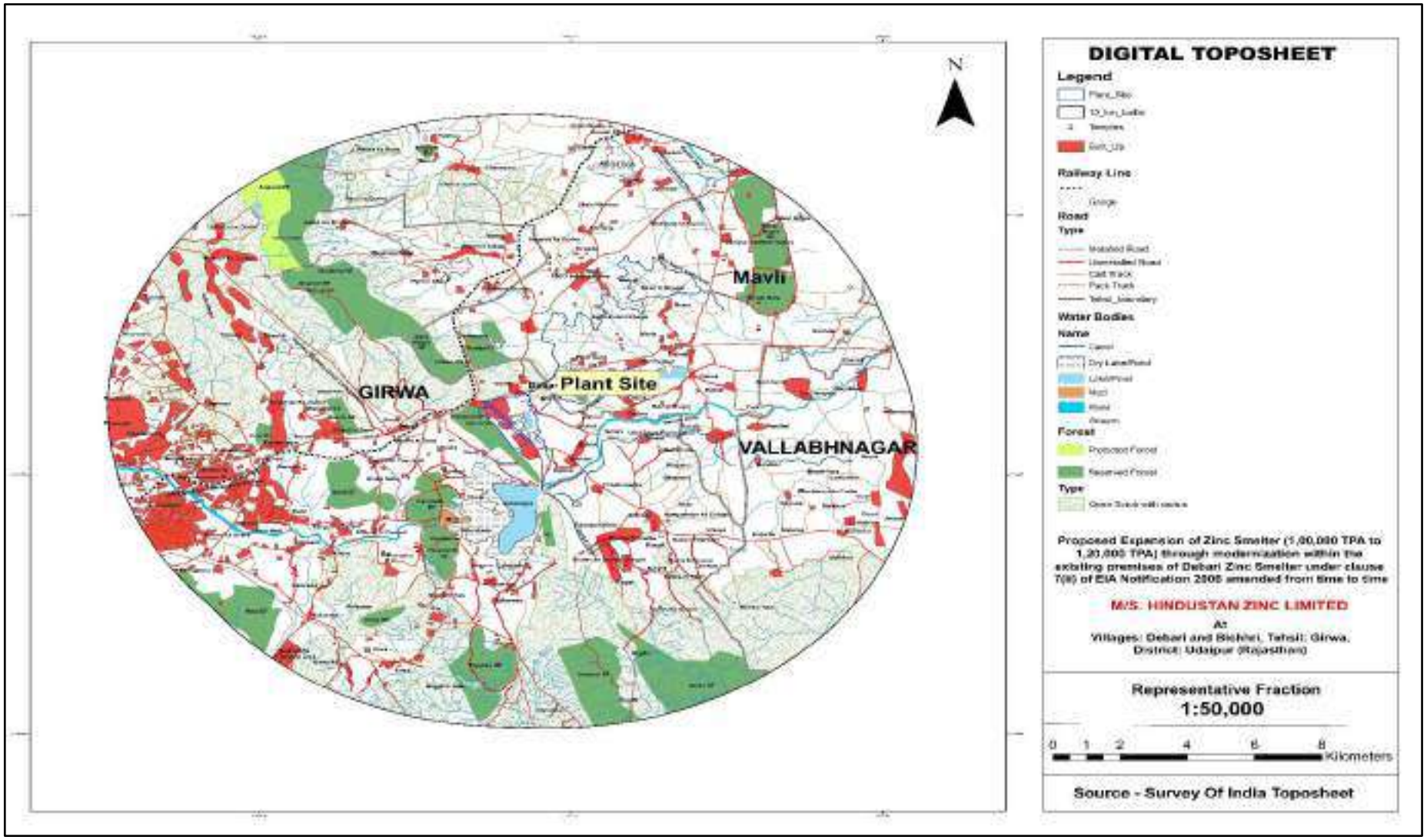


Figure 3.1(d): Digital Toposheet showing the study area (10 Km radius of Plant site) and site location (including all eco- sensitive areas and environmentally sensitive places) on 1: 50,000 scale

3.4 ENVIRONMENTAL COMPONENTS

Information on the following components / parameters was collected to study the present scenario of the area:

1. Land (including Geology, Topography, Land Use & Land Cover etc.)
2. Meteorology
3. Air Environment
4. Noise Environment
5. Water Environment
6. Soil Environment
7. Biological Environment
8. Socio-economic Environment

3.5 ESTABLISHMENT OF BASELINE FOR VALUED ENVIRONMENTAL COMPONENTS

Baseline data was collected for the study area by monitoring and surveying of various environmental components/parameters in the core as well as buffer zone during the study period i.e., Summer Season (March, 2022 to May, 2022); details of which are given in Table - 3.3 given below.

Sampling, preservation, transportation/storage and analysis of samples was carried out by a NABL accredited and MoEF&CC approved Environmental Laboratory namely J.M. EnviroLab Pvt. Ltd. under the supervision of respective EC/FAE concerned.

Table - 3.3: Baseline Data Collection (Summer Season: March, 2022 to May, 2022)

S. No.	Environmental Component	Primary data				Secondary data
		Parameters	Frequency	Monitoring / Sampling Locations	Methodology	
1.	Micro-Meteorology	Wind speed (Hourly), Wind direction, Dry bulb, Temperature, Wet bulb, Temperature, Relative humidity, Rainfall, Solar radiation, Cloud cover, Environmental Lapse Rate	Hourly Continuous	01 (Plant site)	Automatic Weather monitoring station	IS 5182 Part 1-20 Site specific primary Data collected at site. IMD book (Climatological normals 1981-2010), Past year Rainfall data for Udaipur. Solar GIS
2.	AAQ	PM_{10}, $PM_{2.5}$, SO_2, NO_x, CO, HC, Zn and Pb	(24 hourly), twice a week	08	*Sampling:* CPCB Guidelines/NAAQS/ IS 5182 and Instrument Manual *Analysis:* CPCB Guidelines / IS 5182	Existing project baseline data.
3.	Noise	Equivalent noise levels in Leq in dB (A)	Once in a season (day & night time)	08	*Sampling*: IS 9989 *Analysis:* CPCB Guidelines/IS 9989	--
4a.	Surface Water quality	Parameters as per IS 2296:1992	Once in a season	04	*Sampling:* CPCB Guideline & APHA 22nd edition 2012 *Analysis:* IS 10500-2012/ IS 3025/APHA 22nd edition 2012	BIS Standards
4 b.	Ground Water quality	Parameters as per IS 10500 - 2012	Once in a season	08		--
5.	Traffic Study	Type of vehicle	-	NH-27	Manual by observation	IRC guidelines for capacity of Urban Roads in Plain areas 106:1990
6.	Land Environment					
7a.	Soil quality	Parameters As per IS 2720/USDA	Once in a season	08	*Sampling: USDA* Analysis: As per IS 2720/USDA	Indian Agricultural Research Institute Handbook

S. No.	Environmental Component	Primary data				Secondary data
		Parameters	Frequency	Monitoring / Sampling Locations	Methodology	
7b.	Land use/Landscape, Location code, Total project area, Topography, Drainage (natural), Cultivated, forest, plantations, water bodies, roads and settlements	Land use/Land Cover	Once in a season	10 km radius study area	Primary and secondary data collection using field survey and authenticated credentials. Processing using DIP technique and preparation of LULC using ERDAS Imagine 9.2.	Satellite image from NRSC, Hyderabad. Survey of India Toposheet
8.	Biological Environment	Flora and fauna	Once in a season	Study area	Quadrate sampling method/ random sampling	Forest working plan and Local Information and forest.rajasthan.gov.in
8a.	**Aquatic**	Flora and fauna	Once in a season	Study area	Samples to collect from upstream and downstream of Discharge point, nearby tributaries at downstream, and Also from dug wells close to activity site. For forest studies, direction of wind should be considered while selecting forests.	Government offices, NGOs, published literature
8b.	**Terrestrial** Vegetation-species list, economic importance, forest produce, medicinal value, Importance value index (IVI) of trees, Fauna, Avi fauna, Rare and endangered species					
9.	Socio- Economic Environment	Socio- Economic Demography, Infrastructure resource base, Economic resource base, Health status: Morbidity pattern, Cultural and aesthetic attributes Education	Once in a season	Study area	***Economic Parameter*** Random Sampling of the villages. Survey Conduction, Through Questionnaire approach. Group Discussions.	• Demographic Data: Census data, 2011. • List of prevailing diseases from Public Health Centre • List of villages where public health Centre are set up • List of schools • Map of taluka. • Bharat Maps GIS • Bharat Maps

3.5.1 Instruments Used for Environmental Baseline Data Collection

The following instruments were used at the sampling location for environmental baseline data collection work.

- Respirable Dust Sampler with attachment for gaseous Pollutants, Envirotech APM 460.
- Fine Particulate Sampler (FPS), APM 550.
- Sound Level Meter, Model Envirotech SLM - 100.
- Digital D.O. Meter Model, 831 E (CPCB Kit).
- Weather Monitoring Station, Model Enviro WM 271.
- Global Positioning System (GPS).

The collected samples of air, water, noise and soil as given in above section were collected from the representative monitoring / sampling points. The primary data covering the details such as type of vegetation/ various agricultural crops, no. of forest, type of habitation, their occupation type, existing infrastructure and communication/ medical facilities were also collected by the team through interaction with a large number of local inhabitants from the study area and also with different government departments / agencies for preparation of additional studies such as Land use land cover study, study of biological environment etc.

Based on the primary and secondary data collected from the 10 km radius buffer area and the core area, the analysis, interpretation and conclusion of the baseline conditions/status within the core zone and buffer zone are given in below.

3.6 BASELINE STATUS OF THE VARIOUS ENVIRONMENTAL COMPONENTS

3.6.1 Land

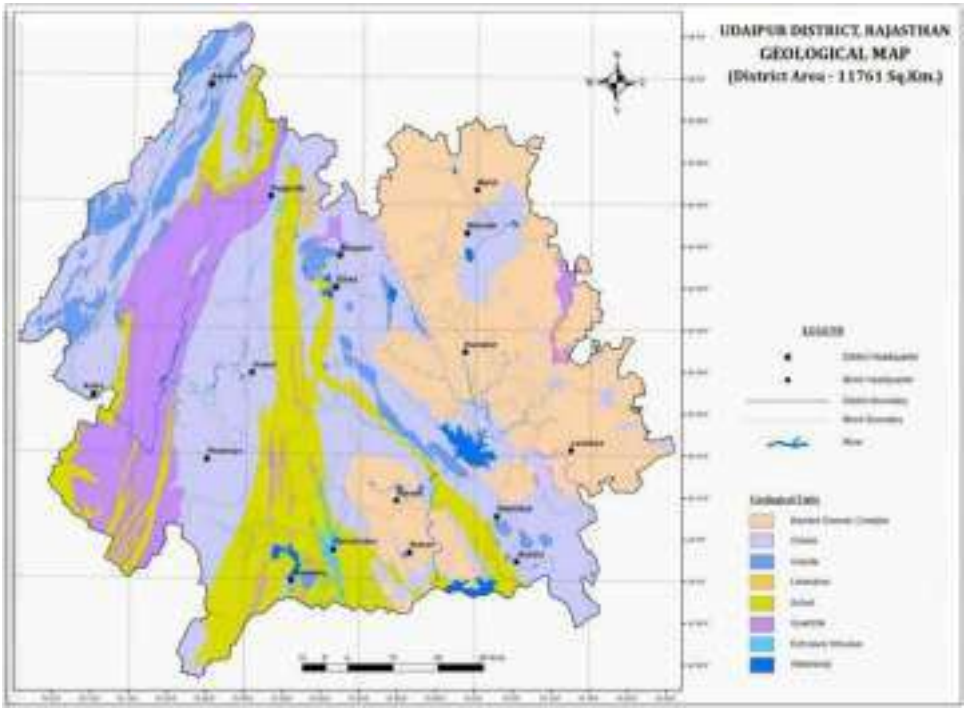
3.6.1.1 GEOLOGY

Regional Geology

In Udaipur district the rock types ranging in age from Archean to upper Proterozoic are present in the area which holds significant position in metallogeny and tectonics of the western Indian craton. The Precambrian meta-sediments belong to 3 geological cycles designated as Bhilwara, Aravalli and Delhi Supergroups. The Bhilwara Supergroup is represented by the Hindoli Group and Mangalwar Complex of Archean age. The Mangalwar complex of Bhilwara Supergroup represents the oldest meta-supracrustals of Rajasthan grouped within Lasaria and Sarada and the overlying Mando–Ki–Pal and Potla Formations. The Hindoli group is represented by the Sujanpura Formation consisting of volcano–clastics with tuffs and meta-greywacke. The Bhilwara Orogeny experienced large-scale magnetism that resulted in the emplacement of intrusive granitic plutons of the Untala and Gingla granites. The Regional geological succession along with the geological map of the district is shown in Table 3.4 and figure 3.2(a).

Table 3.4: Regional geological succession

Super	Group	Formation
Delhi	Gogunda	Calc-schists, gneisses, mica-schists, garnetiferous biotite-schists,
	Rikhabdeo ultramafic suite	Serpentinite, talc-chlorite-schist, actinolite-tremolite schist & asbestos
	Jharol	Chlorite-mica schist, calc schist & quartzite
Aravalli	Bari lake	Meta volcanics, chlorite schists, amphibolite, quartzite &
	Udaipur	Phyllite, mica schists, meta siltstone, quartzite, dolomite, gneisses & migmatites
	Debari	Meta arkose, quartzite, phyllite, dolomitic marble & dolomite
-------X--------X--------X--------X--------X---Unconformity---X--------X--------X--------X--------X-----		
Bhilwara	Mangalwar complex	Migmatites, gneisses, quartzite, felspathic garneti ferrous mica



Source: GSI.gov

Figure3.2 (a): Geological Map of Udaipur District

Geology of the study area

The entire area comprises of amphibolite / hornblende schist, basic meta-volcanics, volcanic conglomerate, calcareous quartzite, carbonaceous phyllite, cherty quartzite, dolomite, dolomitic marble, feldspathic mica schist, feldspathic quartzite / meta-subgreywacke, ferruginous quartzite, granite / granite gneiss, migmatite, composite gneiss, manganiferous phyllite, dolomite, meta-conglomerate, mica schist / schist, pebbly meta-arkose, phyllite, meta-greywacke, meta-conglomerate, mica schist, quartz vein/reef, quartzite, quartzite with bands of phyllite, stromatolitic and manganiferous dolomitic marble & stromatolitic and phosphatic cherty dolomite. The eastern side of the study area is entirely composed of granite gneiss, migmatite, composite gneiss of lasaria formation mangalwar group and bhilwara supergroup.

These granite gneiss, migmatite, composite gneiss is of archaean age. the major part of the western region is composed of phyllite, meta-greywacke, meta-conglomerate of sabina formation and are of palaeoproterozoic age, pebbly meta-arkose of jaisamand formation of palaeoproterozoic age etc. The detail lithology of the study area is given in table 3.5 given below. The tectonic activities in this area gave rise to different lineament structure such as fault, joint/fracture, ridge parallel, drainage parallel, overturned syncline fold, synform (f1) fold and antiform (f1) fold. The detailed geological map along with the lineament structure of the study area is given in figure 3.2(c)

Table 3.5: Lithology of the study area

Super Group	Group	Formation	Lithology	Age
Aravalli	Udaipur	Sabina	Manganiferous Phyllite	Palaeo Proterozoic
			Phyllite, Meta-Greywacke, Meta-Conglomerate	
	Debari	Berwas	Calcareous Quartzite	
			Carbonaceous Phyllite	
			Dolomite	
			Phyllite	
		Dakankotra	Carbonaceous Phyllite	
			Manganiferous Phyllite, Dolomite	
			Quartzite	
			Stromatolitic And Phosphatic Cherty Dolomite	
		Delwara	Basic Meta-Volcanics, Volcanic Conglomerate	
			Feldspathic Mica Schist	
			Phyllite, Mica Schist	
		Gurali	Quartzite	
		Jaisamand	Feldspathic Quartzite / Meta-Subgreywacke	
			Ferruginous Quartzite	
			Meta-Conglomerate	
			Mica Schist / Schist	
			Pebbly Meta-Arkose	
			Quartzite With Bands Of Phyllite	
		Jhamarkotra	Cherty Quartzite	
			Stromatolitic And Manganiferous Dolomitic Marble	
-------X--------X--------X--------X--------X---Unconformity---X--------X--------X--------X--------X-----				
Bhilwara	Mangalwar Complex	Lasaria	Amphibolite / Hornblende Schist	Archaean
			Dolomitic Marble / Dolomite	
			Granite Gneiss, Migmatite, Composite Gneiss	
			Quartzite	

3.6.1.2 Geomorphology

Geomorphologically, the area can be sub-divided into three major geomorphological units, i.e., hills (structural/linear/denudational), denudational origin (pediment/buried pediment), and fluvial origin (valley fill). Most of the area is covered by hills, mostly runoff zones; the northeast and south of the district are covered by denudational origin, which is formed by erosion, stripping, and leaching, and serves as good recharge zones. Nearby the water bodies, the area

is covered by fluvial origin, which is formed by the mass movement, transportation, and deposition and erosion of soil/sediment by streams, and serves as good recharge zones.

Table 3.6(A): Geomorphologic units, their description and distribution

Origin	Landform Unit	Description of Lithology
Denudational	Buried Pediment	Pediment covers essentially with relatively thicker alluvial, colluvial or weathered materials.
	Pediment	Broad gently sloping rock flooring, erosional surface of low relief between hill and plain, comprised of varied lithology, criss-crossed by fractures and faults.
	Intermontane valley	Depression between mountains, generally broad & linear, filled with colluvial deposits.
Fluvial	Valley fill	Formed by fluvial activity, usually at lower topographic locations, comprising of boulders, cobbles, pebbles, gravels, sand, silt and clay. The unit has consolidated sediment deposits.
Hills	Structural Hills	Linear to arcuate hills showing definite trend-lines with varying lithology associated with folding, faulting etc.

Geomorphology of the study area

Geomorphologically the study area is majorly composed of Pediment & Pediplain. Moderately Dissected Hills & Valleys extends in NS direction towards the western side of the study area. Anthropogenic Terrain and Active Quarry is located on the western side of the study area. The Pediment-Pediplain Complex is located in the northern, western & south western region. Other geomorphological units are also present within the study area such as Hill, Inselberg, Residual Hill, Ridge, Highly Dissected Hills & Valleys and different waterbodies such as Lake, Pond & River. The geomorphological map of the study area is given in figure 3.2(d)

3.6.1.3 Topography of the study area

The Study area consist of undulating topography, which characterized different low mound Inselberg structures along with slightly undulating to plain topography. However, at several places flat topped low mounds and narrow discontinuous ridges break the monotony. On careful examination with the help of Remote sensing data collected from USGS SRTM elevation maps it can be concluded that the elevation of the study area varies from 459 m amsl to 917 m amsl resulting in ground relief of 458 m as per the digital elevation model shown in figure 3.2(f). The maximum elevation within the study area is towards the North western region while the minimum elevation is towards the South western direction. The general slope of the ground is towards South. The contour map of the study area with a contour interval of 60 m is shown in figure 3.2(g).

3.6.1.4 Drainage Pattern

The western portion of the district is drained by the Sabarmati River which flows south into Gujarat. The northern portion of the district is drained by tributaries of the Banas River, including the Ahar River, which flows through the city of Udaipur. The southern and central portion of the district is drained by the tributaries of the Mahi River including the Som and Gomti rivers. These rivers are seasonal; with dendritic to sub-dendritic drainage. Dhebar also known as Jaisamand Lake together with the Pichola and the Fatehsagar lakes imparts the scenic beauty to the area. Keeping in view the

above-described climatic conditions and limited natural water resources the erstwhile rulers 'Maharanas' of Mewar constructed several lakes in the Udaipur basin to overcome the problems of availability of water for the local population. The city is famous all over the world for its enchanting lakes. Udaipur is dependent on its lake system, which is directly, or indirectly the life source of the city in terms of surface water resources, tourism, and the ecosystem at large. The detailed physiographic and drainage map of the district is shown in figure 3.2(b).

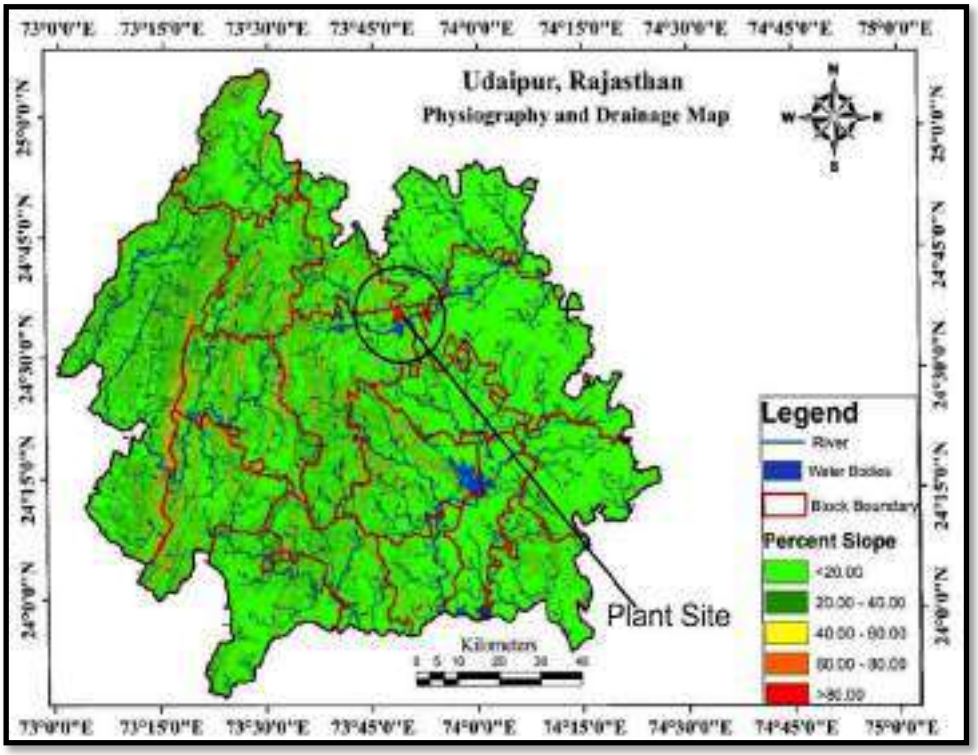


Figure 3.2(b): Physiographic and Drainage Map of Udaipur District

Drainage of the Study area

The drainage pattern of the study area is sub dendritic to dendritic in nature with a poor drainage density which forms due to pronounced slope to the surface. The master slope of the area is from N to S. In buffer area 1st, 2nd & 3rd order of stream are present as per the Strahler classification. The major river in the study area is Berach River at the southern side of the core zone and flows from west to east. The Berach river meets and drains out from Udaisagar lake. The Gudela Nadi is towards the northern side of the study area which meets the Khemli talav situated at about 9 km from the core zone in the northern region of the study area. There are 3 seasonal nallahs passing through the plant site, which have run off water from the nearby hill in west direction during rains only and they will not be disturbed due to the proposed expansion of the project. There are also different small lakes, pond and nalas/ Canal within the study area. The drainage map of the study area is given in figure 3.2(e)

Surface elevations of the surface water bodies existing within the study area are given as under:

Table 3.6(B): Surface elevations of the surface water bodies existing within the study area

S. No.	Water Body	Approx. Distance & Direction from Plant Site	Surface Elevation (m)
1.	Udai Sagar Right Canal	~ 1.5 km in ESE direction from Plant site	527
2.	Udaisagar	~1 km in SSW direction from Plant site	544
3.	Berach River	~1.5 km in SE direction from Plant site	523
4.	Ahar Nadi	~ 3.5 km in SW direction from Plant site	542
5.	Vela Nala	~6.5 km in ENE direction from Plant site	512
6.	Khemli Talav	~8 km in NNE direction from Plant site	530
7.	Bagdara Talav	~ 8 km in SSW direction from Plant site	537
8.	Gadela Nadi	~ 9 km in NNE direction from Plant site	514

Source: SOI Toposheet and Google Earth Imagery

As per Generic ToR point no. 3(E), Drainage map of the of the plant site and study area has been given here as Figure 3.2(E).

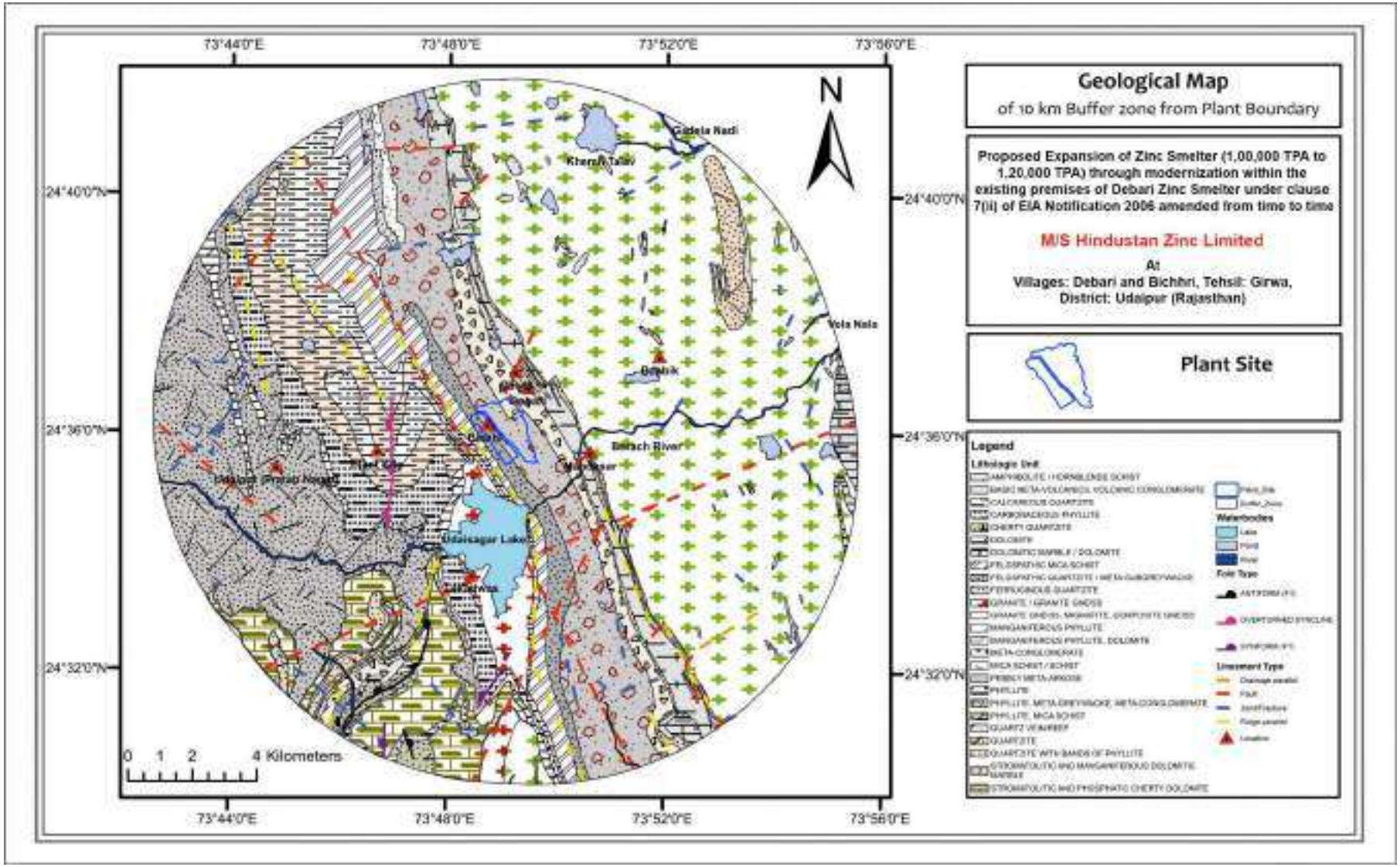


Figure 3.2(c): Geological Formations in Study Area

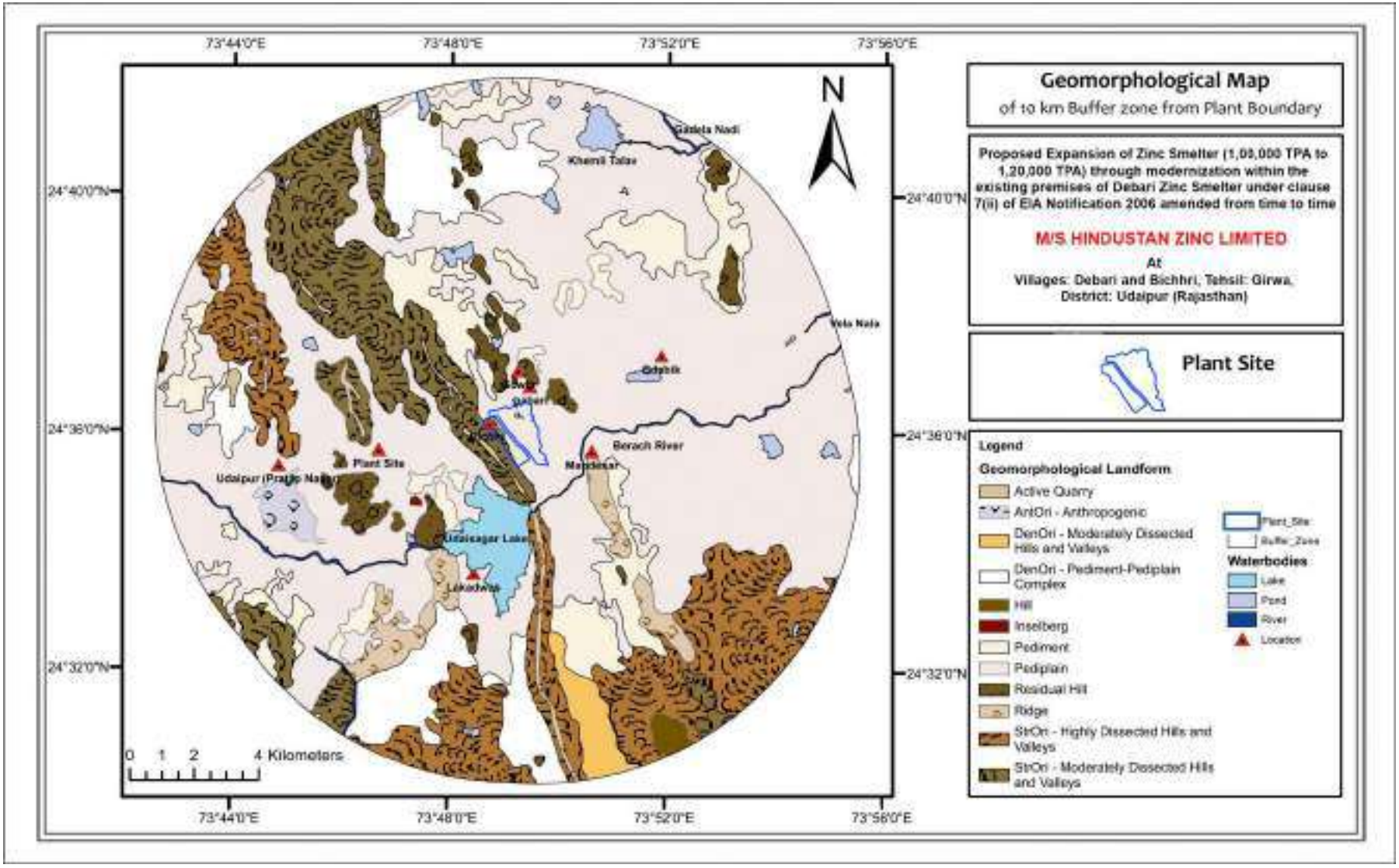


Figure 3.2(d): Geomorphologic Map of Study Area

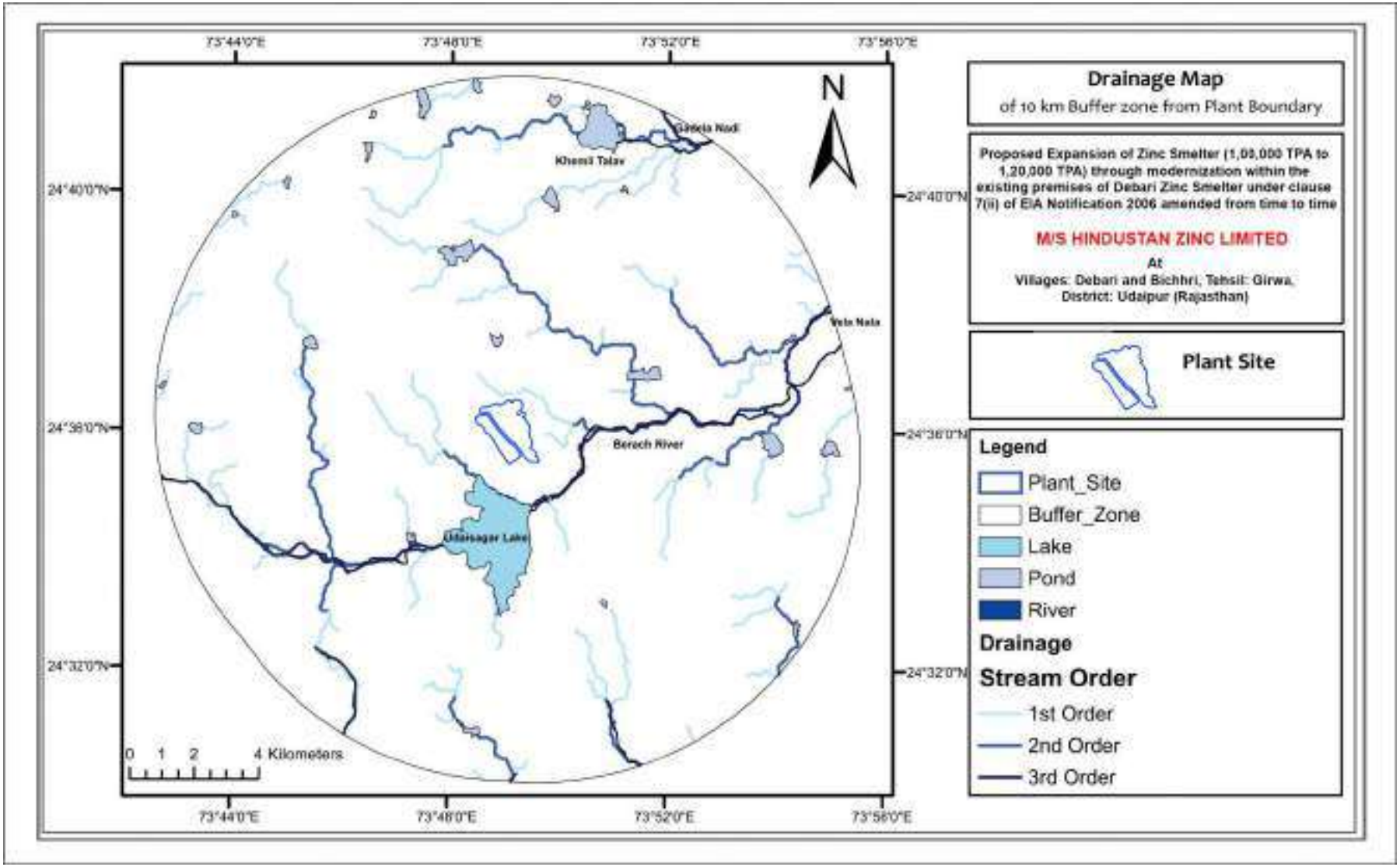


Figure 3.2(e): Drainage map of 10 km Study Area

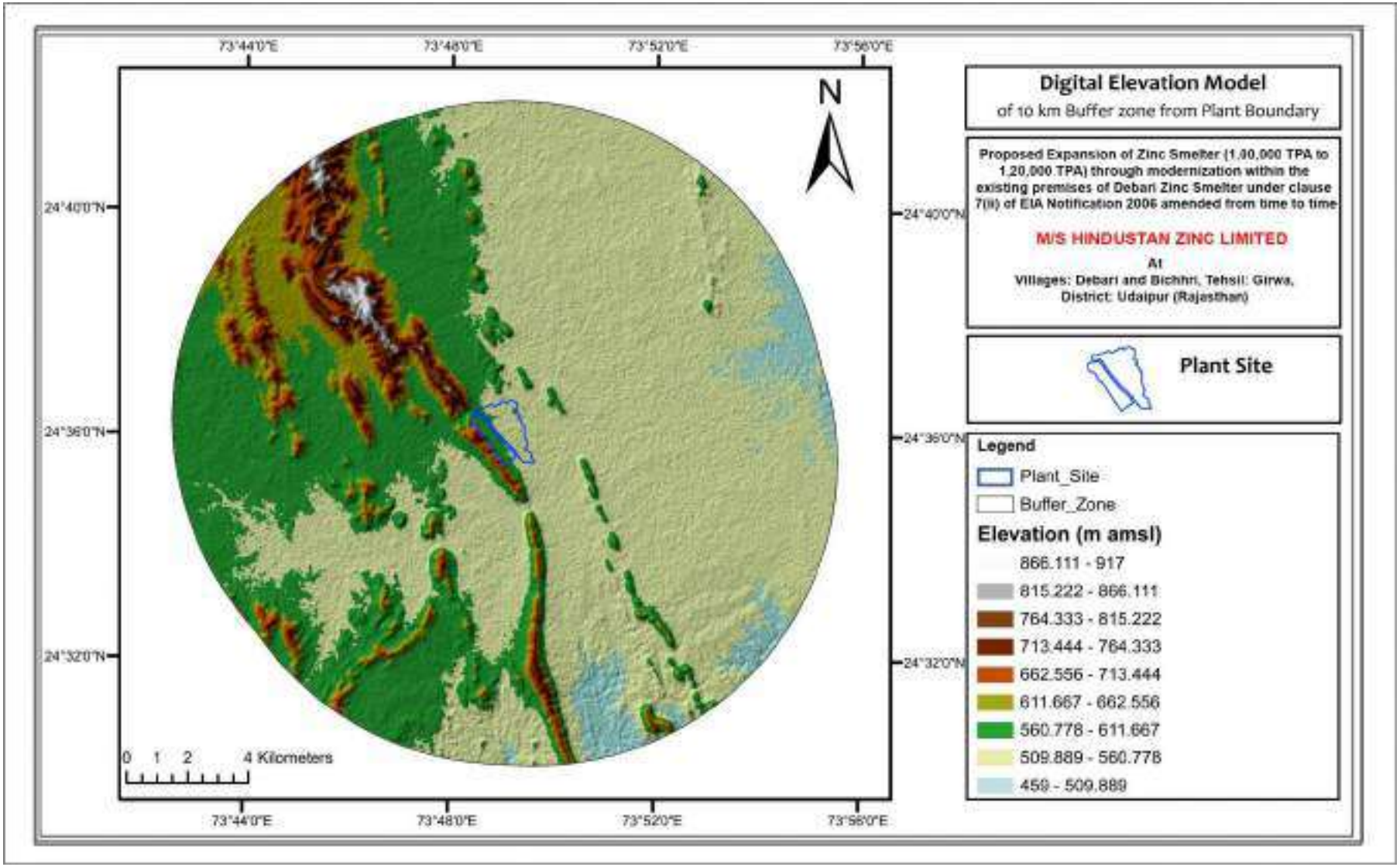


Figure 3.2(f): Digital Elevation Map of 10 km Study Area

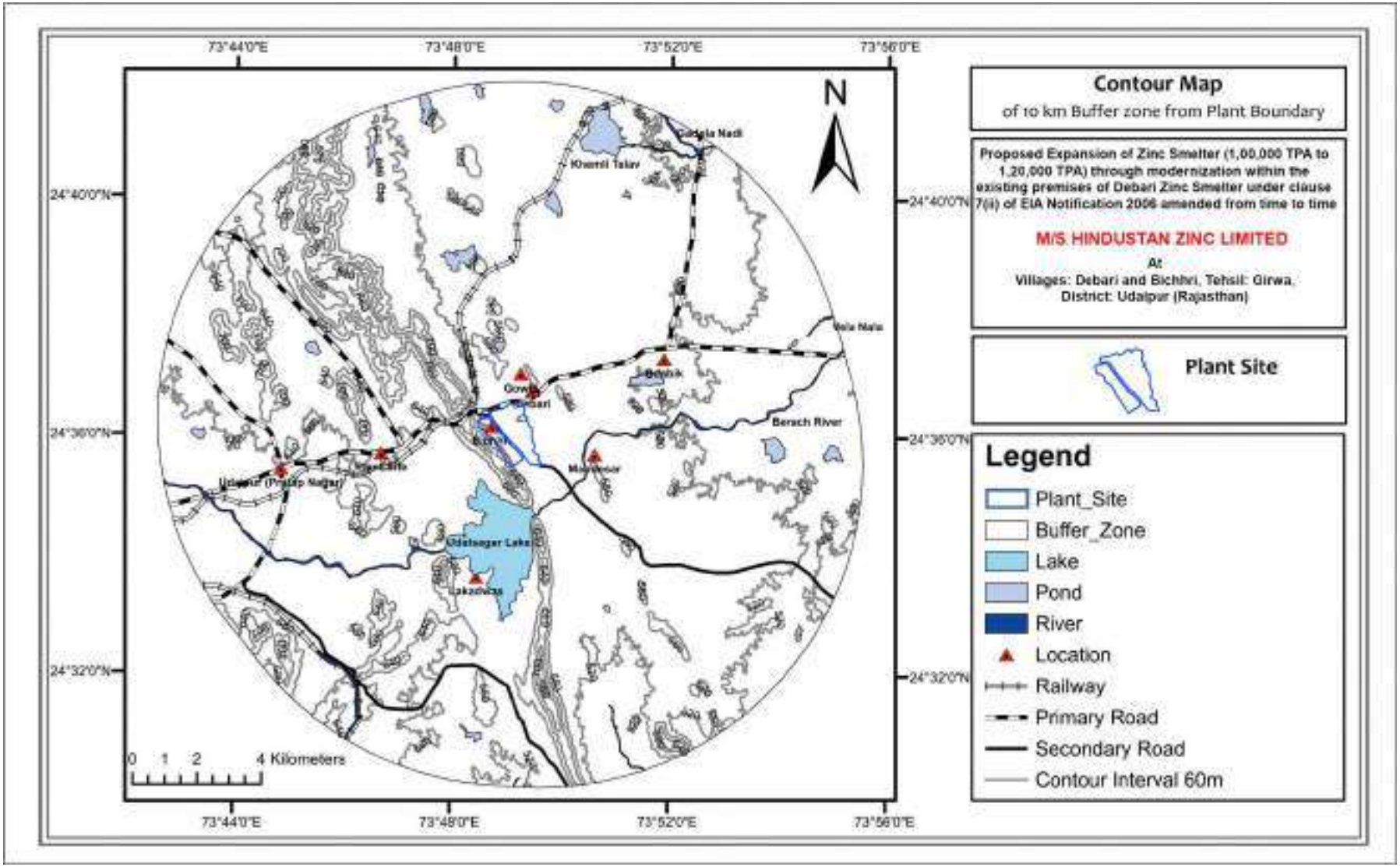


Figure 3.2(g): Contour Map of 10 km Study Area

3.6.1.5 Land Use & Land Cover Pattern

To study the land use pattern of the study area, land use / land-cover maps have been prepared in accordance to Standard ToR, Generic Point no. 3 (A) (iv) and (E).

ToR Point No.3 (A) of Generic Condition "Present land use/ land cover map of the plant site including 100m around the plant site, has been prepared, based on satellite imagery, using RESOURCESAT-2A (L4FMX) digital data. High-resolution satellite image data having 1 m-5 m spatial resolution like quick bird, Ikonos, IRS P-6 pan sharpened etc. for the 10 km radius area from proposed site. The same shall be used for land use / land-cover mapping of the area" has been incorporated via opting the following process:

- Development of land use & land cover map using land coordinates of the plant area.
- Identification and marking of important basic features according to primary and secondary data.
- Evaluation of the impact on existing land use of the plant area.
- Suggestive measures for conservation and sustainable use of land.

Current vintage data of Indian Remote Sensing Satellite RESOURCESAT-2A (L4FMX) digital FCC (False Color Composite) has been used for preparation of Land Use/ Land Cover thematic map of study area.

Satellite image has been procured from National Remote Sensing Centre, Hyderabad. Survey of India Toposheet as a reference map on 1:50,000 scale has been used for preparation of base layer data like road, rail network; village and plant site and for geo-referencing of satellite image.

Technical Details of Data Used

- Satellite Image - RESOURCESAT-2A (L4FMX)
- Satellite Data Source - NRSC, IRS-Resourcesat 2A, Sensor- Liss 4
- Satellite Vintage - 15th March, 2022
- SOI Toposheet No. - Core Zone: G43D5
  - Buffer Zone: G43D1, G43D2, G 43D5 & G43D6
- Software Used - Earth Resources Data Analysis System (ERDAS) Imagine 9.2

Methodology

The land use / land cover map is prepared by adopting the interpretation techniques of the Satellite image in combination with collateral data such as Survey of India topographical maps. Image classification is done by using visual interpretation techniques and digital classification using any of the image processing software. The various activities for preparation of LULC include preprocessing, rectification, image enhancements and classifying the satellite data for assessing the change in land use land cover due to developmental activities. The imagery is interpreted and ground checked for. The final map is prepared after ground truthing. The different land use/land cover categories in the study area have been carried out based on the NRSC land use / land cover classification system. Satellite Image (FCC) of the study area is given in Figure 3.3 (a).

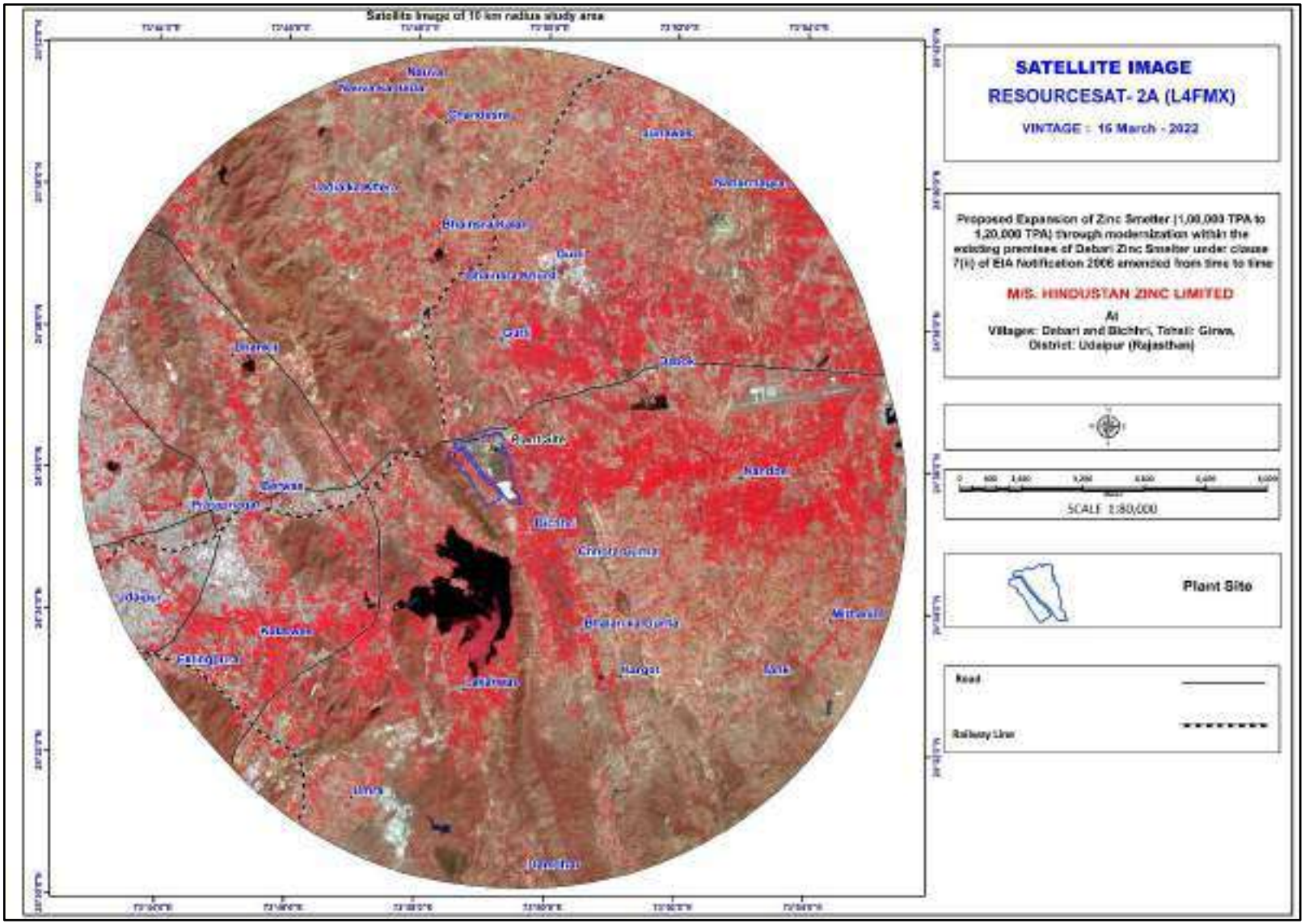


Figure 3.3 (a): Satellite Image (FCC) of the study area

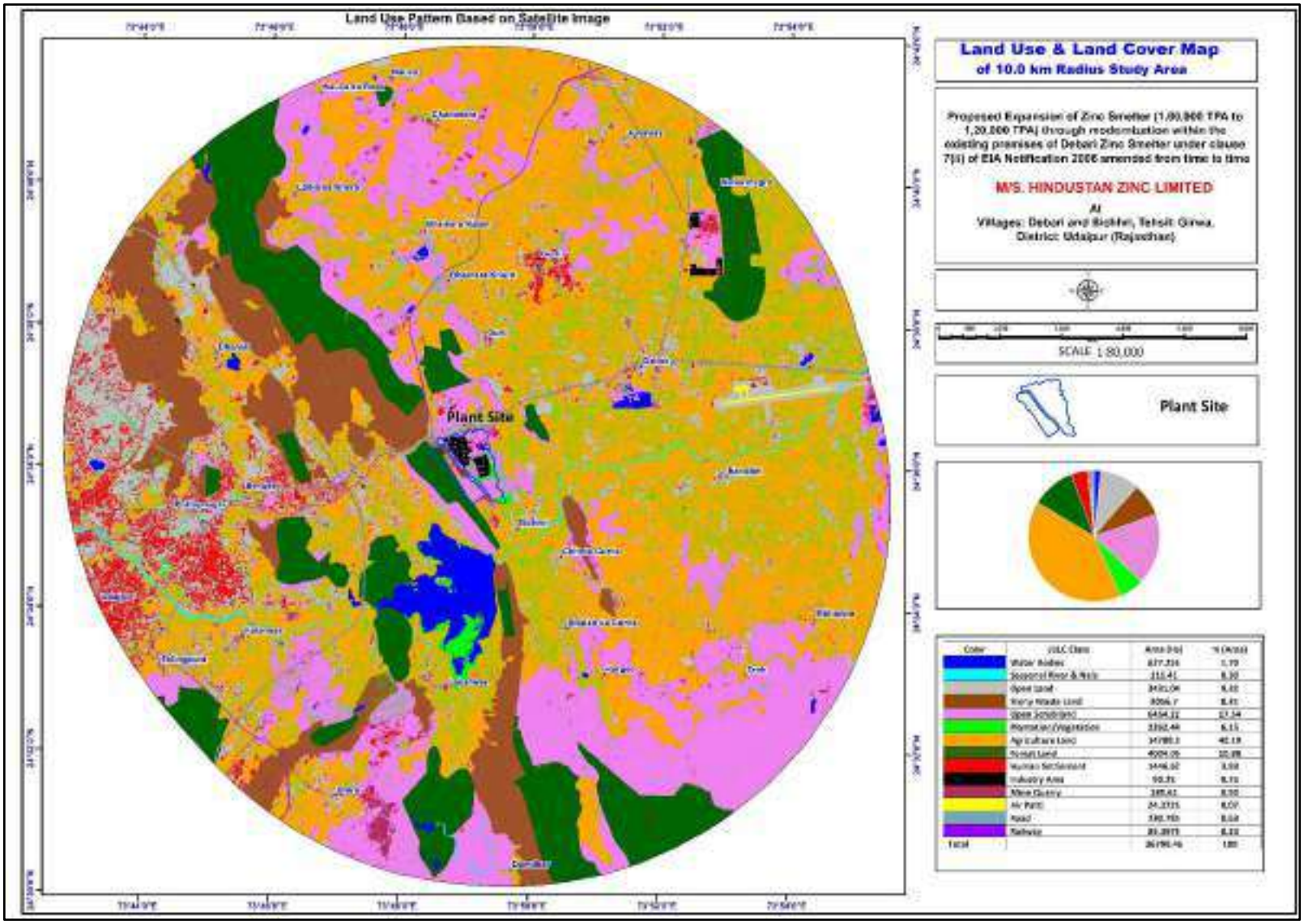


Figure 3.3 (b): Land Use / Land Cover Map of the Study Area

Land Use Pattern of the Buffer Zone (Study area)

Details of the same are given in Table - 3.7 and map shown in Figure - 3.3 (b).

Table - 3.7: Land Use / Land Cover Details of Study Area

S. No.	Legend	Area (in ha)	% Area
1.	Water Bodies	627.255	1.70
2.	Seasonal River and Nala	111.41	0.30
3.	Open Land	3431.04	9.32
4.	Stony Waste Land	3056.7	8.31
5.	Open Scrub Land	6454.22	17.54
6.	Plantation/Vegetation	2262.44	6.15
7.	Agriculture Land	14789.3	40.19
8.	Forest Land	4004.06	10.88
9.	Human Settlement	1446.62	3.93
10.	Industry Area	90.25	0.25
11.	Mine Quarry	185.61	0.50
12.	Air strip	24.3725	0.07
13.	Road	230.785	0.63
14.	Railway	85.3975	0.23
Total		**36799.46**	**100**

Source: LU/LC Map for Buffer Zone

Observation

- The 10 km radius of study area mainly comprises of Agriculture Land (40.19%), Open Scrub Land (17.54%), Forest Land (10.88%), Open Land (9.32%) and Stony Waste Land (8.31%), of the total study area.
- Rest of the land use classes cover only 13.51% of the study area including Water Bodies, Seasonal River and Nala, Plantation/Vegetation, Human Settlement, Mine Quarry, Air strip, Road and Railway.
- 20 no. of RFs and 2 PF are there within the study area as mentioned in table 3.1. The buffer zone studied has no National Park, Wildlife Sanctuary, Biosphere Reserve etc.
- 0.25% of the total study area is majorly occupied by industrial establishments. Details of the industries have been mentioned in table 3.2 of this chapter.
- ***Cropping pattern of the study area***

  Rajasthan has two principal crop seasons i.e. Rabi and Kharif. The Rabi crops are winter crops and are sown in the months of October and November and are harvested in the months of March and April. The principal Rabi crops are Barley, Wheat, Gram, Pulses and Oil Seeds. The major oil seeds are Rapeseed and Mustard. The Kharif crops are the crops that are grown in the summer season and are seeded in the months of June and July. These crops are harvested in the months of September and October and include bajra, pulses, jowar, maize and groundnut. The regions that are highly irrigated or receive abundant water supply are utilized for the cultivation of improved high-yielding varieties of rice. Some places of Rajasthan that has black soil nurture the growth of major cash crops like cotton. In some region's tobacco is also grown.

The plant site falls in Humid & sub-humid southern plains agro-climatic zone of Rajasthan and major crops grown are kharif-Maize, Pulses, paddy, Sorghum & Rabi-Wheat & Gram. (Source:https://farmech.dac.gov.in/FarmerGuide/RJ/index1.html&https://agriculture.rajasthan.gov.in

3.6.2 Seismicity and Flood Hazard Zonation of the Area

Seismicity of the Area

Many parts of the Indian subcontinent have historically high seismicity. Seven catastrophic earthquakes of magnitude greater than 8 (Richter scale) have occurred in the western, northern and eastern parts of India and adjacent countries in the past 100 years. Approx. 59% of the land area of India is liable to seismic hazard damage.

Bureau of Indian Standards [IS - 1893 (Part-1): 2002], has grouped the country into four seismic zones viz. Zone - II, III, IV and V. Of these, the most seismically active region is Zone - V, while Zone - II is the least seismically active region. The Modified Mercalli Intensity (MMI) scale, which measures the impact of the earthquakes on the surface of the earth, broadly associated with various zones is as follows:

Table - 3.8 (A): Seismic Zones in India

S. No.	Seismic Zone	Risk	Intensity on MMI Scale
1.	Zone - II	Low Risk Zone	VI & below
2.	Zone - III	Moderate Risk Zone	VII
3.	Zone - IV	High Risk Zone	VIII
4.	Zone - V	Very High-Risk Zone	IX & above

Source: IMD & NIDM

According to GSHAP data, the state of Rajasthan falls in a region of moderate to high seismic hazard. Historically, parts of this state have experienced seismic activity in the M 5.0 range.

Table - 3.8 (B): Classification of districts of Rajasthan as per seismic zones

S. No.	Seismic Zone	Risk	Districts
1.	Zone - II	Low Risk Zone	Ganganagar, Hanumangarh, Churu, Jodhpur, Pali, Rajasamand, Chittorgarh, Jhalawar, Baran, Kota, Bundi, sawaiMadhopur, Karauli, Dholpur, Banswara, areas of Bikaner, Udaipur, Parts of Jhunjhunu, Sikar, Jaipur
2.	Zone - III	Moderate Risk Zone	Parts of Udaipur, Dungarpur, Sirohi, Barmer, Jaisalmer, Bikaner, Parts of Jhunjhunu, Parts of Sikar, Jaipur, Dausa, Bharatpur
3.	Zone - IV	High Risk Zone	Parts of Barmer (Chotan Block), Jalore (Sanchore Block), Alwar (Tijara Block), Bharatpur (Block nagar, Pahari)

{*Source: (https://www.rajras.in/seismic-zones-faults-earthquake-hazard-rajasthan/)*}Classification of districts of Rajasthan as per seismic zones [IS - 1893 (Part-1): 2002] is given in Table 3.8 (b).

In 2004, Seismic Hazard Map of India was updated by the Bureau of Indian Standards (BIS) in which much of the Rajasthan state falls under Zones II and III [shown in Figure - 3.4]

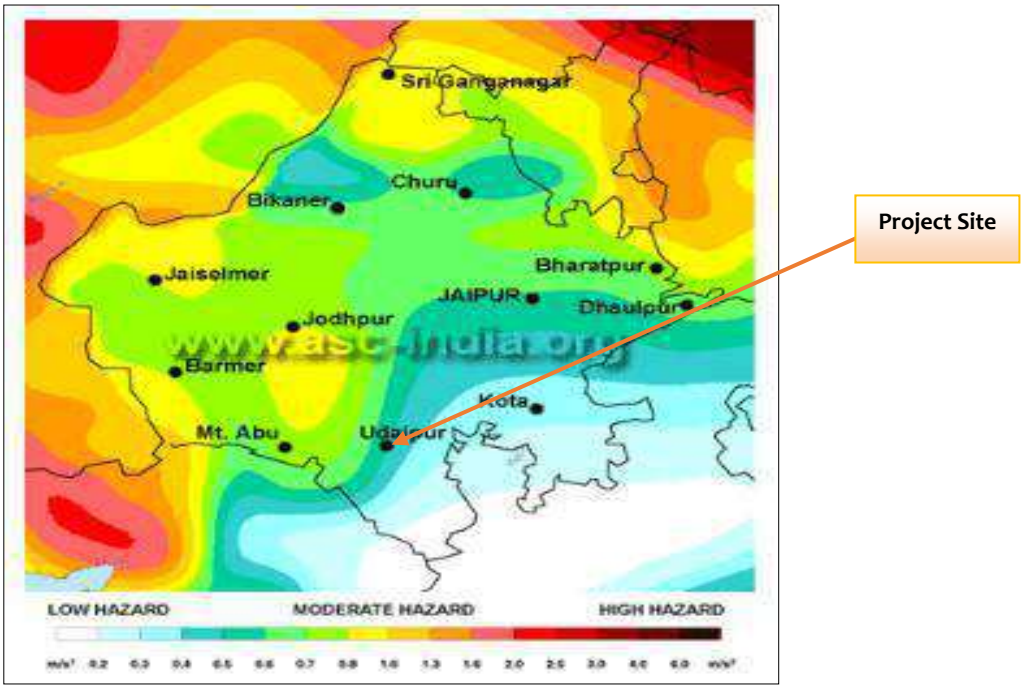


Figure 3.4: GSHAP Hazard map for Rajasthan

Conclusion: From Table 3.6 (b) and Figure: 3.4, it is observed that eastern part of Udaipur lies in Zone II, while the plant site as well as study area lies in Zone-II of Seismic Zoning Map of India, updated by India Metrological Department (IMD) and National Institute of Disaster Management (NIDM). Thus, the plant area is located in an area of Low-Risk Zone by national standards. Seismic Zoning Map of India showing the plant site is given in Figure - 3.5.

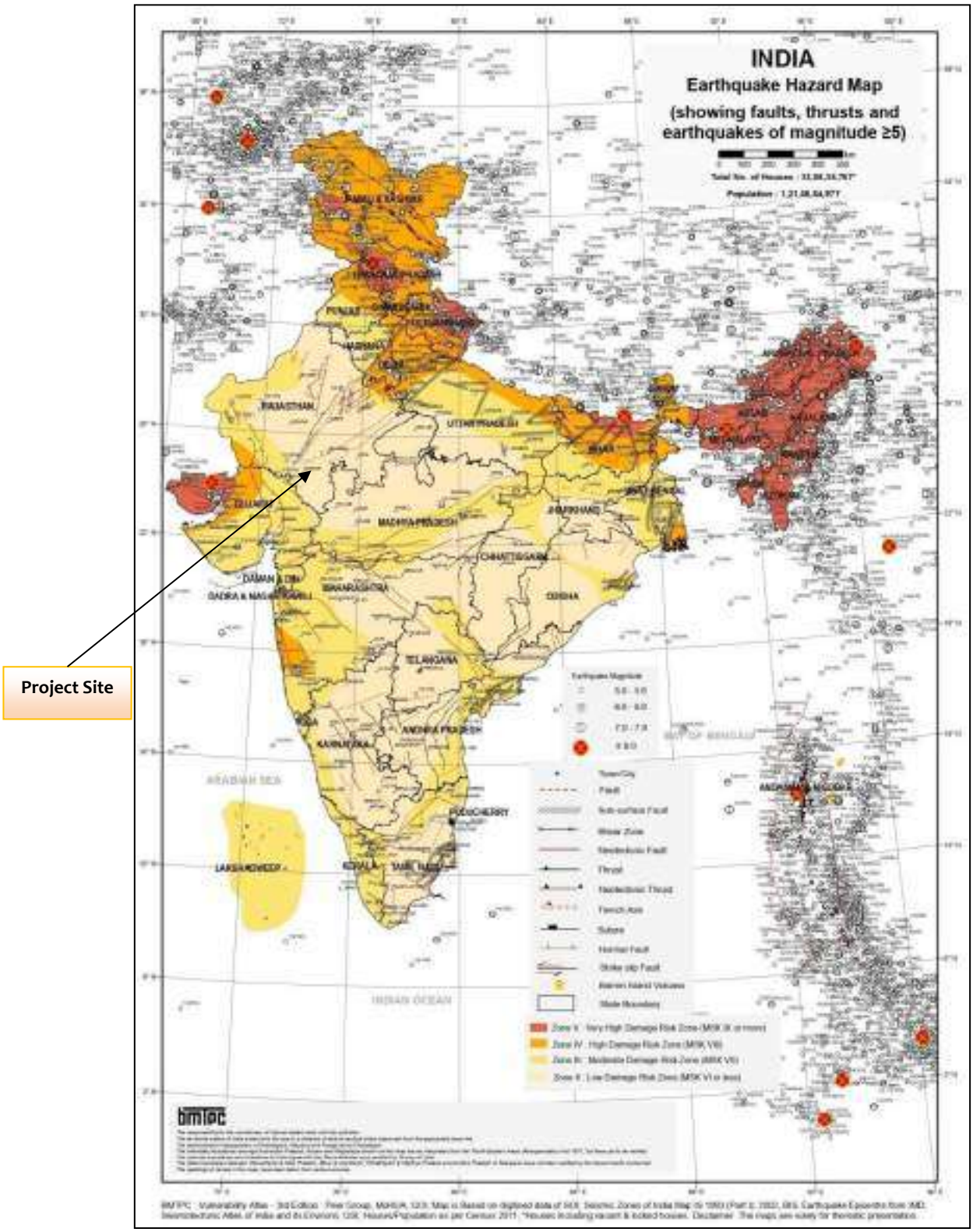


Figure 3.5: Seismic Zone Map (Plant site falls in Seismic Zone II)

Classification of districts of Rajasthan as per seismic zones [IS-1893 (Part-1):2002] is given in Table 3.8 (b) & Figure 3.5

Flood Hazard Zonation of the Area

Though most parts of Rajasthan receive scanty rainfall, the State has a history of floods and inundations, mostly along the basins of rivers like Luni and Chambal. There are 13 river basins in the state, out of which Luni, Banas, and Chambal basins are the largest. Flood prone areas of Rajasthan. Include major parts of the basins and sub basins of River Luni in Barmer, Pali, Sirohi and Jalore; and the basins and sub basins of River Chambal in Baran, Kota and Bundi districts. Also, major portions of Bharatpur districts falling under the basin of River Banganga, and the basins of River Ghaggar in Sriganganagar are vulnerable to floods.

Flood Hazard Zonation Map of India showing the plant site is given in Figure-3.6 (a) & 3.6 (b) respectively.

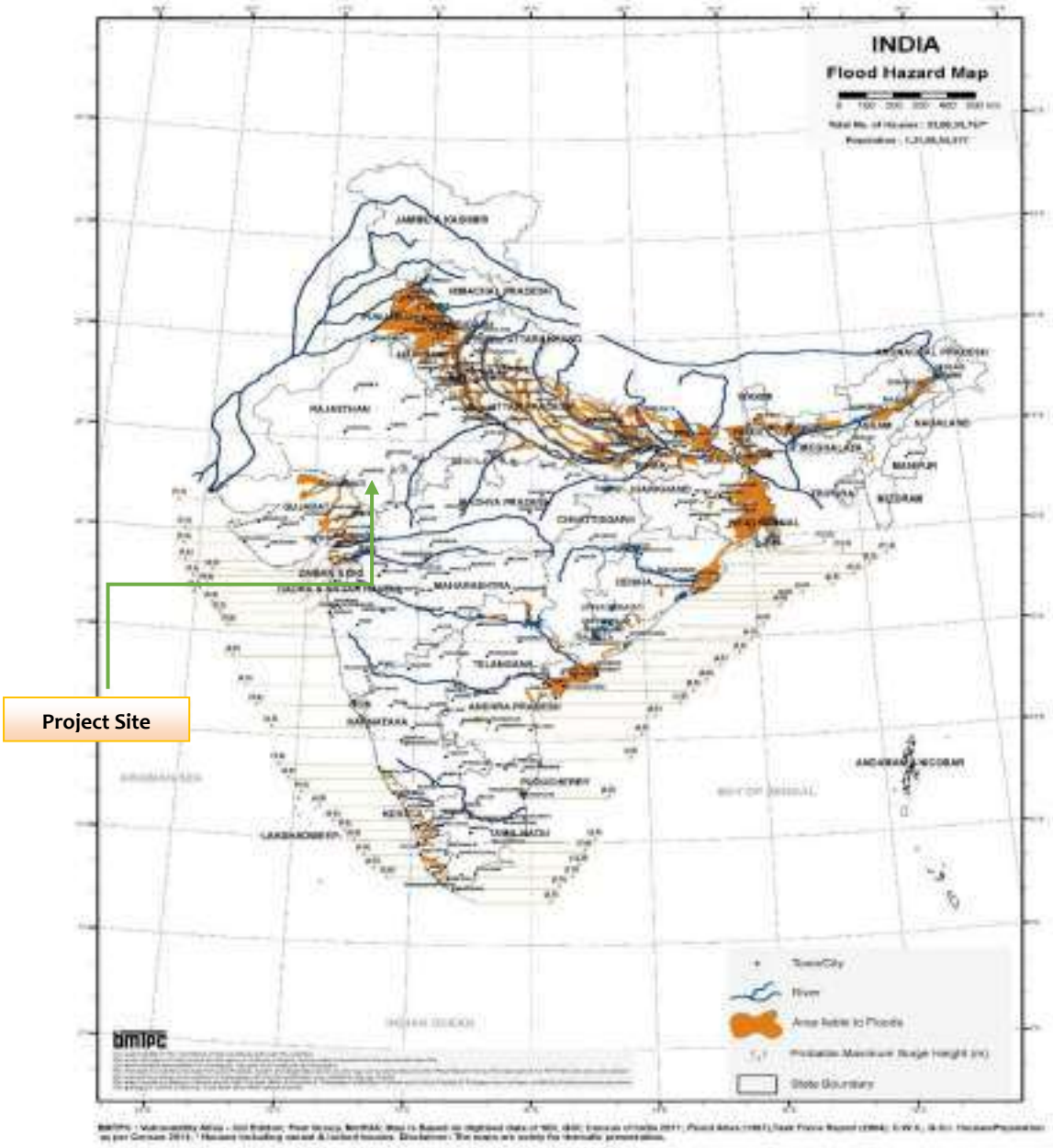


Figure 3.6 (a): Flood Hazard Zonation Map of the Area

Figure 3.6 (a) shows that the plant site does not falls in flood prone area as per the "BMTPC: Vulnerability Atlas - 3rd Edition (updated on 2nd March, 2019); Peer Group, Ministry of Housing (MoH) and UPA (Urban Poverty Alleviation); based on digitized data of SOI, GOI; Census of India 2011; Flood Atlas (1987), Task Force Report (2004), C.W.C., GOI".

Figure 3.6 (b): Flood Zone Map of Rajasthan (Source: http://www.dmrelief.rajasthan.gov.in)

However, as per the Flood Zone map of Rajasthan (source: http://www.dmrelief.rajasthan.gov.in) the study area of plant site falls in flood plains [Figure: 3.6 (b)].

Climate & Rainfall

Udaipur district has a sub-humid climate. There are three distinct seasons in a year. The winter season encompassing four months from November to February are mild and pleasant, with temperature ranging between 0ºC (Mount Abu) to 18ºC with little or no humidity. In Dec Jan months occasional cold waves bring down the temperatures significantly. March is a pleasant transition month to summer. The summer months from April to June, record average daily temperatures of around 37ºC. May and June are the hottest months when temperature reaches up to 48ºC. Annually, most of the rainfall is received during the monsoon season which extends from June (end of June) to September.

Table - 3.9: Rainfall Data of Udaipur District

Year	Annual rainfall (in mm)	Year	Annual rainfall (in mm)
1991	513.0	2007	499.0
1992	858.0	2008	757.0
1993	486.0	2009	496.0
1994	764.0	2010	902.0
1995	404.0	2011	1015.0
1996	671.0	2012	739.0
1997	643.0	2013	862.0
1998	678.0	2014	768.0
1999	288.0	2015	559.0
2000	465.0	2016	719.0
2001	546.0	2017	752.0
2002	352.0	2018	508.0
2003	618.0	2019	1189.0
2004	567.0	2020	936.0
2005	773.0	2021	883.0
2006	926.0		
Average Annual Rainfall - 681.80 mm			

*Source:*https://water.rajasthan.gov.in/content/water/en/waterresourcesdepartment/WaterManagement/IWRM/annualrainfall.html

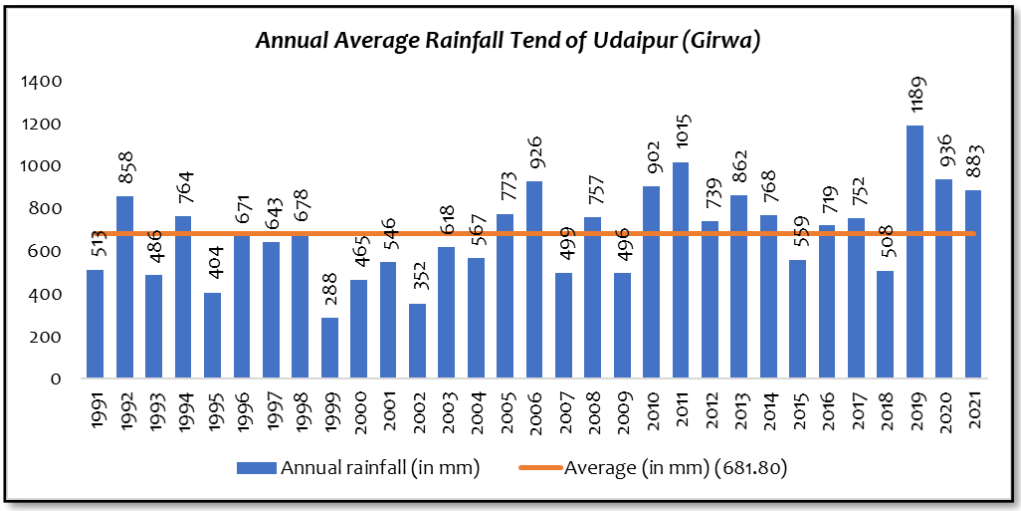


Fig. 3.7: Annual Average Rainfall Tend of Udaipur (Girwa)

Conclusion

The annual average rainfall in the region is around 681.80 mm (average of last 30 years rainfall data from 1991-2021) varying from minimum 288 mm in 1999 to maximum 1189 mm in 2019.

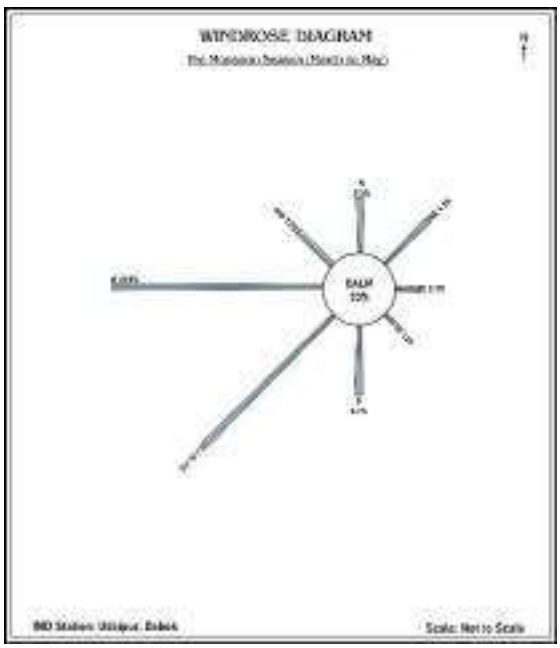
3.6.3 Meteorology

Meteorology plays a vital role in determining the transport and diffusion pattern of air pollutants released into the atmosphere. The principal variables include horizontal convective transport (average wind speed and direction), vertical convective transport (atmospheric stability) and topography of the area.

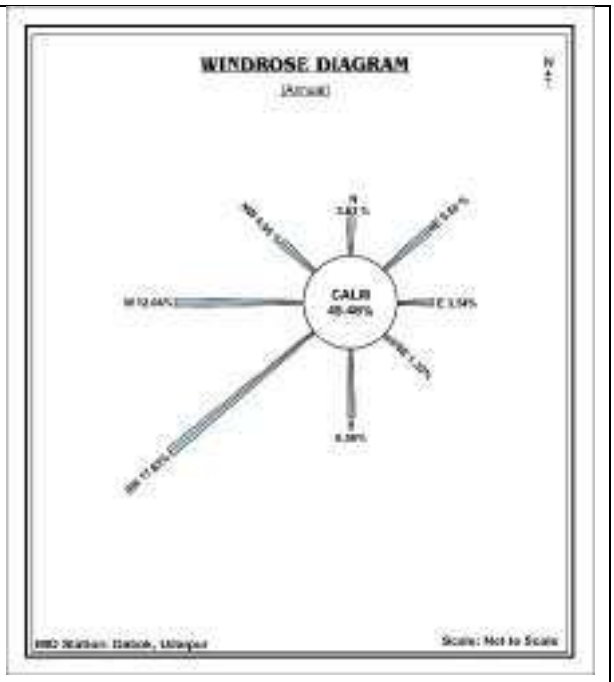
Meteorological characteristics of an area are very much important in assessing possible environmental impacts and in preparing environmental management plan. Meteorological factors are time dependent and changes with respect to time thus meaningful interpretation can be drawn only from long-term reliable data. For collecting the baseline data, understanding of the meteorological conditions at the plant site is done through annual records data obtained from India Meteorological Department (IMD) (1981-2010). The prime importance of understanding the wind speed/wind direction from the IMD data was to determine the baseline monitoring sites for air with respect to the direction of the dominant meteorological factor.

The nearest IMD station to the plant site is located in Udaipur (Dabok) (which is ~4.5 km in East direction from the plant site). Based on the previous IMD data [Climatological Normals (1981-2010)], the pre-dominant wind direction was considered. As per the data, pre-dominant wind direction during summer season (March to May) was observed from West, according to which, the locations for ambient air quality monitoring stations were selected. Seasonal wind rose prepared based on secondary meteorological data obtained for Udaipur (Dabok) is given in Figure - 3.7 (b).

It was observed that the overall dominant wind pattern (annual) for the study period was from South West (SW) direction. Wind Rose Diagram showing the wind pattern during the study period is shown in Figure - 3.8 (a).



Seasonal Wind Pattern for Summer Season (March to May): From West



Annual Wind Pattern: From SW

Figure 3.8 (a): Wind Rose Diagram for Udaipur -Summer Season: As per Climatological Normals (1981-2010)

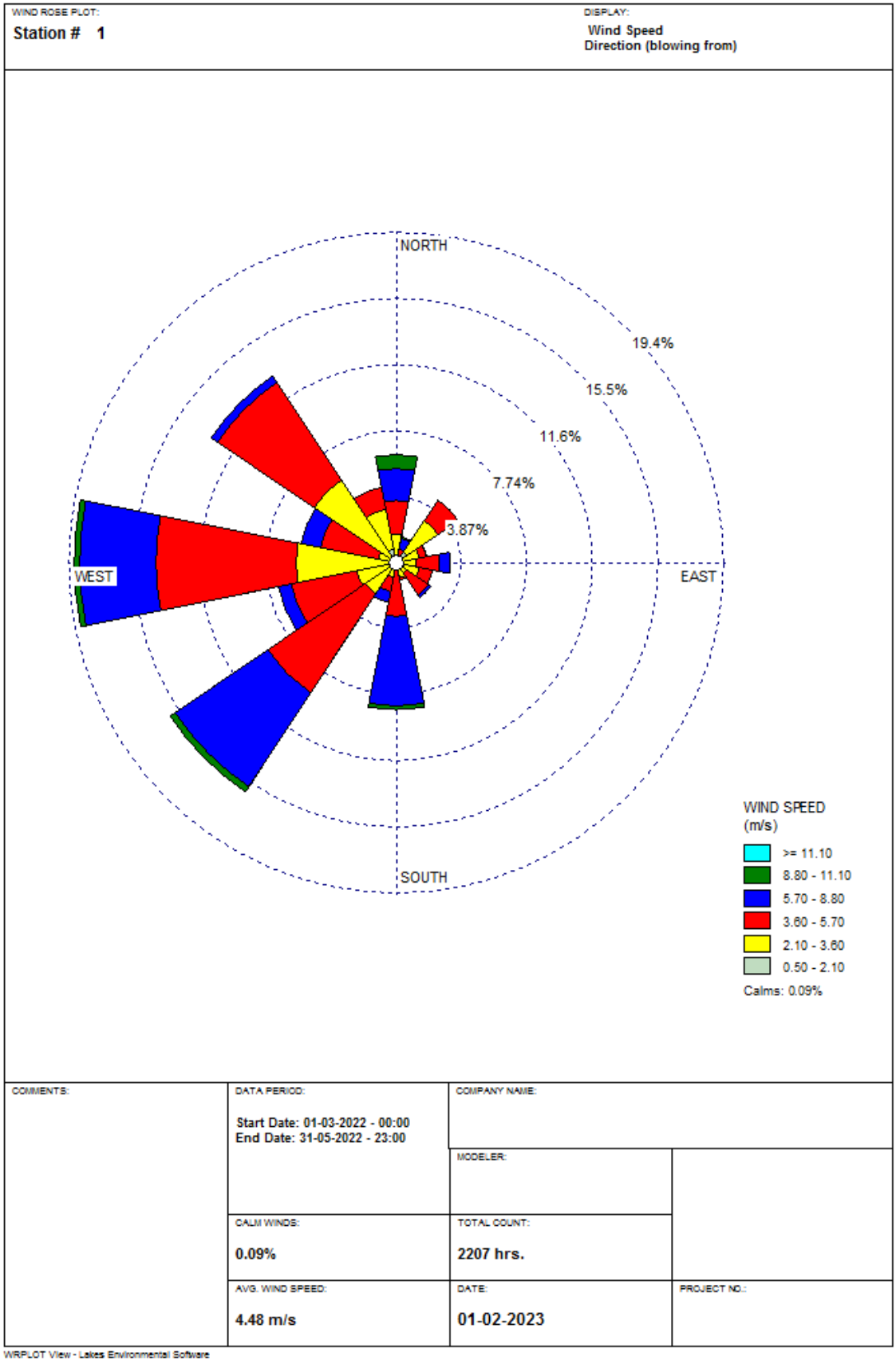


Figure 3.8 (b): Wind Rose Diagram as per Meteorological data Summer Season (March to May, 2022) Micro-Meteorology at Site

Meteorological station was set-up at site to record surface meteorological parameter during *Summer Season (March., 2022 to May, 2022).*

Theoretically, meteorological parameters such as Temperature, Humidity and wind speed/ wind direction, Rainfall are the basic parameter which helps in determining the ambient environment quality of the area. Thus, primary data for the Wind speed /wind direction, Temperature, Humidity and rainfall was recorded during the study period. Based on the collected meteorological data, relative percentage frequencies of different wind directions and speed were calculated and plotted as a wind rose diagram. The percentage calculated for all parameters wind speed, wind direction, rainfall, temperature can influence the Quality, dispersion and movement of the pollutant thereby helps in the determining the Impacts caused by the plant activity.

Summary of the micro-meteorology at site is given in Table - 3.10. Detailed Hourly Meteorological Data has been enclosed as ***Annexure –11*** with this EIA / EMP Report

Table - 3.10(a): Micro-Meteorology at Site
Study Period: Summer Season (March., 2022 to May, 2022)

Month	Temperature (^{O}C)		Wind Speed (m / sec.)		Relative Humidity (%)	
	Max.	Min.	Max.	Min.	Max.	Min.
March, 2022	31.89	13.51	8.69	0.33	48.62	5.62
April, 2022	36.35	19.13	8.67	0.8	48.81	4.81
May, 2022	38.82	23.63	10.77	0.93	52.69	8.38

Source: Meteorological data at site

Table - 3.10(b): Micro-Meteorology at Site

Monthly average	Solar Radiation(kWh/m²)	Cloud Cover (%)	
March, 2022	965.51	37	36.33%
April, 2022	993.94	35	
May, 2022	1029.06	37	

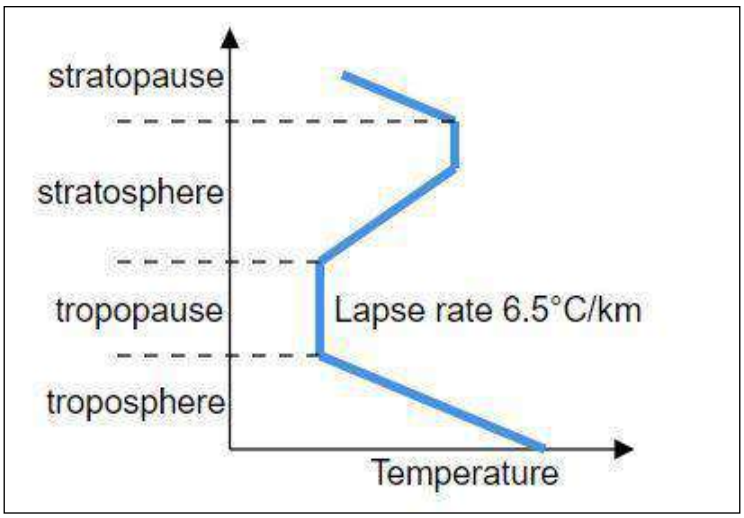
Source: Solar GIS & NASA power Access Data

Lapse Rate

Lapse rate is the rate of change in temperature observed while moving upward through the earth's atmosphere. It is positive when the temperature decreases with elevation, zero when the temperature is constant with elevation, and negative when the temperature increases with elevation.

Environment Lapse Rate

The environmental lapse rate also called normal lapse rate, is the lapse rate of non-rising air. It is highly variable. It is affected by radiation, convection, and condensation.



Mixing Height

Mixing Height (MH) is the vertical extent through which the contaminant plume can be mixed. Forecasting of mixing height is done with the aid of the vertical temperature profile. The MH is a function of stability. In unstable air the MH is higher and in stable air the MH is lower. With a lower MH, there is a smaller volume of air in which the pollutant can be dispersed, resulting in higher concentrations in the ambient environment. There is a seasonal variation of MH. During summer daylight hours, MH can be few thousand feet whereas for winter it can be a few hundred feet. It also varies in the course of a day. It is lowest at night and increases during the day.

As site specific mixing heights were not available, mixing heights based on IMD publication, "Atlas of Hourly Mixing Height and Assimilative Capacity of Atmosphere in India", has been considered to establish the worst-case scenario. Secondary information has been used to determine the mixing height over the study region for the study period i.e., Summer Season and it varies from 85 – 2700 meters (IMD).

Table -3.11: Mixing Height (Summer Season)

Time (Hours)	Mixing Height (m)
06:00	85
07:00	90
08:00	180
09:00	650
10:00	850
11:00	1200
12:00	1900
13:00	2100
14:00	2300
15:00	2450
16:00	2600
17:00	2700
18:00	2300
19:00	1600
20:00	1525

Source: IMD publication, "Atlas of Hourly Mixing Height and Assimilative Capacity of Atmosphere in India"

3.6.3.1 Ambient Air Environment

Composite Ambient air quality monitoring has been carried out within the 10 km study area of the Plant site to determine the baseline concentration of various air pollutants in the ambient air.

The ambient air quality depends upon the emission sources, meteorological conditions and the background concentration of specific pollutants. Samples were collected from the 10 km study area to observe the ambient air quality conditions throughout the region. It helps in providing a data base for evaluation of the anticipated impacts in 10 km radius study area by the activities of the Expansion project. It will also be useful in ascertaining the quality of air environment in conformity to standards of the ambient air quality during operation phase of the project.

Monitoring Parameters

The samples were collected for the following air quality determinants:

- Sulphur Dioxide (SO_2)
- Nitrogen Dioxide (NO_2)
- Particulate Matter (PM_{10} and $PM_{2.5}$)
- Carbon Monoxide (CO)
- Zinc (Zn)
- Hydrocarbons (HC)
- Lead (Pb)

Analytical methods prescribed by CPCB & approved Indian Standard methods were used for carrying out air quality monitoring.

Methodology

The methodology adopted for ambient air quality monitoring is given below in Table - 3.12.

Table - 3.12: Details of Test Procedures

S. No.	Parameters	Test Method Specification against which test are performed	Range of testing	Limit of detection	Equipment used for monitoring	
					Equipment required for Sampling	Equipment required for Analysis
1.	Sulphur Dioxide (SO_2)	IS: 5182, (P-2), 2001 Reaffirmed 2017	5 µg/m³ to 1050 µg/m³	5 µg/m³	Respirable dust sampler/Low flow Pump	UV spectrophotometer
`2.	Nitrogen Dioxide (NO_2)	IS: 5182, (P-6), 2006 Reaffirmed 2017	6 µg/m³ to 750 µg/m³	6 µg/m³	Respirable dust sampler/Low flow Pump	UV spectrophotometer
3.	Particulate Matter (PM_{10})	IS: 5182, (P-23), 2006 Reaffirmed 2017	10 µg/m³ to 1000 µg/m³	10 µg/m³	Respirable dust sampler,	Desiccators, high accuracy weighing balance
4.	Particulate Matter ($PM_{2.5}$)	IS: 5182,P-24 :2019	10 µg/m³ to 500 µg/m³	10 µg/m³	Fine Particulate sampler	Desiccators, high accuracy weighing balance
5.	Carbon Monoxide (CO)	IS: 5182, (P-10), 1999 Reaffirmed 2019	0.5 mg/m³ to 50 mg/m³	0.5 mg/m³	Sampling in Tedlar Bag with low flow pump	Gas chromatography with detector (FID)

S. No.	Parameters	Test Method Specification against which test are performed	Range of testing	Limit of detection	Equipment used for monitoring	
					Equipment required for Sampling	Equipment required for Analysis
6.	Zinc	JME/STOP/03 Issue date-04.12: 2020	0.5 ng/m3 to 100 µg/m3	0.5 µg/m3	Respirable dust sampler with EPM filter paper	Atomic absorption spectroscopy
7.	Hydrocarbon	IS 5182: Part 17 (Reaffirmed Year: 2019	1.0 ppm to 100 ppm	1.0 ppm	Sampling in Tedlar Bag with low flow pump	Sample is collected in Tedlar Beg with a constant flow rate of 1 to 2 LPM for 1 liter of sample volume.
8.	Lead	IS:5182 (Part-22) 2004 Reaffirmed 2014	0.02 µg/m3 to 50 g/m3	0.02 µg/m3	Respirable dust sampler with EPM filter paper	Atomic absorption spectroscopy

Protocol Used: CPCB Guidelines/IS-5182

Monitoring Schedule

Ambient Air quality monitoring has been carried out at 8 locations for 24 hours for PM_{10}, $PM_{2.5}$, So_2, NO_2, CO, Zn, HC & Pb with frequency of twice a week for three months (26 observations for one location).

Monitoring Locations

Sampling locations in the downwind and upwind were selected for AAQ Monitoring keeping in view the pre-dominant wind direction prevailing in the area during the study period and as per the IMD data.

It can be observed from the wind rose diagram {Figure - 3.8(b)} that the dominant wind direction during the study period was from West.

Villages / locations have been selected in the downwind direction as well as in the upwind direction for AAQ monitoring from the plant site.

Monitoring stations selected for Ambient Air Quality Monitoring during the study period are given in Table - 3.13 & shown in Figure - 3.9.

Table - 3.13: Locations of Ambient Air Quality Monitoring Stations
Study Period: Summer Season (March, 2022 to May, 2022)

Station code	Sampling Location	Approx. Aerial Distance & direction	Selection Criteria
AAQ1	Plant site	Core zone	Core zone
AAQ2	Near Bichhri Village	~0.25 km in E direction	Downwind of pre-dominant wind direction
AAQ3	Mandesar Village	~9.0 km in E direction	Downwind of pre-dominant wind direction Near Airport
AAQ4	Near Panwari RF	~0.2 km in W direction	Upwind of pre-dominant wind direction Near RF NearNH27
AAQ5	Debari Village	~1.0 km in NE direction	Upwind of 2nd pre-dominant wind direction

Station code	Sampling Location	Approx. Aerial Distance & direction	Selection Criteria
			NearNH27
AAQ6	Udaipur (Pratap nagar near Gugla RF)	~6.5 km in W direction	Mostly habitation area Near RF
AAQ7	Village Lakarwas	~4.5 km in S direction	Crosswind of dominant wing direction Near Udaisagar
AAQ8	Village Gowla	~0.4 km in N direction	Crosswind of dominant wing direction Near NH 27

Source: SOI Toposheet& field survey

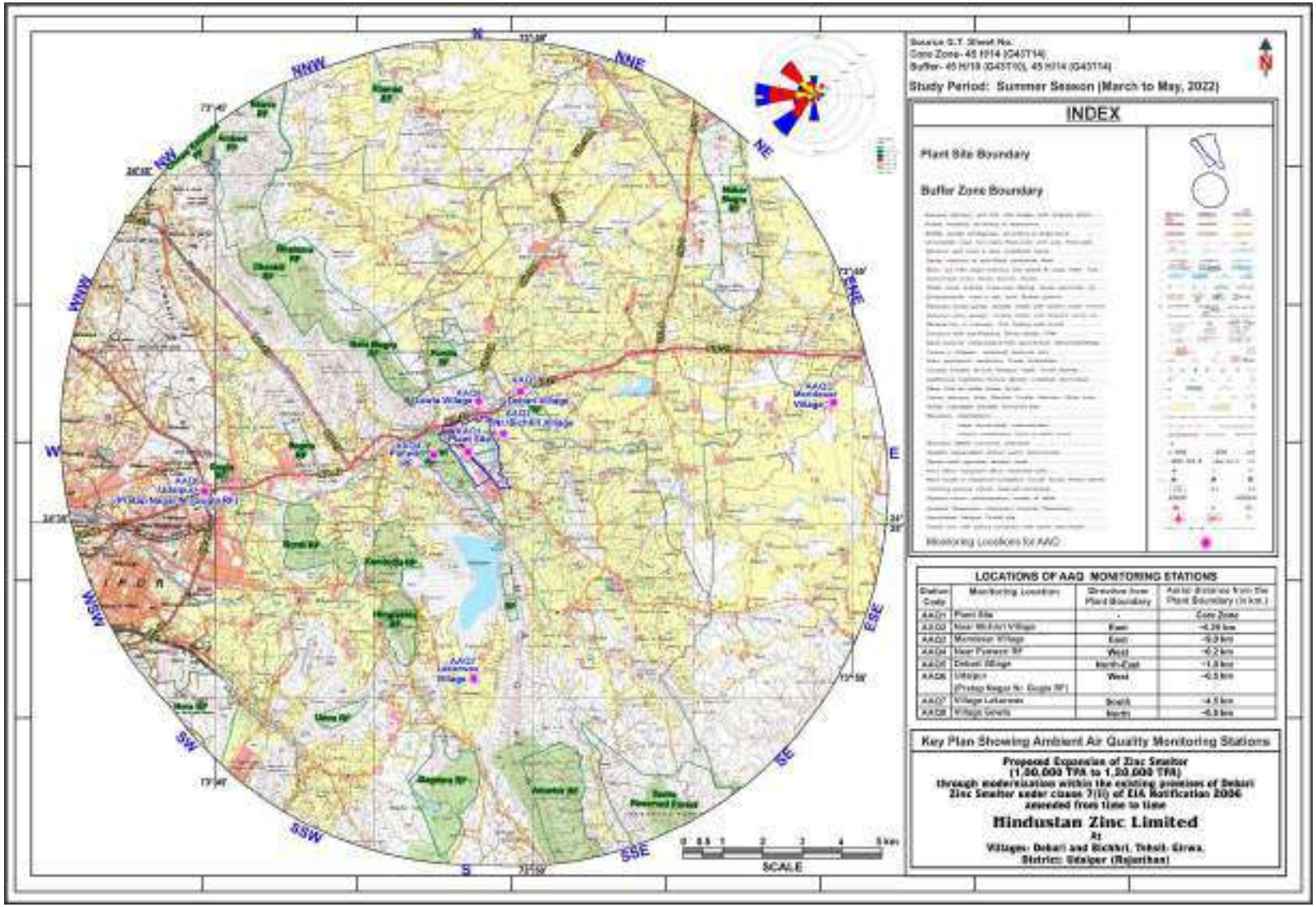


Figure 3.9: Key Plan showing Ambient Air Quality Monitoring Locations

Ambient Air Quality Monitoring

Table - 3.12 below shows the maximum and minimum concentration of the air pollutants monitored at different monitoring locations during the study period. All 24 observations of pollutants for each location are detailed in Ambient Air Quality Monitoring Tables enclosed as ***Annexure -12*** along with this EIA/EMP Report.

Table - 3.14: Ambient Air Quality Monitoring Results
Study Period: Summer Season (March, 2022 to May, 2022)

S. No.	Sampling Location	Parameters												
		$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		Nitrogen Oxide (NO_2) (µg/m³)		Sulphur Dioxide (SO_2) (µg/m³)		Carbon Monoxide (CO) (mg/m³)		Zinc (Zn) (µg/m³)	Total Hydrocarbon (mg/m³)	Lead (µg/m3)
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.			
1.	Plant site	42.6	33.8	81.7	67.5	26.3	16.9	15.3	8.2	0.98	0.70	3.02	1.9	0.26
2.	Near Village Bichhri	38.9	30.1	77.5	63.8	23.5	14.0	13.4	7.6	0.75	0.62	1.88	BDL	0.11
3.	Village Mandesar	36.5	28.9	74.1	60.5	21.4	13.1	13.8	7.8	0.79	0.60	BDL	BDL	0.05
4.	Near Panwari RF Area	38.7	26.5	69.4	58.9	19.7	12.2	12.3	6.9	0.67	BDL	BDL	BDL	BDL
5.	Village Debari	45.2	35.8	83.0	65.6	24.3	14.8	14.8	6.7	0.84	0.66	1.16	BDL	BDL
6.	Udaipur (Pratap nagar near Gugla RF)	51.3	42.3	88.1	72.2	28.2	19.2	16.6	8.8	1.12	0.70	1.28	2.2	0.39
7.	Village Lakarwas	38.8	31.2	70.8	62.6	20.5	12.7	11.9	7.0	0.66	BDL	BDL	BDL	BDL
8.	Village Gowla	40.1	35.6	73.9	61.3	22.8	13.8	12.7	6.6	0.73	BDL	BDL	BDL	BDL
Detection Limit										0.5		1.0	1.0	0.02
NAAQS*		60		100		80		80		4		-	-	1

NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009
Remark - Detection limits for Zinc – 0.5(µg/m3) and Total Hydrocarbon -1.0 mg/m³, Lead-0.02(µg/m3)
Source: Ambient Air Quality Monitoring Results from JM EnviroLab Pvt. Ltd.

Observation:

Ambient Air Quality Monitoring reveals that the concentrations of PM2.5 and PM10 for all the 8 AAQM stations were in range of 26.5 to 51.3 µg/m3 and 58.9 to 88.1 µg/m3 respectively and were found to be within the prescribed limits.

As far as the gaseous pollutants SO2 and NO2 are concerned, the prescribed CPCB limit of 80 µg/m3 has never surpassed at any station. The concentrations of SO2 and NO2 were found to be in range of 6.6 to 16.6 µg/m^3 and 12.2 to 28.2 µg/m^3 respectively. The concentration of CO was found to be in range of BDL to 1.12 mg/m^3. The concentration Zinc (Zn) ranges between BDL (DL: 1 µg/m^3) to 3.02 µg/m^3, the concentrations of Total Hydrocarbon was BDL (DL: 1.0 mg/m^3) to 2.2 mg/m^3 and the concentrations of lead was BDL (DL: 0.02 µg/m^3) to 0.39 µg/m^3.

The prime contributors for the air pollutants within the 10 km study area include industrial and human activities such as construction and vehicular movement, etc. The maximum concentration of most of the parameters was found in Udaipur which may be due to vehicular movement, densely populated area and minimum at Near Panwari RF which may be due to domestic activities and geological barrier from the plant by Panwari RF.

All the parameters at the monitoring locations were found well within the prescribed NAAQ standards. But it is expected, due to the proposed expansion project, there will be increase in the pollutant concentration in the nearby villages, primarily in the villages falling in the downwind direction, but adequate mitigation measure will be adopted to mitigate the additional air pollution load. Detailed mitigation measures to be adopted by Hindustan Zinc Limited to control the air emissions are given in Chapter- 4 & 10 of this EIA/EMP report.

3.6.3.2 Noise Environment

Noise often defined as unwanted sound, interferes with speech communication, causes annoyance, distracts from work, and disturbs sleep, thus deteriorating quality of human environment.

Source of Noise

There are several sources of noise in the 10 km radius of the study area, which contributes to the local noise level of the area. Ambient noise sources in the vicinity of the plant site include noise from plant operation, traffic on road, human activities in villages and agricultural fields.

Ambient Noise Level

In order to know the baseline noise levels, in and around the plant site, noise levels were measured at site and villages in the study area.

Sampling Schedule

The sampling was done during day time & night time once in the study period.

Sampling Locations

Locations / stations selected for noise level monitoring are given in Table - 3.15.

Table - 3.15: Locations of Ambient Noise Level Monitoring Stations

S. No.	Monitoring stations	Tentative distance (from plant lease boundary) & direction (from center point)	Selection Criteria
ANL1	Plant site	Core zone	o Core zone
ANL2	Near Bichhri	~0.25 km in East direction	o Downwind of pre-dominant wind direction
ANL3	Village Debari	~1.0 km in NE direction	o Upwind of 2nd pre-dominant wind direction o NearNH27
ANL4	Village Gowla	~0.4 km in N direction	o Crosswind of dominant wind direction o Near NH 27
ANL5	Habitation between plant site and Panwari RF	~0.1 km in West direction	o Upwind of pre-dominant wind direction o Near RF
ANL6	Ghata Wala Mataji Temple	~0.6 km in WNW direction	o Near NH27
ANL7	Diggi	~0.8 km in SSE direction	o Crosswind of dominant wind direction
ANL8	Village Sihara	~2.7 km in ESE direction	o Crosswind of 2nd dominant wind direction

Source: SOI Toposheet & Field Survey

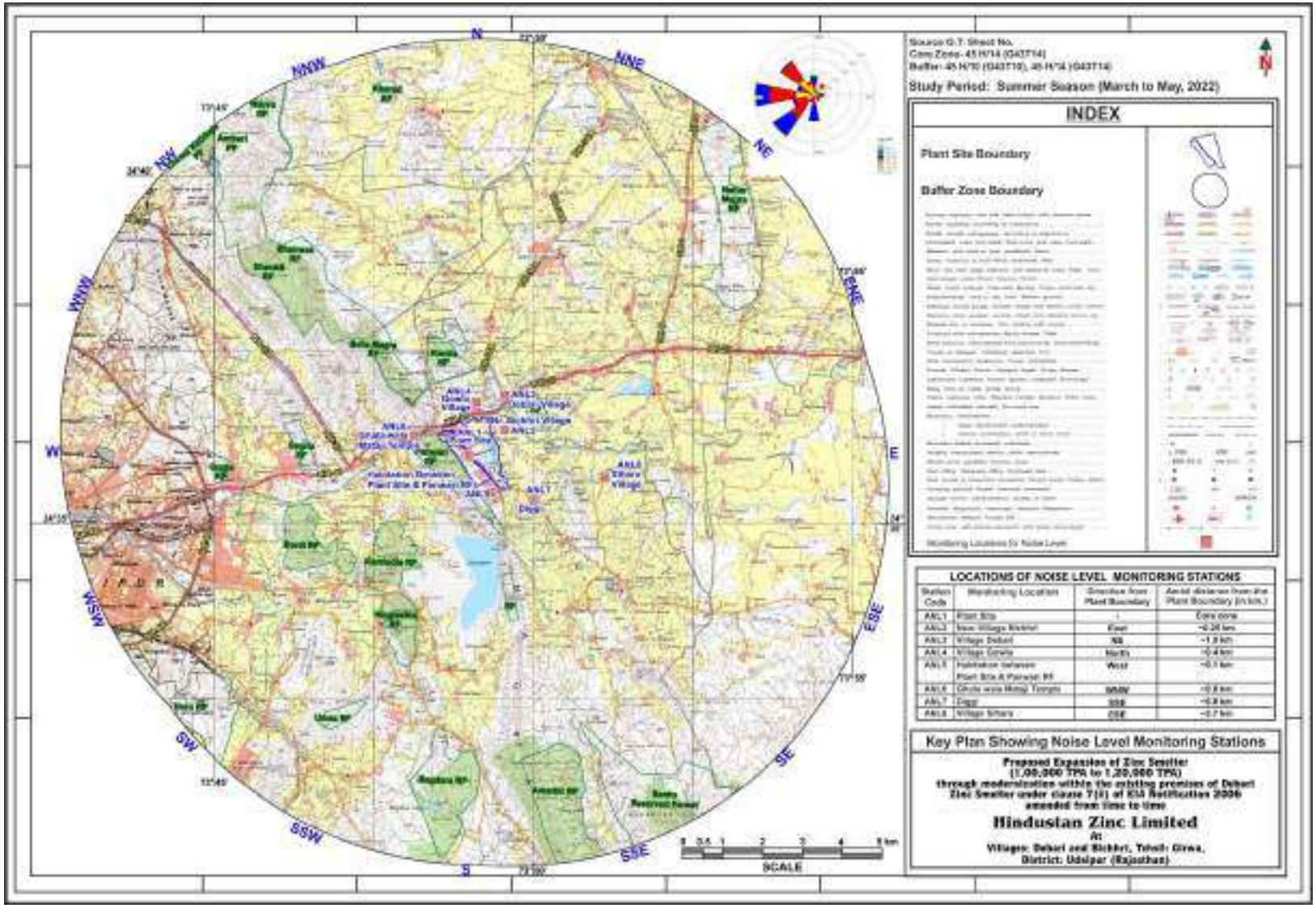


Figure 3.10: Key Plan showing Ambient Noise Level Monitoring Stations

Ambient Noise Level Monitoring Results

Ambient noise levels monitored at different locations (as mentioned in Table - 3.15) during the study period are given in Table - 3.16.

Table - 3.16: Ambient Noise Level Monitoring Results
Study Period: Summer Season (March, 2022 to May, 2022)

S. No.	Monitoring Locations	Noise Level Leq. dB (A)			
		Day Time (6:00 am to 10:00 pm)	Prescribed limit	Night Time (10:00 pm to 6:00 am)	Prescribed limit
1.	Plant Site	66.4	75	56.4	70
2.	Near Village Bichhri	52.3	55	42.1	45
3.	Village Debari	53.5	55	43.8	45
4.	Village Gowla	52.9	55	42.7	45
5.	Habitation between Plant site and Panwari RF	51.5	55	42.0	45
6.	Ghatawala Mataji Temple	53.7	55	42.3	45
7.	Village Diggi	52.1	55	42.5	45
8.	Village Sihara	51.9	55	41.7	45

Source: Ambient Noise Level Monitoring Results

Observations:

Ambient noise levels were measured at 08 locations in and around the plant site during the day and night time. Noise level varies from 51.5 to 66.4 Leq dB (A) during day time and from 41.7 to 56.4 Leq dB (A) during night time.

The noise is mainly caused due to nearby anthropogenic activities and transportation. Noise pollution is the major problem in the urban areas but the small towns and the nearby villages all along the road side are also the victim of the noise problems.

The highest value of noise level as monitored in day time and in night time were observed at Plant Site due to plant activities and the minimum noise levels were observed at habitation between plant site and Panwari RF during day time and night time as there is less habitation and there is no other major source of noise pollution in proximity of this area.

From the above study and discussions, it can be concluded that noise levels in the study area are well within the prescribed limits as prescribed by the Noise Pollution (Regulation and Control) Rules, 2000.

Minor increase in noise levels near to the plant site will be seen due to the proposed expansion project.

Impact assessment and mitigation measures suggested for the same have been detailed in Chapter 4 of this EIA/EMP Report.

3.6.4 Water Quality Environment

As a significant part of predefined frame work of the present study, water sample were collected from selected locations. The reconnaissance survey was undertaken and monitoring locations were finalized based on:

- Presence, location and uses of major water bodies in the region

- Type and location of industrial/residential areas
- Likely area that can represent baseline conditions

The water resources in the study area were divided into two categories for getting ideal upshot of baseline status of water quality of the study area. The two major water resources are categorized as follows:

- Surface water resources: Nallah, Ponds, River, Canals, Lake.
- Ground water resources (Tube well, Open well, Hand pumps, etc.)

3.6.4.1 Surface Water Quality

Surface water samples were collected from 04 water bodies in the study area and analyzed to know the surface water quality of the area. Surface water location details are shown on key plan and results are given below.

Table - 3.17: Locations of surface water sampling stations

S. No.	Sampling Stations	Approx. aerial distance from Plant Boundary	Direction from Plant site
SW1	Udaisagar	~1.0 km	SSW
SW2	Ahar Nadi	~ 3.5 km	SSW
SW3	Berach River	~1.5 km	SE
SW4	Bagdara Talav	~ 8.0 km	SSW

Source: SOI Toposheet and Field Survey

There are 3 seasonal nallahs passing through the plant site which remain active during rains only. The same were found dry during the study period. Rest of the major water bodies were also found dry during the study peiod.

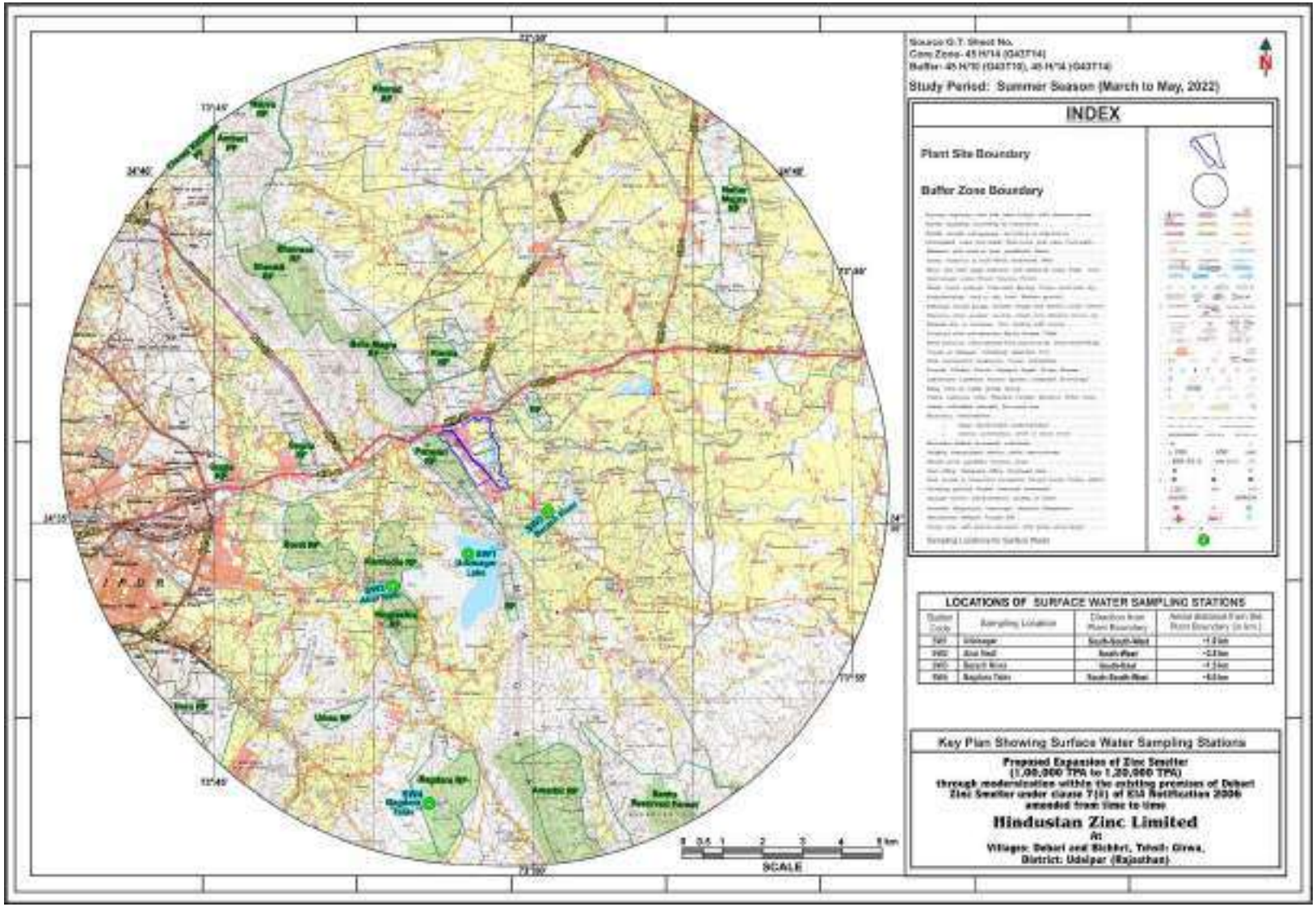


Figure - 3.11: Key Plan showing Surface Water Sampling Locations

Table - 3.18: Surface Water Analysis Results

S. No.	Parameters	Unit	Udiasagar	Ahar River	Berach River	Bagdara Talav
1.	pH (at 25°C)	--	7.44	7.62	7.58	7.77
2.	Odour	--	10.0	Agreeable	Agreeable	Agreeable
3.	Turbidity	NTU	14.0	10.0	4.0	7.0
4.	Total Hardness as $CaCO_3$	mg/l	341.59	371.26	391.11	584.14
5.	Calcium as Ca	mg/l	63.35	69.33	81.22	120.75
6.	Alkalinity as $CaCO_3$	mg/l	280.28	313.52	323.04	356.25
7.	Chloride as Cl	mg/l	369.89	384.36	339.81	362.37
8.	Magnesium as Mg	mg/l	44.60	48.18	45.80	68.74
9.	Total Dissolved Solids	mg/l	996.0	1136.0	1012.0	1116.0
10.	Sulphate as SO_4	mg/l	92.80	119.21	101.39	121.60
11.	Fluoride as F	mg/l	0.69	0.81	0.87	1.05
12.	Nitrate as NO_3	mg/l	4.82	5.87	6.90	8.54
13.	Iron as Fe	mg/l	0.39	0.19	0.45	0.42
14.	Phosphate as Po_4	mg/l	0.34	0.23	0.09	0.25
15.	Total Suspended Solid	mg/l	24.1	18.6	8.9	12.3
16.	Biochemical Oxygen Demand	mg/l	16.3	18.0	7.6	11.0
17.	Chemical Oxygen Demand	mg/l	46.9	63.3	24.0	36.0
18.	Sodium as Na	mg/l	176.0	193.0	164.0	122.0
19.	Potassium as K	mg/l	2.7	2.9	3.2	3.4
20.	Conductivity	µs/cm	1639.0	1823.0	1626.0	1719.0
21.	Dissolve Oxygen	mg/l	6.3	6.1	7.2	6.9

BDL – Below Detection Limit, DL- Detection Limited

***Source**: Surface Water Analysis*

***Note:** Surface water quality was also analyzed for Colour (1.0 Hazen Unit), Turbidity (1.0 NTU), Residual free Chlorine (0.2 mg/l), Cyanide as CN (0.02 mg/l), Aluminium as Al (0.03 mg/l), Boron(0.2 mg/l), Phenolic Compounds (DL 0.001 mg/l), Anionic Detergents as MBAS (DL 0.02 mg/l), Hexa Chromium as Cr^{+6} (DL 0.03 mg/l) , Zinc as Zn (DL 0.0005 mg/l), Copper as Cu(DL 0.02 mg/l), Manganese as Mn (DL 0.01 mg/l), Lead as Pb(DL 0.008 mg/l) , Selenium as Se (DL 0.005 mg/l), Arsenic as As (DL 0.002 mg/l), Mercury as Hg (DL 0.001 mg/l) , and Nickel (DL 0.001 mg/l) but not detected.*

Interpretation

The above-mentioned chemical analysis of surface water samples reveals that there is a variation in the chemical composition of water samples from nearby water bodies. The other water bodies viz. Vela Nala, Khemli Talav, Gadela Nadi and Udaisagar Right Canal etc. were found dry during baseline monitoring.

The turbidity of water samples were found (4.0 to 14.0 NTU) and the odour was found agreeable at three sampling locations.

The value ranges of various parameters such as pH (7.44 to 7.77), Total Hardness (341.59 mg/l to 584.14 mg/l) indicating hard water, Total Dissolved Solids (996.0 mg/l to 1136.0 mg/l), Alkalinity (280.28 mg/l to 356.25 mg/l), and conductivity (1626.0 µs/cm to 1823.0 µs/cm) is satisfactory due to presence of ions in the water body, Sulphate (92.80 mg/l to 121.60 mg/l), nitrates (4.82 mg/l to 8.54 mg/l), Calcium (63.35 mg/l to 120.75 mg/l), Magnesium (44.60 mg/l to 68.74 mg/l), sodium (122 mg/l to 193 mg/l), potassium (2.7 mg/l to 3.4 mg/l), COD (24 mg/l to 63.3 mg/l), TSS (8.9 mg/l to 24.1 mg/l), fluoride (0.69 mg/l to 1.05 mg/l), Fe (0.19 to 0.45 mg/l), chloride (339.81 mg/l to 384.36 mg/l), Phosphate (0.09 mg/l to 0.34 mg/l), DO (6.1 mg/l to 7.2 mg/l), BOD (7.6 mg/l to 18 mg/l).

Conclusion:

As per the CPCB standards, the water quality parameters DO and pH for all sampling sites are within permissible limit of Class A whose designed best use is "Drinking water source without conventional treatment but after disinfection" making it suitable for aquatic life; but due to the higher values of BOD the surface water quality is mildly polluted so it cannot be directly used or consumed as a source of drinking water. The same can be utilized after proper treatment.

Details regarding Impact assessment and mitigation measure have been given in Chapter 4 of this EIA/EMP Report.

3.6.4.2 Ground Water Quality

The sources of potable water in the area are the bore-wells, tube-wells, Hand pumps and tap water. The quality of ground water was studied by collecting 8 water samples from the available water resources around the plant site.

Analytical methods prescribed by APHA & approved Indian Standard methods were used for carrying out ground water quality monitoring.

Details of ground water sampling locations and their distance and directions are given in Table - 3.19 & shown in Figure - 3.12.

Table - 3.19: Locations of Ground water and Soil sampling stations

S. No.	Sampling Station	Approx. aerial distance from Plant Site	Direction
SWGS1	Plant site	-	-
SWGS2	Near Bichhri	~0.25 km	East
SWGS3	Mandesar	~9.0 km	East
SWGS4	Debari	~1.0 km	NE

S. No.	Sampling Station	Approx. aerial distance from Plant Site	Direction
SWGS5	Udaipur (Pratap nagar near Gugla RF)	~6.5 km	West
SWGS6	Lakarwas	~4.0 km	South
SWGS7	Gowla	~0.5 km	North
SWGS8	Dabok	~4.5 km	ENE

Source: SOI Toposheet and Field Survey

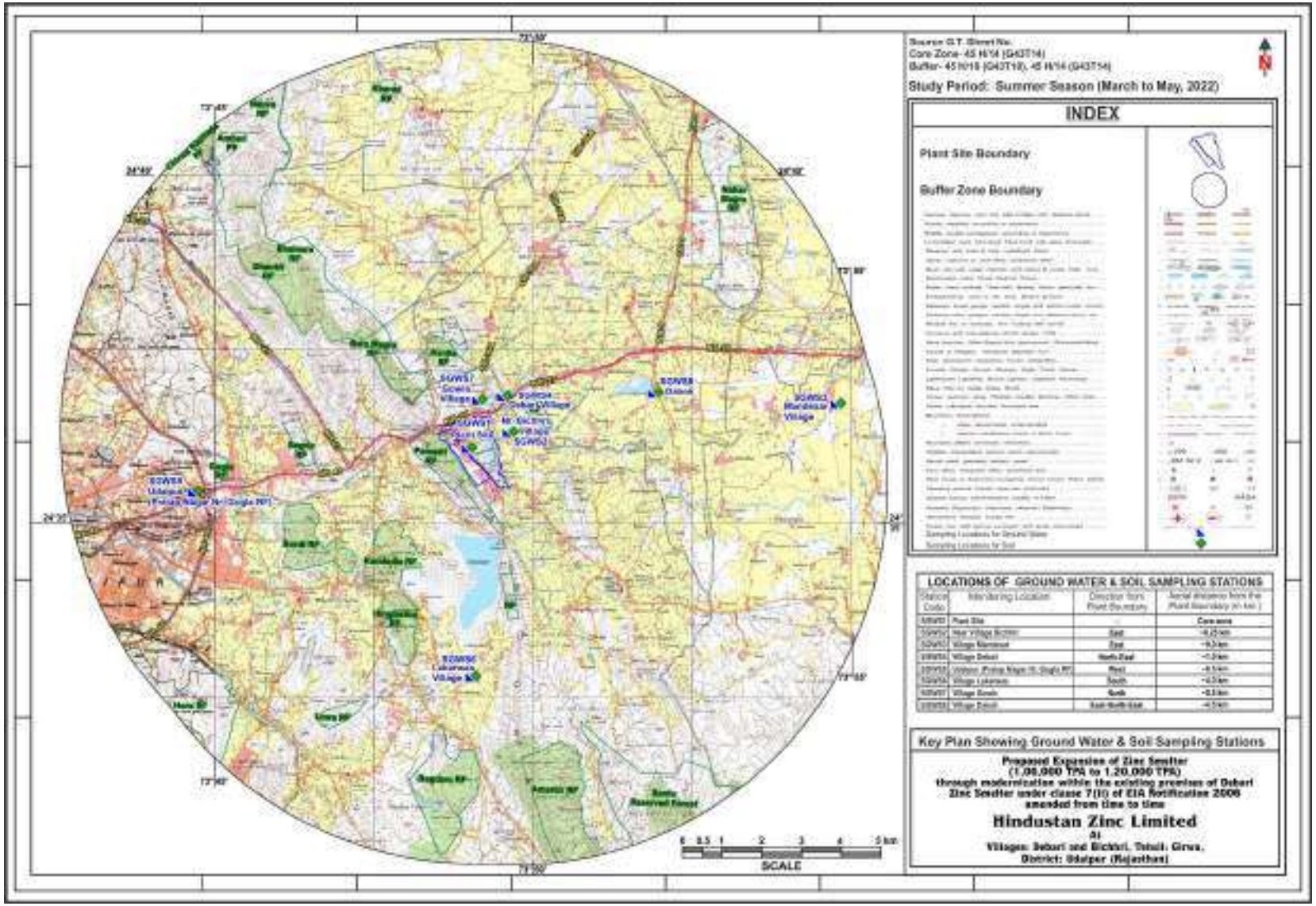


Figure - 3.12: Key Plan showing Ground Water and Soil Sampling Location

Table - 3.20: Ground Water Quality Analysis Results
Study Period: Summer Season (March, 2022 to May, 2022)

S. No.	Parameters	Unit	Plant Site	Village-Bichheri	Village-Mandesar	Debari	Udaipur	Village-Lakadwas	Village-Gowla	Dabok	Specification as per IS 10500-2012	
											Requirement Acceptable Limit	Permissible Limit in the Absence of Alternate Source
1.	pH (at 25°C)	-	7.42	7.48	7.52	7.85	7.55	7.52	7.74	7.67	6.5-8.5	No Relaxation
2.	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3.	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4.	Total Hardness as $CaCO_3$	mg/l	301.94	336.65	549.47	792.01	415.88	623.72	594.65	470.27	200	600
5.	Calcium as Ca	mg/l	87.13	97.25	142.53	188.12	114.86	182.24	138.63	122.73	75	200
6.	Alkalinity as $CaCO_3$	mg/l	261.2	280.2	318.2	418.0	327.7	331.6	399.0	380.0	200	600
7.	Chloride as Cl	mg/l	164.9	114.9	312.4	442.3	112.4	323.6	303.2	147.8	250	1000
8.	Magnesium as Mg	mg/l	20.55	22.84	47.11	78.40	31.42	41.07	60.45	39.87	30	100
9.	Total Dissolved Solids	mg/l	702.0	636.0	1056.0	1498.0	713.0	1122.0	1123.0	809.0	500	2000
10.	Sulphate as SO_4	mg/l	95.41	92.07	134.72	201.3	123.6	123.9	146.5	123.6	200	400
11.	Fluoride as F	mg/l	0.83	0.94	1.13	1.28	1.19	1.22	0.98	1.08	1	1.5
12.	Nitrate as NO_3^-	mg/l	15.04	22.04	19.64	33.06	26.22	29.05	27.85	19.05	45	No Relaxation
13.	Iron as Fe	mg/l	0.63	0.32	0.29	0.48	0.44	0.36	0.29	0.46	1	No Relaxation
14.	Sodium as Na	mg/l	78.0	48.0	106.0	156.0	43.4	124.5	120.0	58.0	--	--
15.	Potassium as K	mg/l	3.4	2.9	4.6	6.9	5.6	3.2	2.3	2.8	--	--
16.	Conductivity	µS/cm	1131.00	972.00	1665.00	2412.00	1183.00	1722.00	1596.00	1189.00	--	--

Source: Ground Water analysis Report
Remarks: BDL - Below Detectable Limit, DL - Detection Level
Note: *Apart from the above, various parameters viz. Colour (DL 5.0 Hazen Unit), Turbidity (DL 1.0 NTU), Cyanide as CN (DL 0.02 mg/l), Aluminum as Al (DL 0.03 mg/l), Phenolic Compounds (DL 0.001 mg/l), Anionic Detergents as MBAS (DL 0.02 mg/l), Hexa Chromium as Cr^{+6} (DL 0.03 mg/l), Chromium as Cr (DL 0.002 mg/l), Zinc as Zn (DL 0.10 mg/l), Copper as Cu (DL0.02 mg/l), Manganese as Mn (DL 0.10 mg/l), Cadmium as Cd (DL 0.002 mg/l), Lead as Pb (DL 0.008 mg/l), Arsenic as As (DL 0.002 mg/l), Mercury as Hg (DL 0.001 mg/l), Phosphate as PO4 (DL 0.02 mg/l), Nickel (DL 0.005 mg/l), Total Suspended Solids (DL 1.0 mg/l), Boron(0.20 mg/l) were analyzed in the water samples but the same were not detected*

Interpretation of Ground Water Analysis

The physico-chemical analysis of groundwater samples was compared with Drinking Water Standard (IS:10500-2012). The pH of the groundwater samples ranged from 7.42 to 7.85 which is within the permissible limit. As per the drinking water standards, pH has an optimum range of 6.5 to 8.5, therefore, the study area has a pH ranging with the prescribed limits; thus, the samples are fit for drinking purpose. The odour and taste were found agreeable at all sampling locations.

The observed values of parameter vary from: Total dissolved solids (636 to 1498 mg/l), total hardness (301.9 to 792.0 mg/l) and total alkalinity (261.2 to 418.0 mg/l). Village Debari and village Lakadwas has hard water and needs treatment before consumption or any other domestic activities. Hard water cause accumulation of deposits in appliances and pipes can cause blockage and in appliances, it can cause loss of energy efficiency and decrease its life span. The concentration of chloride was found to be (112.4 to 442.3 mg/l) and sulphate was (92.07 to 201.3 mg/l), Nitrate (15.04 to 33.06 mg/l), Calcium (87.13 to 188.12 mg/l), Magnesium (20.55 to 78.40 mg/l). The conductivity (972 to 2412 µS/cm). The Fluoride concentration (0.83 to 1.28 mg/l) was within permissible range for all villages. Based on the conductivity values, the groundwater samples are good for irrigation purpose. Iron was found (0.29 mg/l to 0.63mg/l). The sodium concentration (43.4 to 124.5 mg/l) and potassium concentration (2.3 to 6.9 mg/l).

Thus, it can be concluded from the sampling results for groundwater that all the samples were observed to be within the permissible limits and complies to the drinking water standard (IS: 10500-2012) except Village Village Debari and Village Lakadwas where Total Hardness are out of the prescribed limit. The adequate mitigation measure proposed in this regard have been given in Chapter 4 of this EIA / EMP Report.

3.6.4.3 Soil Environment

Soil Quality and Characteristics

The information on soil quality has been gathered by collecting data from various secondary sources and supplemented by collection and analysis of soil samples from representative locations. In order to assess the base line characteristics of the soil profile of the nearby areas of Plant Site, the samples were analyzed for key and chemical parameters.

The sampling locations were finalized with the following considerations:

- To enable information on baseline characteristics and,
- To determine the anticipated impact of Plant operation activities on soil characteristics.

Representative soil samples were collected from 08 different specified locations within the study area from the plant site. Standard procedures were followed for the sampling and analysis of physico-chemical parameters. Details of Location of soil sampling stations along with the direction are given in Table - 3.19 and Figure: 3.12 and soil analysis results are given in Table - 3.20.

Table - 3.21: Soil Analysis Results
Study Period: Summer Season (March, 2022 to May, 2022)

S. No.	Parameters	Unit	Sampling Locations							
			Plant Site	Village-Bichhari	Village-Mandesar	Village-Debari	Village-Lakadwas	Udaipur Pratap Nagar	Village Gowla	Village-Debok
1.	pH (at 25°C) (1:2.5 soil water sus.)	-	7.61	7.56	7.34	7.56	7.38	7.32	7.68	7.22
2.	Conductivity (1:2 soil water sus)	mS/cm	0.57	0.46	0.47	0.55	0.52	0.78	0.58	0.45
3.	Soil Texture	-	Sandy clay	Sandy clay	Clay Loam	Sandy clay	Sandy clay	Clay Loam	Sandy Clay Loam	Clay Loam
4.	Colour	-	Light Brown	Reddish Brown	Light Brown	Light Brown	Dark Brown	Light Brown	Light Brown	Dark Brown
5.	Water Holding Capacity	%	42.6	43.4	49.6	41.39	45.9	50.37	46.19	49.4
6.	Bulk Density	gm/cc	1.43	1.42	1.32	1.40	1.39	1.30	1.37	1.29
7.	Chloride	mg/kg	269.62	265	289	248.25	474	196.08	276.84	373
8.	Calcium	mg/kg	3026.00	1943.00	2350.00	3017.00	2951.00	2886.00	3062.00	2647.00
9.	Sodium	mg/kg	285.55	193.00	261.00	335.23	328.00	304.87	256.31	180.36
10.	Potassium	kg/hec	764.51	544	533	532.51	533	1491.02	513.26	533
11.	Magnesium as Mg	mg/kg	614.50	315.00	398.00	546.20	470.00	504.20	589.61	418.00
12.	Organic Matter	%	1.06	1.09	0.91	0.78	0.97	1.11	0.89	1.02
13.	Available Nitrogen as N	kg/hec	160.25	301	299	312.64	333	298.4	308.2	279
14.	Available Phosphorus	kg/hec	48.62	42.6	56.3	98.64	48.6	62.9	76.51	87.6
15.	Zinc as Zn	mg/kg	19.54	30.0	44.1	47.25	33.7	40.93	34.26	51.2
16.	Manganese as Mn	mg/kg	195.62	149.9	157.7	173.07	177.23	231.64	167.52	245.36
17.	Lead as Pb	mg/kg	16.57	9.03	25.4	19.97	16.5	15.03	23.16	22.4
18.	Copper as Cu	mg/kg	22.25	10.9	16.35	25.33	11.6	11.63	44.43	22.7
19.	Organic Carbon	%	0.61	0.63	0.53	0.45	0.56	0.64	0.52	0.59
20.	SAR Value	-	1.24	1.07	1.31	1.48	1.48	1.38	1.11	0.86
21.	Sand	%	51	47	26	52	49	25	64	29
22.	Silt	%	13	14	44	9	13	41	14	42
23.	Clay	%	36	39	30	39	38	34	22	29
24.	Porosity	%	50.63	51.53	50.81	53.24	52.78	53.57	53.98	49.7
25.	Salanity	ppt	0.41	0.35	0.32	0.40	0.43	0.62	0.40	0.28

Source: Soil Quality Analysis Report.

Table - 3.22: Standard Soil Classification

S. No.	Parameters	Classification
1.	pH	<4.5 extremely acidic 4.51 - 5.0 very strong acidic 5.01 - 5.5 strongly acidic 5.51 - 6.0 moderately acidic 6.1 - 6.5 slightly acidic 6.51 - 7.3 Neutral 7.31-7.8 slightly alkaline 7.81-8.5 moderately alkaline 8.51 - 9.0 strongly alkaline >9.0 Very strongly alkaline
2.	Salinity Electrical Conductivity (mho/cm) 1 mho/cm = 640 ppm	Up to 1.0 average 1-2 harmful to germination 2-3 harmful to crops
3.	Nitrogen (kg/ha)	Up to 50 very less 51-100 less 110-150 good 151-300 better >300 sufficient
4.	Phosphorus (kg/ha)	Up to 15 very less 15 - 30 less 31-50 medium 51-65 on average sufficient 66-80 sufficient >80 more than sufficient
5.	Potassium (kg/ha)	0-120 very less 120-180 less 180-240 medium 241-300 average 301-360 better >360 more than sufficient

Source: Indian Agricultural Research Institute Handbook

Observations:

- The soil samples were Reddish, Light and Dark Brown in colour indicating well drained soil samples. The textures of soil samples were Sandy Clay to Sandy Clay loam. The soil texture are desirable for agriculture.
- All soil samples have Neutral to slightly alkaline nature, having pH range from 7.22 to 7.68. Water holding capacity (41.39 % to 50.37 %) and bulk density (1.29 to 1.43 g/cc) were ideal for the crops. Physical quality of soil samples is good for the plantation.
- All the major nutrients were present, namely organic matter (0.78 % to 1.11 %) optimum, nitrogen (160.25 to 333 kg/ha) better to sufficient, phosphorus (42.6 to 98.64 kg/ha) medium to more than sufficient and potassium (513.26 to 1491.02 kg/ha) more than sufficient. This indicates that soil fertility is good with nitrogen, phosphorus in average quantity in some soil samples in the study area.
- Other nutrients were present in the soil samples, namely calcium (1943 to 3062 mg/kg), magnesium (315 to 614.5 mg/kg), zinc (19.54 to 51.2 mg/kg). SAR value was also calculated for the study and it was found in the range of 0.86 to 1.48.

- The texture of the soil samples majorly consists of Sandy Clay to Sandy Clay loam which favors good drainage, fertility of the soil and it has ability to retain moisture and nutrients to the soil. The samples have an optimum content of organic matter which is suitable for the Plant growth. As observed the essential nutrients within the soil of the sampled villages, Nitrogen content was observed to be present in the better to sufficient quantity, whereas the values for phosphorus were found to be medium to more than sufficient & potassium is more than sufficient. The soil sample of the plant site shows a comparatively neutral to slightly alkaline pH in nature and consist majorly Sandy loam Salinity electrical conductivity is also found to be present average.
- From the results, it can be concluded that the quality of the soil within the study area is suitable for plantation and greenbelt.

3.7 BIOLOGICAL ENVIRONMENT

3.7.1 Introduction

Biological study is essential to understand the impact of industrialization and urbanization on existing flora and fauna of the study area. Studies on various aspects of ecosystem play an important role in identifying sensitive issues for undertaking appropriate action to mitigate the impact, if required.

The biological study was undertaken as a part of the EIA study report to understand the present status of ecosystem prevailing in the study area, to compare it with past condition with the help of available data, to predict changes in the biological environment because of present activities and to suggest measures for maintaining its health.

A baseline survey was conducted to study floral and faunal diversity of the terrestrial and aquatic environment of the study area within the 10 km radius of the plant site.

Some of the information was collected from the local habitants. All the collected data were classified to interpret the impact of pollution on the flora and fauna of that region.

The present study was carried out in steps as mentioned below:

a) Floral Study

i. The floral survey of project area is based on extensive field survey of the area. The seasonal study has been conducted during *summer season* (March to May, 2022). The plant species were identified with the help of available literature, concern with forest department and local people of study area.

ii. Floral survey was conducted by ocular assessment and visual encounter survey in core and buffer zone of plant site.

iii. After surveying the core and the buffer areas, a detailed floral inventory has been compiled. List of all plants from the study area was prepared and their habitats were recorded.

iv. Plant and animal communities were noted.

b) Survey and Sampling of Plant Species Diversity

i. Site selection criteria: The core study area of Plant Site is located at Villages Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan). The buffer study area comprises of 10 km radius from the Plant site.

ii. Wind rose diagram was used to study wind pattern on the surroundings of the plant site.

iii. Survey was made with reference to topography, land use, vegetation pattern, etc. The observations were taken on natural vegetation, road side plantation and non- forest area (agricultural field, in plain areas, village waste land, etc.) for inventorization of different species.

iv. To study herbaceous and woody vegetation systematically, standard methods of analyzing vegetation, i.e. Quadrate sampling were used for determination of vegetation composition and richness.

c) Estimation of Faunistic Components

i. Ground survey for fauna was carried out by trekking and vehicular transects method for identification of animal groups such as Butterflies, Insects, Birds, Reptiles, Amphibians and Mammals etc. inhibiting the area. The fauna was identified by using standard monograph of birds, butterflies, Reptiles, Mammals etc.

ii. For Avifauna, Visual Encounter Survey (VES) technique was used in the Morning (05:30 to 09:30 hrs.) and Evening (16:30 to 19:00 hrs.) for study of diversity.

iii. For Mammals, Reptiles, Amphibians etc., species have been recorded by calls, droppings, burrows, pug marks, indirect species- specific evidence, by inquiring from local people and actual sighting.

iv. Survey was conducted just before dusk time to 10:30 hours for Nocturnal Animals. Light trap method was used to determine the insect diversity.

v. A visit to the local Fish market to conduct 'Basket Survey' for understanding Ichthyofaunal diversity.

vi. A trekking route map has been prepared for study of biological diversity by ground survey.

vii. Photo documentation of all the Floral and Faunal species along with cropping patterns has been done.

Table – 3.23: Inventory of floral diversity in Core & Buffer zone of study area Based on Actual Sighting, based on inputs from locals and Perused from Secondary Data Habit: Tree (T), Shrub (S), Herb (H), Grass (G) and Climber (C)

S. No.	Scientific name	Local name / English Name	Family	Habit	Core Zone	Buffer Zone	IUCN conservation status as on 15th Sep, 2022
Tree Species							
1.	*Acacia auriculiformis*	Australian Acacia	Fabaceae	T	-	+	LC
2.	*Acacia ferruginea*	Rusty Acacia	Fabaceae	T	+	+	VU
3.	*Acacia leucophloea*	White-bark Acacia	Fabaceae	T	+	+	LC

S. No.	Scientific name	Local name / English Name	Family	Habit	Core Zone	Buffer Zone	IUCN conservation status as on 15th Sep, 2022
4.	*Acacia nilotica*	Babool	Fabaceae	T	+	+	LC
5.	*Aegle marmelos*	Wood Apple	Rutaceae	T	+	+	NT
6.	*Ailanthus excelsa*	Indian Tree of Heaven	Simaroubaceae	T	+	+	NA
7.	*Alangium salviifolium*	Sage-leaved Alangium	Alangiaceae	T	-	+	LC
8.	*Albizia lebbek**	Siris Tree	Fabaceae	T	+	+	LC
9.	*Albizia odoratissima*	Ceylon Rosewood	Fabaceae	T	+	+	LC
10.	*Anogeissus latifolia*	Axle Wood Tree	Combretaceae	T	-	+	NA
11.	*Azadirachta indica**	Neem	Meliaceae	T	+	+	LC
12.	*Bauhinia variegate**	Orchid Tree	Fabaceae	T	-	+	LC
13.	*Bombax ceiba**	Red Silk Cotton	Malvaceae	T	+	+	LC
14.	*Boswellia serrata*	Indian Frankincense	Burseraceae	T	+	+	NA
15.	*Butea monosperma*	Flame of Forest	Fabaceae	T	+	+	LC
16.	*Cassia fistula*	Golden Shower	Fabaceae	T	+	+	LC
17.	*Cordia dichotoma*	Indian Cherry	Boraginaceae	T	+	+	LC
18.	*Cordia myxa*	Clammy Cherry	Boraginaceae	T	-	+	LC
19.	*Dalbergia lanceolaria subsp. paniculata*	Passi	Fabaceae	T	+	-	NA
20.	*Dalbergia sissoo**	Indian Rosewood	Fabaceae	T	-	+	LC
21.	*Delonix regia*	Flame Tree	Fabaceae	T	-	+	LC
22.	*Dichrostachys cinerea*	Sickle Bush	Fabaceae	T	-	+	LC
23.	*Eucalyptus globules**	Eucalyptus	Myrtaceae	T	+	+	LC
24.	*Euphorbia nivulia*	Leafy Milk Hedge	Euphorbiaceae	T	+	+	NA
25.	*Feronia elephantum*	Wood Apple	Rutaceae	T	+	+	NA
26.	*Ficus bengalensis*	Banyan Tree	Moraceae	T	+	+	NA
27.	*Ficus racemosa*	Cluster Fig	Moraceae	T	+	+	LC
28.	*Ficus religiosa*	Peepal Tree	Moraceae	T	+	+	NA
29.	*Garguga pinnata*	Grey Downy Balsam	Burseraceae	T	+	-	NA
30.	*Gmelina arborea**	Gamhar	Verbenaceae	T	+	+	LC
31.	*Holarrhena pubescens*	Indrajao	Apocynaceae	T	+	+	LC
32.	*Holoptelea integrifolia*	Indian Elm	Ulmaceae	T	+	+	NA
33.	*Ixora parviflora**	Small-flowered Ixora	Rubiaceae	T	-	+	NA
34.	*Jacaranda mimosifolia**	Jacaranda	Fabaceae	T	-	+	VU
35.	*Kigelia pinnata*	Sausage Tree	Bignoniaceae	T	-	+	NA

S. No.	Scientific name	Local name / English Name	Family	Habit	Core Zone	Buffer Zone	IUCN conservation status as on 15th Sep, 2022
36.	*Lannea coromandelica*	Indian Ash Tree	Anacardiaceae	T	+	+	LC
37.	*Leucaena leucocephala**	White Babool	Fabaceae	T	+	+	CD
38.	*Madhuca longifolia**	Indian Butter Tree	Sapotaceae	T	-	+	NA
39.	*Miliusa tomentosa*	Hoom	Annonaceae	T	+	-	NA
40.	*Millingtonia hortensis*	Indian Cork Tree	Bignoniaceae	T	+	+	NA
41.	*Mitragyna parvifolia*	True Kadamba	Rubiaceae	T	+	+	NA
42.	*Moringa concanensis*	Konkan Moringa	Moringaceae	T	+	-	NA
43.	*Peltophorum pterocarpum*	Copperpod	Fabaceae	T	+	-	NA
44.	*Plumeria alba*	Pagoda Tree	Apocynaceae	T	+	-	NA
45.	*Pongamia glabra*	Pongam Tree	Fabaceae	T	+	+	LC
46.	*Prosopis juliflora*	Mesquite	Fabaceae	T	+	+	NA
47.	*Ricinus communis*	Castor	Euphorbiaceae	T	+	+	NA
48.	*Saraca indica**	Seeta Ashok	Fabaceae	T	+	-	LC
49.	*Schrebera swietenioides*	Weaver's Beam Tree	Oleaceae	T	-	+	NA
50.	*Senna siamea*	Siamese Cassia	Fabaceae	T	+	+	LC
51.	*Syzygium cumini**	Java Plum	Myrtaceae	T	+	+	LC
52.	*Tectona grandis**	Teak	Verbenaceae	T	-	+	NA
53.	*Terminalia bellirica*	Belliric Myrobalan	Combretaceae	T	-	+	LC
54.	*Thevetia neriifolia*	Mexican oleander	Apocynaceae	T	+	+	NA
55.	*Toona ciliate**	Toon Tree	Meliaceae	T	-	+	LC
56.	*Vitex negundo*	Chaste Tree	Verbenaceae	T	+	+	LC
57.	*Wrightia tinctorea*	Sweet Indrajao	Apocynaceae	T	+	+	NA
Shrub Species							
1.	*Abutilon indicum*	Indian Mallow	Malvaceae	S	+	+	NA
2.	*Acanthocereus tetragonus*	Fairy Castle Cactus	Cactaceae	S	+	+	LC
3.	*Atalantia monophylla*	Climbing Atalantia	Rutaceae	S	-	+	NA
4.	*Bougainvillea spectabilis**	Bougainvillea	Nyctaginaceae	S	+	+	NA
5.	*Breynia retusa*	Cup-Saucer Plant	Phyllanthaceae	S	-	+	LC
6.	*Caesalpinia bonduc*	Fever Nut	Fabaceae	S	-	+	LC
7.	*Caesalpinia pulcherrima*	Peacock Flower	Fabaceae	S	-	+	LC
8.	*Calotropis gigantea*	Crown Flower	Apocynaceae	S	+	+	NA
9.	*Capparis decidua*	Bare Caper	Capparidaceae	S	+	+	LC
10.	*Carissa spinarum*	Wild Karanda	Apocynaceae	S	+	-	LC

S. No.	Scientific name	Local name / English Name	Family	Habit	Core Zone	Buffer Zone	IUCN conservation status as on 15th Sep, 2022
11.	*Cissus quadrangularis*	Devil's Backbone	Vitaceae	S	-	+	NA
12.	*Cocculus hirsutus*	Broom Creeper	Menispermaceae	S	-	+	NA
13.	*Crotalaria pusilla*	Small Rattlepod	Fabaceae	S	+	-	NA
14.	*Datura metel*	Downy Thorn Apple	Solanaceae	S	+	+	NA
15.	*Dioscorea bulbifera*	Air Yam	Dioscoreaceae	S	+	+	NA
16.	*Dodonaea viscosa*	Hop Bush	Celastraceae	S	-	+	LC
17.	*Euphorbia neriifolia*	Indian Spurge Tree	Euphorbiaceae	S	+	+	LC
18.	*Flueggea leucopyrus*	Indian Snowberry	Phyllanthaceae	S	+	+	LC
19.	*Grewia abutifolia*	Mallow-leaved Crossberry	Malvaceae	S	+	+	NA
20.	*Grewia hirsuta*	Huktapata	Malvaceae	S	-	+	NA
21.	*Helicteres isora*	Screw Tree	Malvaceae	S	-	+	NA
22.	*Hemidesmus indicus*	Indian Sarsaparilla	Apocynaceae	S	+	-	NA
23.	*Hibiscus micranthus**	Tiny Flower Hibiscus	Malvaceae	S	-	+	NA
24.	*Indigofera tinctoria*	True Indigo	Fabaceae	S	-	+	NA
25.	*Ipomoea aquatica*	Water Morning Glory	Convolvulaceae	S	-	+	LC
26.	*Ipomoea carnea*	Bush Morning Glory	Convolvulaceae	S	+	+	NA
27.	*Ipomoea violacea*	Sea Moonflower	Convolvulaceae	S	+	+	NA
28.	*Jatropha gossypiifolia*	Bellyache Bush	Euphorbiaceae	S	+	+	LC
29.	*Justicia adhatoda*	Malabar Nut	Acanthaceae	S	+	+	LC
30.	*Lablab purpureus*	Egyptian Bean	Fabaceae	S	+	+	NA
31.	*Lantana camara*	Lantana	Verbenaceae	S	+	+	NA
32.	*Mimosa hamata*	Sickle Bush	Fabaceae	S	-	+	NA
33.	*Nerium oleander**	Oleander	Apocynaceae	S	+	+	LC
34.	*Opuntia elatior*	Prickly Pear	Cactaceae	S	+	-	LC
35.	*Passiflora foetida**	Stinking Passionflower	Passifloraceae	S	+	-	NA
36.	*Pergularia daemia*	Hair Knot Plant	Apocynaceae	S	+	-	LC
37.	*Senna auriculata*	Tanner's Cassia	Fabaceae	S	+	+	NA
38.	*Tecoma stans**	Yellow Bell	Bignoniaceae	S	+	-	LC
39.	*Trichosanthes cucumerina*	Snake Gourd	Cucurbitaceae	S	+	-	NA
Herb Species							

S. No.	Scientific name	Local name / English Name	Family	Habit	Core Zone	Buffer Zone	IUCN conservation status as on 15th Sep, 2022
1.	*Abrus pricatorius*	Coral Bead Vine	Fabaceae	H	-	+	NA
2.	*Acalypha lanceolata*	Toothed-bract Indian Copperleaf	Euphorbiaceae	H	-	+	NA
3.	*Acanthospermum hispidum*	Bristly Starbur	Asteraceae	H	+	+	NA
4.	*Adiantum aleuticum*	Western Maidenhair Fern	Pteridaceae	H	-	+	NA
5.	*Aerva lanata*	Mountain Knot Grass	Amaranthaceae	H	-	+	NA
6.	*Ageratum conyzoides*	Goatweed	Asteraceae	H	+	+	LC
7.	*Allium sativum*	Garlic	Alliaceae	H	+	+	
8.	*Alternanthera sessilis*	Sessile Joyweed	Amaranthaceae	H	-	+	LC
9.	*Alysicarpus hamosus*	Round-leaf Alyce Clover	Fabaceae	H	-	+	NA
10.	*Amaranthus albus*	Common Tumbleweed	Amaranthaceae	H	+	+	NA
11.	*Amaranthus spinosus*	Prickly Amaranth	Amaranthaceae	H	-	+	NA
12.	*Amaranthus viridis*	Green Amaranth	Amaranthaceae	H	+	+	NA
13.	*Amaranthus wrightii*	Wright's Amaranth	Amaranthaceae	H	+	-	NA
14.	*Andrographis paniculata*	Creat	Acanthaceae	H	+	+	NA
15.	*Asparagus racemosus*	Asparagus	Asparagaceae	H	+	+	NA
16.	*Barleria acanthoides*	Philippine Violet	Poaceae	H	+	+	NA
17.	*Barleria cristata*	Porcupine Flower	Acanthaceae	H	-	+	NA
18.	*Bidens biternata*	Yellow-flowered Blackjack	Asteraceae	H	-	+	NA
19.	*Bidens pilosa*	Spanish Needle	Asteraceae	H	+	+	NA
20.	*Blepharis maderaspatens*	Madras Blepharis	Acanthaceae	H	-	+	NA
21.	*Blumea lacera*	Lettuce-leaf Blumea	Asteraceae	H	+	-	DD
22.	*Boerhavia diffusa*	Red Spiderling	Nyctaginaceae	H	+	+	NA
23.	*Borreria articularis*	Jointed Buttonweed	Rubiaceae	H	+	+	NA
24.	*Catharanthus pusillus*	Tiny Periwinkle	Apocynaceae	H	+	+	NA
25.	*Celosia argentea*	Cock's Comb	Amaranthaceae	H	+	+	LC
26.	*Cleome gynandra*	Wild Spiderflower	Cleomaceae	H	+	+	NA

S. No.	Scientific name	Local name / English Name	Family	Habit	Core Zone	Buffer Zone	IUCN conservation status as on 15th Sep, 2022
27.	*Commelina benghalensis*	Benghal Dayflower	Commelinaceae	H	+	+	LC
28.	*Commelina diffusa*	Creeping Dayflower	Commelinaceae	H	-	+	LC
29.	*Commelina maculate*	Spotted Dayflower	Commelinaceae	H	+	+	NA
30.	*Cosmos sulphureus**	Yellow Cosmos	Asteraceae	H	+	+	NA
31.	*Crotalaria medicaginea*	Medick Rattlepod	Fabaceae	H	+	+	NA
32.	*Crotalaria scabrella*	Cherukonna	Fabaceae	H	-	+	LC
33.	*Croton bonplandianus**	Bonpland's croton	Euphorbiaceae	H	-	+	NA
34.	*Cynarospermum asperrimum*	Hill Blepharis	Acanthaceae	H	-	+	NA
35.	*Cyperus dubius*	Soft Sedge	Cyperaceae	H	-	+	LC
36.	*Cyperus esculentus*	Common Nut Sedge	Cyperaceae	H	+	+	LC
37.	*Cyperus squarrosus*	lepoded Flatsedge	Cyperaceae	H	+	+	LC
38.	*Desmodium triflorum*	Creeping Tick Trefoil	Fabaceae	H	+	-	LC
39.	*Digera muricata*	False Amaranth	Amaranthaceae	H	-	+	NA
40.	*Echinops echinatus*	Indian Globe Thistle	Asteraceae	H	+	+	NA
41.	*Eclipta prostrata*	False Daisy	Asteraceae	H	-	+	LC
42.	*Euphorbia heterophylla*	Wild Poinsettia	Euphorbiaceae	H	-	+	NA
43.	*Euphorbia hirta*	Asthma Weed	Euphorbiaceae	H	+	+	NA
44.	*Evolvulus alsinoides*	Dwarf Morning Glory	Convolvulaceae	H	+	+	NA
45.	*Fagonia cretica*	Virgin's Mantle	Zygophyllaceae	H	+	+	NA
46.	*Glossocardia bosvallea*	Patthar Suva	Asteraceae	H	-	+	NA
47.	*Gomphrena celosioides*	Cockscomb Gomphrena	Amaranthaceae	H	-	+	NA
48.	*Gomphrena globosa*	Globe Amaranth	Amaranthaceae	H	+	-	NA
49.	*Hyptis suaveolens*	American Mint	Lamiaceae	H	+	+	NA
50.	*Impatiens balsamina*	Balsam	Balsaminaceae	H	+	-	NA
51.	*Indigofera cordifolia*	Heart-leaf Indigo	Fabaceae	H	+	-	NA
52.	*Ipomoea rubriflora*	Redstar	Convolvulaceae	H	-	+	NA
53.	*Justicia diffusa*	Spreading Justicia	Acanthaceae	H	+	+	NA
54.	*Justicia glauca*	Glaucus Justicia	Acanthaceae	H	+	+	NA

S. No.	Scientific name	Local name / English Name	Family	Habit	Core Zone	Buffer Zone	IUCN conservation status as on 15th Sep, 2022
55.	*Justicia japonica*	Common small Justicia	Acanthaceae	H	+	+	NA
56.	*Lepidagathis cristata*	Crested Lepidagathis	Acanthaceae	H	-	+	NA
57.	*Leucas aspera*	Common Leucas	Lamiaceae	H	+	+	NA
58.	*Leucas lamiifolia*	Mint-leaved Leucas	Lamiaceae	H	-	+	NA
59.	*Malvastrum coromandelianum*	False Mallow	Malvaceae	H	-	+	NA
60.	*Mimosa pudica*	Touch-me-not	Fabaceae	H	-	+	LC
61.	*Ocimum americanum**	Hoary Basil	Lamiaceae	H		+	NA
62.	*Ocimum gratissumum**	Wild Basil	Lamiaceae	H	+	+	NA
63.	*Ocimum tenuiflorum**	Holy Basil	Lamiaceae	H	+	+	NA
64.	*Oldenlandia corymbosa*	Diamond Flower	Rubiaceae	H	+	+	LC
65.	*Oldenlandia umbellate*	Chay Root	Rubiaceae	H	-	+	NA
66.	*Oxalis corniculata*	Creeping Wood Sorrel	Oxalidaceae	H	+	-	NA
67.	*Parthenium hysterophorus*	Congress Grass	Asteraceae	H	+	+	NA
68.	*Pavonia zeylanica*	Ceylon Swamp Mallow	Malvaceae	H	-	+	NA
69.	*Pedalium murex*	Crow Thorn	Pedaliaceae	H	+	+	NA
70.	*Phyllanthus niruri*	Gulf Leaf Flower	Phyllanthaceae	H	+	+	NA
71.	*Physalis minimaculata*	Ground Cherry	Solanaceae	H	+	+	VU
72.	*Senna alata*	Candle Bush	Fabaceae	H	-	+	LC
73.	*Senna insularis*	-	Fabaceae	H	+	+	NA
74.	*Senna occidentalis*	Coffee Senna	Fabaceae	H	+	-	LC
75.	*Senna tora*	Stinking Senna	Fabaceae	H	+	+	NA
76.	*Sida acuta*	Common Wireweed	Malvaceae	H	+	+	NA
77.	*Sida cordifolia*	Heart-leaf Sida	Malvaceae	H	-	+	NA
78.	*Sida rhombifolia*	Jellyleaf	Malvaceae	H	+	+	NA
79.	*Solanum nigrum*	Black Nightshade	Solanaceae	H	-	+	NA
80.	*Solanum xanthocarpum*	Thorny Nightshade	Solanaceae	H	-	+	NA
81.	*Spermacoce neohispida*	Shaggy Button Weed	Rubiaceae	H	+	+	NA
82.	*Spermacoce verticillata*	Shrubby False Buttonweed	Rubiaceae	H	+	+	NA
83.	*Sphaeranthus indicus*	Globe Thistle	Asteraceae	H	+	+	LC

S. No.	Scientific name	Local name / English Name	Family	Habit	Core Zone	Buffer Zone	IUCN conservation status as on 15th Sep, 2022
84.	*Tephrosia purpurea*	Wild Indigo	Fabaceae	H	+	+	EN
85.	*Tribulus terrestris*	Puncture Vine	Zygophyllaceae	H	+	+	LC
86.	*Trichodesma indicum*	Indian Borage	Boraginaceae	H	+	-	NA
87.	*Tridax procumbens*	Mexican Daisy	Asteraceae	H	+	+	NA
88.	*Trigonella corniculata*	Wild Trefoil	Fabaceae	H	+	+	NA
89.	*Triumfetta cordifolia*	Burbark	Malvaceae	H	+	+	NA
90.	*Triumfetta rhomboidea*	Burr Bush	Malvaceae	H	+	+	NA
91.	*Withania somnifera*	Winter Cherry	Solanaceae	H	-	+	DD
Climber Species							
1.	*Butea superba*	Palasbel	Fabaceae	C	-	+	NA
2.	*Citrullus colocynthis*	Tumba	Cucurbitaceae	C	-	+	NA
3.	*Citrullus lanatus*	Water melon	Cucurbitaceae	C	-	+	NA
4.	*Cucumis callosus*	Kachari	Cucurbitaceae	C	+	+	NA
5.	*Cryptolepis buchanani*	Naagbel	Combreteaceae	C	-	+	NA
6.	*Cuscuta reflexa*	Amarbel	Convolvulaceae	C	-	+	LC
7.	*Momordica charantia*	Bitter gourd (Karela)	Cucurbitaceae	C	-	+	NA
8.	*Momordica dioica*	Ban Karela	Cucurbitaceae	C	-	+	NA
9.	*Luffa acutangula*	Ridge gourd (Turai)	Cucurbitaceae	C	-	+	NA
Grass Species							
1.	*Aristida adscensionis*	Common Needle Grass	Poaceae	H	+	+	NA
2.	*Axonpus compressus*	Summer Grass	Poaceae	H	-	+	NA
3.	*Bothriochloa bladhii*	Australian Bluestem	Poaceae	H	+	-	NA
4.	*Brachiaria reptans*	Running Grass	Poaceae	H	+	+	LC
5.	*Cenchrus ciliaris*	Buffel Grass	Poaceae	H	+	+	LC
6.	*Cymbopogon martini*	Palmarosa Grass	Poaceae	H	-	+	NA
7.	*Cynodon dactylon*	Bermuda Grass	Poaceae	H	+	+	NA
8.	*Dactyloctenium aegyptium*	Crowfoot Grass	Poaceae	H	+	+	NA
9.	*Dichanthium annulatum*	Sheda Grass	Poaceae	H	-	+	NA
10.	*Digitaria stricta*	Hairy crabgrass	Poaceae	H	-	+	NA
11.	*Enteropogon dolichostachyus*	Long-spike Finger Grass	Poaceae	H	-	+	NA
12.	*Eragrostiella bifaria*	Double-row Lovegrass	Poaceae	H	+	+	NA
13.	*Eragrostis amabilis*	Chinese Lovegrass	Poaceae	H	+	+	NA
14.	*Eragrostis japonica*	Lovegrass	Poaceae	H		+	LC

S. No.	Scientific name	Local name / English Name	Family	Habit	Core Zone	Buffer Zone	IUCN conservation status as on 15th Sep, 2022
15.	*Heteropogon contortus*	Black Speargrass	Poaceae	H	+	+	NA
16.	*Imperata cylindrica*	Cogon Grass	Poaceae	H	-	+	LC
17.	*Melinis repens*	Rose Natal Grass	Poaceae	H	-	+	NA
18.	*Paspalum distichum*	Knot Grass	Poaceae	H	+	+	LC
19.	*Themeda quadrivalvis*	Grader Grass	Poaceae	H	+	+	NA
20.	*Themeda triandra*	Kangaroo Grass	Poaceae	H	-	+	NA

Source: Primary site survey and secondary data
(+) Shows: Presence of the species and (-) Shows: Absence of the species (*) Planted Species

Status of RET Species

During Field Survey, no endemic, rare, endangered and threatened species of flora are recorded under threatened status in the study area.

Table 3.24: Inventory of Agro Biodiversity of the Core & Buffer zone of study area
Habit: Tree (T), Shrub (S), Herb (H), Grass (G) and Climber (C)

S. No.	Scientific name	Local name/ English Name	Family	Habit	Core Zone	Buffer Zone	IUCN conservation status as on 15th Sep, 2022
1.	*Arachis hypogaea**	Ground nut	Fabaceae	H	+	+	NA
2.	*Argemone Mexicana**	Mexican Poppy	Papaveraceae	H	+	+	NA
3.	*Bambusa arundinaceae**	Bamboo	Poaceae	H	-	+	NA
4.	*Brassica oleraceae**	Cabbage	Brassicaceae	H	+	+	NA
5.	*Carica papaya**	Papaya	Caricaceae	T	+	+	DD
6.	*Citrus limon**	Lemon	Rutaceae	S	-	+	LC
7.	*Citrus media**	Citron	Rutaceae	S	-	+	NA
8.	*Clitorea ternatea**	Cowpea	Fabaceae	S	+	+	NA
9.	*Colocasia esculenta**	Taro	Arecaceae	H	+	+	NA
10.	*Corchorus capsularis**	White Jute	Malvaceae	H	-	+	NA
11.	*Cucumis melo**	Muskmelon	Cucurbitaceae	S	+	+	NA
12.	*Daucus carota**	Carrot	Apiaceae	H	+	-	LC
13.	*Dendrocalamus strictus**	Calcutta Bamboo	Poaceae	H	+	+	NA
14.	*Gossypium hirsutum**	Mexican Cotton	Malvaceae	S	-	+	VU
15.	*Indigofera tinctoria**	True Indigo	Fabaceae	S	-	+	NA
16.	*Luffa acutangula**	Wild Ridge Gourd	Cucurbitaceae	S	-	+	NA
17.	*Lycopersicum esculentum**	Tomato	Solanaceae	H	+	+	NA
18.	*Mangifera indica**	Mango	Anacardiaceae	T	+	+	DD
19.	*Momordica charantia**	Bittergourd	Cucurbitaceae	S	+	-	NA
20.	*Momordica dioica**	Wild Buttergourd	Cucurbitaceae	S	+	+	NA

S. No.	Scientific name	Local name/ English Name	Family	Habit	Core Zone	Buffer Zone	IUCN conservation status as on 15th Sep, 2022
21.	*Musa x paradisiaca**	Banana	Musaceae	H	+	-	LC
22.	*Oryza sativa**	Rice	Poaceae	H	+	+	LC
23.	*Pennisetum glaucum**	Bajra/Pearl Millet	Poaceae	H	+	+	LC
24.	*Pheonix sylvestris**	Date Palm	Arecaceae	T	+	+	NA
25.	*Phyllanthus emblica**	Indian Gooseberry	Euphorbiaceae	T	+	-	LC
26.	*Pithecellobium dulce**	Sweet Tamarind	Fabaceae	T	+	+	LC
27.	*Psidium guajava**	Guava	Myrtaceae	T	+	+	LC
28.	*Raphanus sativus**	Radish	Brassicaceae	H	+	-	NA
29.	*Saccharum officinarum**	Sugarcane	Poaceae	H	+	+	NA
30.	*Solanum melongena**	Brinjal	Solanaceae	H	+	+	NA
31.	*Solanum tubersoum**	Potato	Solanaceae	H	+	-	NA
32.	*Sorghum bicolor**	Jowar	Poaceae	H	+	+	LC
33.	*Tamarindus indica**	Tamarind	Fabaceae	T	+	+	LC
34.	*Trichosanthes cucumerina**	Snake Gourd	Cucurbitaceae	S	+	-	NA
35.	*Trigonella foenumgraecum**	Fenugreek	Fabaceae	H	+	+	NA
36.	*Triticum aestivum**	Wheat	Poaceae	H	+	+	DD
37.	*Zea mays**	Corn	Poaceae	H	+	+	LC

Source: Primary site survey and secondary data
(+) Shows: Presence of the species and (-) Shows: Absence of the species (*) Planted Species
LC: Least Concern, NA: Not available, NT: Near Threatened, VU: Vulnerable, DD: Data Deficient

Table No. - 3.25: Inventory of faunal diversity in Core & Buffer zone of study area
Based on Actual Sighting, based on inputs from locals and Perused from Secondary Data

S. No.	Scientific name	Common name/ English Name	Conservation status according to IWPA-1972	Core	Buffer	IUCN Conservation status
Mammals						
1.	*Presbytis entellus*	Common Langur, Hanuman Monkey	Sch-II	-	+	VU
2.	*Axis axis*	Spotted Dear or Chital	Sch-II	-	+	LC
3.	*Boselaphus tragocamelus*	Blue Bull or Nilgai	Sch-II	-	+	LC
4.	***Canis aureus (Linn)***	**Jackal or Gidar**	**Sch-I**	**-**	**+**	**NA**
5.	***Felis chaus (Gildenstaedt)***	**Jungle Cat**	**Sch-I**	**-**	**+**	**LC**
6.	*Funambulu pennanti*	Five striped palm Squirrel	Sch-IV	+	+	LC
7.	***Herpestes smithi***	**Ruddy Mongoose**	**Sch-I**	**-**	**+**	**LC**
8.	***Hyaena hyaena (Linn)***	**Striped Hyaena**	**Sch-I**	**-**		**NT**
9.	***Hystrix indica (kerr)***	**Indian Crested porcupine**	***Sch-I***	**-**	**+**	**LC**

S. No.	Scientific name	Common name/ English Name	Conservation status according to IWPA-1972	Core	Buffer	IUCN Conservation status
10.	*Lepus nigricollis*	Indian Hare	Sch-II	-	+	LC
11.	*Megaderma lyra*	Bat (Indian Falsa Vampire)	Sch. IV	+	+	LC
12.	***Panthera pardus (Linn)***	**Beghera/Leopard/Panther**	**Sch-I**	**-**	**+**	**VU**
13.	*Rattus rattus*	Common House Rat	Sch-IV	+	+	LC
14.	*Suncus murinus*	Grey Musk Shrew	Sch. IV	+	+	LC
15.	*Lepus nigricollis*	Indian Hare	Sch-II	-	+	LC
16.	***Vulpes bengalensis***	**Indian Fox or common fox**	**Sch-I**	**-**	**+**	**LC**
Avifauna						
1.	*Acridotheres ginginianus*	Bank Myna	Sch- II	+	+	LC
2.	*Acridotheres tristis*	Common Myna	Sch- II	+	+	LC
3.	*Alcedo atthis*	Common kingfisher	Sch- II	-	+	LC
4.	*Amaurornis phoenicurus*	White breasted Waterhen	Sch- II	-	+	LC
5.	*Anas poecilorhyncha.*	Indian spot-billed duck	Sch-II	-	+	LC
6.	*Apus affinis*	Indian House Swift	Sch- II	-	+	LC
7.	*Ardea cinerea (Linn.)*	Grey Heron	Sch- II	-	+	VU
8.	*Ardeola grayii*	Indian pond heron	Sch- II	-	+	LC
9.	*Athene brama*	Spotted owlet	Sch- II	+	+	LC
10.	*Bubulcus ibis (Linn.)*	Cattle Egret	Sch- II	+	+	LC
11.	*Burhinus oedicnemus (Linn.)*	Stone curlew	Sch- II		+	LC
12.	*Centropus sinensis (stepheus)*	Greater coucal	Sch- II	+	+	LC
13.	*Ceryle rudis (Linn.)*	Pied kingfisher.	Sch- II	-	+	LC
14.	*Cinnyris asiaticus*	Purple sunbird	Sch- II	+	+	LC
15.	*Columba livia*	Rock Dove	Sch- IV	+	+	LC
16.	*Copsychus fulicatus*	Indian Robin	Sch- II	+	+	LC
17.	*Copsychus saularis*	Oriental Magpie Robin	Sch- II	+	+	LC
18.	*Coracina macei*	Indian Cuckoo shrike	Sch- II	-	+	LC
19.	*Corvus macrorhynchos*	Large-billed Crow	Sch- II	-	+	LC
20.	*Corvus splendens*	House crow	-	+	+	LC
21.	*Coturnix coromandelica*	Rain Quail	-	+	+	LC
22.	*Vanellus indicus*	Red-Wattled Lapwing	Sch- II	-	+	LC
23.	*Cypsiurus Parvus*	Palm swift	Sch- II	-	+	LC
24.	*Dendrocitta vagabunda*	Rufous Treepie	Sch- II	+	+	LC
25.	*Dicrurus caerulescens (Linn.)*	White bellied Drongo	Sch- II	-	+	LC
26.	*Egretta garzetta. (Linn.)*	Little egret	Sch- II	-	+	LC

S. No.	Scientific name	Common name/ English Name	Conservation status according to IWPA-1972	Core	Buffer	IUCN Conservation status
27.	*Emberiza lathami*	Crested Bunting	Sch- II	-	+	LC
28.	*Eudynamys scolopacea (Linn)*	Western Koel	Sch- II	+	+	LC
29.	*Francolinus francolinus*	Black partridge	Sch- II	-	+	LC
30.	*Gallinula chloropus (Linn.)*	Common Moorhen	Sch- II	-	+	LC
31.	*Palaeornis eupatria*	Alexandrine parakeet	Sch- II	-	+	VU
32.	*Halcyon smyrnensis (Linn.)*	White-breasted Kingfisher	Sch- II	-	+	LC
33.	*Hierococcyx varius*	Common Hawk-cuckoo	Sch- II	-	+	LC
34.	*Hirundo daurica (Linn.)*	Red-rumped Swallow	Sch- II	+	+	LC
35.	*Hirundo smithii (Ieach)*	Wire-tailed Swallow	Sch- II	+	+	LC
36.	*Hydrophasianus chirurgus.*	Pheasant tailed Jacana	Sch- II	-	+	LC
37.	*Lanius excubitor*	Great Grey Shrike	Sch- II	+	+	LC
38.	*Lanius schach (Linn.)*	Long-tailed shrike	Sch- II	-	+	LC
39.	*Lanius vittatus*	Bay-backed shrike	Sch- II	-	+	LC
40.	*Lonchura Malabarica*	White Throated munia	Sch- II	+	+	LC
41.	*Merops orientali(Latham)*	Asian Green Bee-eater	Sch- II	+	+	LC
42.	*Merops philippinus (Linn.)*	Blue-tailed Bee-eater	Sch- II	-	+	LC
43.	*Microcarbo niger*	Little Cormorant	Sch- II	-	+	LC
44.	*Eudynam*	Koel	Sch- II	-	+	LC
45.	*Mirafra erythroptera*	Indian bushlark	Sch- II	+	+	LC
46.	*Motacilla alba*	White Wagtail	Sch- II	+	+	LC
47.	*Motacilla cinerea*	Grey wagtail	Sch- II	+	+	LC
48.	*Motacilla flava*	Western Yellow Wagtail	Sch- II		+	LC
49.	*Motacilla maderaspatensis*	White-browed Wagtail	Sch- II	+	+	LC
50.	*Oriolus oriolus (Linn.)*	Eurasian Golden Oriole	Sch. II	+	+	LC
51.	*Parus xanthogenys*	Himalayan black-lored tit	-	-	+	LC
52.	*Passer domesticus*	House sparrow	Sch- II	+	+	LC
53.	***Pavo cristatus (Linn.)***	**Indian Peafowl**	**Sch. I**	**+**	**+**	**LC**
54.	*Perdicula asiatica (Latham)*	Jungle Bush Quail	Sch- II	-	+	LC
55.	*Ploceus philippinus*	Baya weaver	Sch- II	-	+	LC
56.	*Psittacula cyanocephala*	Plum-headed parakeet	Sch- II	-	+	LC
57.	*Psittacula eupatria*	Alexandrine parakeet	Sch- II	-	+	NT
58.	*Psittacula krameri*	Rose-ringed Parakeet	Sch- II	+	+	LC
59.	*Pterocles exustus*	Common Sandgrouse	Sch- II	-	+	LC

S. No.	Scientific name	Common name/ English Name	Conservation status according to IWPA-1972	Core	Buffer	IUCN Conservation status
60.	*Pycnonotus cafer (Linn)*	Red vented Bulbul	Sch- II	+	+	LC
61.	*Sarcoramphus papa*	King vulture	Sch IV	+	+	LC
62.	*Strenptopelia decaocto*	Eurasian collared dove	Sch- II	-	+	LC
63.	*Streptopelia Chinensis*	Spotted Dove	Sch- II	-	+	LC
64.	*Streptopelia senegalensis*	Laughing dove	Sch- II	+	+	LC
65.	*Streptopelia traquebarica*	Red turtle Dove	Sch- II	-	+	LC
66.	*Tadorna ferruginea (pallas)*	Ruddy Shelduck	Sch- II	-	+	LC
67.	*Terpsiphone paradisi*	Indian Paradise-flycatcher	Sch- II	-	+	LC
68.	*Treron phoenicopterus (Latham)*	Yellow-footed Green Pigeon	Sch- II	+	+	LC
69.	*Turdoides caudata*	Common Babbler	Sch- II	+	+	LC
70.	*Turdoides malcolmi (Sykes)*	Large Grey Babbler	Sch- II	-	+	LC
Reptiles						
1.	*Calotes versicolor*	Changeable Lizard	-	-	+	LC
2.	*Eublepharis macularivl*	Fat tailed gecko	-	-	+	LC
3.	*Calotes versicolor*	Common garden lizard	Sch. II	-	+	VU
4.	*Hemidactylus flaviviridis*	House geckos	Sch. V	-	+	NA
5.	***Daboia rapelii***	**Russell's Viper**	**Sch-I**	**-**	**+**	**LC**
Amphibia						
1.	*Bufo melanostictus*	Common Indian Toad	-	-	+	LC
2.	*Bufo stomaticus*	Marbled Toad	-	-	+	LC
3.	*Euphlyctis cyonophlyctis*	Skittering Frog	-	-	+	LC
4.	*Microhyla ornate*	Ornate Microhylid	-	-	+	LC
5.	*Polypedates maculates*	Common Tree Frog	-	-	+	LC
6.	*Rana limnocharis*	Indian Cricket Frog	-	-	+	LC
7.	*Rana tigerina*	Indian Bull Frog	-	-	+	LC
8.	*Rana tomopterna*	Burrowing Frog	-	-	+	LC
9.	*Uperodon systoma*	Marbled Balloon Frog	-	-	+	LC
Fish and Aquatic Fauna						
1.	*Ambassis nama*	Sia	-	-	+	LC
2.	*C.gachua*	Solly	-	-	+	LC
3.	*Catla catla*	Catla	-	-	+	LC
4.	*Cirrhinus mrigala*	Narains	-	-	+	LC
5.	*Hetropneustes fossilis*	Singhi	-	-	+	LC
6.	*Labeo rohita*	Rohu	-	-	+	LC

S. No.	Scientific name	Common name/ English Name	Conservation status according to IWPA-1972	Core	Buffer	IUCN Conservation status
7.	*M. seenghala*	Singhara	-	-	+	LC
8.	*P.chugma*	Puthi	-	-	+	LC
9.	*Puntius sarana*	Puthi	-	-	+	LC
10.	*T.putitora*	Mahaseer	-	-	+	LC

Source: Primary site survey and secondary data.
LC: Least Concern, NA: Not available, NT: Near Threatened, VU: Vulnerable, DD: Data Deficient

Analysis of Fauna

- 9 Schedule I species were recorded in the study area during field survey which comes in the Wildlife (Protection) Amendment Act, 2022

Interpretation & Conclusion

A primary field survey was carried out within 10 km radius impact zone in and around the plant area to study the floral and faunal diversity of the terrestrial environment of the study area.

- 20 Reserve Forest and 2 Protected Forest lies within 10 km of the study area.
- As per the field survey and List of Flora; no endemic species of flora have been observed. Total 216 species were reported out of which 57 trees, 39 shrubs, 91 herbs, 20 species of grass and 9 species of climbers have been recorded in the study area based on primary observation as well as based on information collected from the secondary data. Out of all the floral species found in the study area 37 are agricultural crops. As per the field survey and List of Flora by ENVIS, MoEFCC; no endemic, endangered and rare species of flora have been observed under threatened status in the study area.
- Among fauna, 16 species of mammals, 5 species of reptiles and 9 amphibians were recorded from the study area. Among avifauna, 70 species were recorded in the study area. No National Park, Sanctuary, Biosphere Reserve, Migratory Corridor of wild animals exists within 10 km radius study area. Among aquatic fauna, 10 species of fishes were reported.
- List of Flora and Fauna existing within the study area has been authenticated by DCF, Udaipur vide letter dated 23.03.2023. The same has been enclosed herewith this EIA/EMP report as ***Annexure 7A.***
- Letter from DCF, Wildlife, Udaipur vide letter no. No.F()Survey/DCF/Udaipur North/4680 dated 14.07.2014 and vide letter no. No.F9()Survey/DCF/WL/2022-23/1635 dated 01.03.2023 regarding no National Park & Sanctuary falling within10 km radius study area of plant site. The Copy of the same is enclosed herewith with this EIA/EMP report as ***Annexure 7B(i&ii).***
- As per the authenticated list, total 9 Schedule 1 species i.e., *Panthera pardus (Leopard), Vulpes bengalensis (Indian Fox), Canis aureus (Golden Jackal), Felis chaus (Jungle Cat), Herpestes smithii (Ruddy Mongoose), Hyaena hyaena (Striped Hyena), Hystrix indica (Indian Crested Porcupine), Daboia russelii (Russell's Viper), Pavo cristatus (Indian Peafowl) found within the study area during survey & budget of Rs. 25 crores have been allocated for the conservation of Schedule I species within the study area of plant site.*

- Wildlife conservation plan for the above species has been prepared and submitted to DCF, Udiapur for authentication from CWW, Udaipur vide letter dated 30.03.2023. The receipt of the same is enclosed herewith with this EIA/EMP report as ***Annexure 7C(i).*** Receipt of revised Wildlife conservation plan submitted to DCF, Udaipur for authentication from CWW, Udaipur on 30.07.2024 is enclosed herewith with this EIA/EMP report as ***Annexure 7C(ii).*** Final Report of Wildlife conservation plan submitted for approval on 30.07.2024 has been attached as ***Annexure 7d*** with this EIA/EMP report.

3.8 Socio-Economic Environment

An essential part of environmental study is socio-economic environment incorporating various facts related to socio-economic conditions in the area, which deals with the total environment. Socio economic study includes demographic structure of the area, provision of basic amenities viz., housing, education, health and medical services, occupation, water supply, sanitation, communication, transportation, prevailing diseases pattern as well as features of aesthetic significance such as temples, historical monuments etc. at the baseline level. This would help in visualizing and predicting the possible impact depending upon the nature and magnitude of the project.

Socio-economic study of an area provides a good opportunity to assess the socio-economic conditions and possibly makes a change in living and social standards of the particular area benefitted due to the Project. It can undoubtedly be said that the proposed expansion project will provide direct and indirect employment and improve the infrastructural facilities and standards of living of the area.

Objectives of the Study

The objective of this socio-economic study is:

- To know the current socio-economic situation in the study area covering the sub factors of education, health, sanitation, water, employment and business
- To recommend practical strategic interventions to improve the area
- To help in providing better living standards
- To help in providing better employment opportunities for locals in the study area.

Scope of Work

- To study the socio-economic environment of the study area
- Data collection during primary field survey and collate it with the secondary sources
- Identification of possible impacts from the expansion project
- Mitigation measures
- Action plan for the implementation of mitigation measures.

Methodology

Collection of Data

Data for this project was collected from primary sources like Field survey, Interviews of locals & secondary sources like Government department, Maps, Literature research etc.

JMEPL conducted the socio-economic baseline survey using a survey team of Field Assistants and a Supervisor apprising them about the project area and relevant documents.

The Survey was conducted using Simple Random Sampling method with a well-structured questionnaire prepared enabling subjects to reply appropriately. The questionnaires were designed to suit the subjects considering their rural background enabling them to furnish correct information and data to the extent possible. Primary data has been collected at village level, household level by questionnaires and focused group discussions.

The study area for the field survey has been divided into three major segments namely Primary Zone (0 - 3 km), Secondary Zone (3 - 7 km) and Outer Zone (7 - 10 km).

Presentation of Data and Analysis

The data collected were presented in a suitable, concise form i.e. tabular or diagrammatic or graphic form for further analysis. These tabulated data were interpreted and analyzed with the help of various qualitative techniques and ideographic approaches.

Study Area

Detailed socio-economic survey was conducted in the study area (buffer zone) within 10 km radius of the plant site. In order to determine the impact of the proposed expansion on nature and inhabitant. To get an overview of the villagers and their perspectives about this expansion activity, different demographic parameters and social aspects such population density, sex ratio, literacy rate, worker ratio etc. has been identified, analyzed, studied together. These impacts may be beneficial or detrimental. If detrimental, anticipated suggestions/ measures are advocated in order to have collective development.

Broadly the study area (buffer zone) was categorized on the basis of the distance of the villages from plant site into 3 zones. The Primary zone relates to 0 to 3 km radius area, secondary zone 3-7 km and outer zone 7-10 km radius area. Demographic profile of study area is enclosed herewith as ***Annexure – 13.***

Socio Economic Profile of the Region

The study area comprises of 63 villages and 1 city (Udaipur) of the study area that covers a total area of 377.08 square kilometres giving approximately 120209 people residence. Following table entails brief information about demography structure at national level, state level, district level and study area.

Table 3.26: Socio-economic profile of the study area as compared to district, state and national level

Particular	India	Rajasthan	Udaipur District	Study Area
Area (in sq. km.)	3,287,263	342239	11724	377.08
Population Density/ sq. Km.	368	200	262	1571
No. of Households	249454252	12711146	623531	120209
Population	1210569573	68548437	3068420	577495
Male	623121843	35550997	1566801	298901
Female	587447730	32997440	1501619	278594
Scheduled Tribes	104281034	9238534	1525289	56783
Scheduled Castes	201378086	12221593	188525	58458
Literacy Rate	72.99%	55.83%	61.82%	85.62%

Particular	India	Rajasthan	Udaipur District	Study Area
Sex Ratio (Females per 1000 Males)	943	928	958	932

Source: Census of India, 2011, https://www.census2011.co.in/census/district/455-udaipur.html, https://www.censusindia2011.com/rajasthan-population.html

Demography structure

Zone wise population of study area:

Census data suggests that the study area is composed of 51.76% of male population while 48.24% of female population. Following table entails information about basic demographic structure of villages/town lying in study area (buffer zone) as primary, secondary & outer zone.

Table - 3.27: Summary of Demographic Profile of Study Area

Study Area Zone	No. of villages / towns	No. of household	Total Population	SC Population	ST Population	Total Literate Population	Workers			Non-Worker
							Main	Marginal	Total	
0 - 3 km	13	4186	20724	1641	5810	12430	5946	2012	7958	12766
3 - 7 km	28	9581	47862	4858	10336	28695	14219	3966	18185	29677
7 - 10 km	23	106442	508909	51959	40637	396996	164829	13221	178050	330859
Total	**64**	**120209**	**577495**	**58458**	**56783**	**438121**	**184994**	**19199**	**204193**	**373302**

Source: *Census of India, 2011*

- Above table identifies the presence of villages and their subsequent population divided under three zones from area (i.e., Primary, secondary and tertiary zone).
- Primary zone has 13 villages where as much as 4186 households with 20724 population are located. Mostly lying on Built-up land for their livelihood and substance.
- Secondary and tertiary zone both comprise of 28 and 23 villages having a total population of 47862 and 508909 respectively.

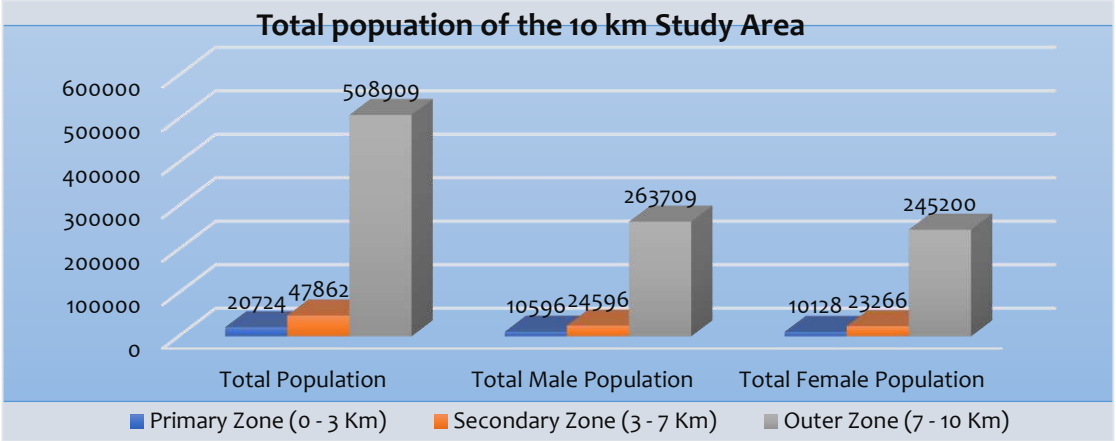


Figure 3.13: Population of study area

Sex Ratio

Sex ratio determine the Human Development Index (HDI) of an area thereby understanding the status of women in that region. Below table gives brief insight about the sex ratio at different zones in study area suggesting that there is a lower proportion of females than male. In India, Child sex ratio is defined as number of females born per 1000 males in age group 0 - 6 years in a human population. As per the census data, the child sex ratio in Secondary zone is 895, which is higher than Primary zone (890) and tertiary zone (868).

Table 3.28: Child Sex ratio of the Study area

S. No.	Buffer Zone	Child Sex Ratio of Study area Female/ 1000 Male
1	Primary Zone (0-3 km)	890
2	Secondary zone (3-7 km)	895
3	Tertiary Zone (7-10 km)	868
4	Study Area (0-10 km)	872

Source: Census of India, 2011

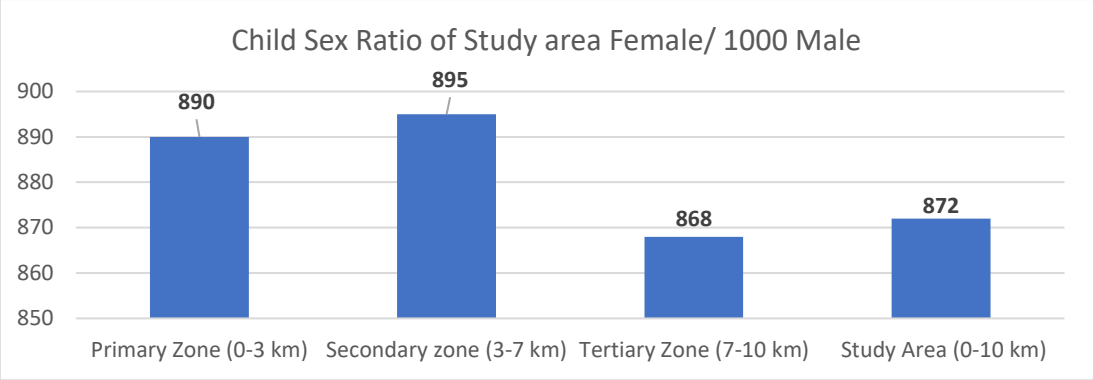


Fig. 3.14: Child Sex Ratio in the Study area

Table 3.29: Sex ratio of the study area

Buffer Zone	Sex Ratio of Study area Female/ 1000 Male
Primary Zone (0-3 km)	956
Secondary zone (3-7 km)	946
Tertiary Zone (7-10 km)	930
Study Area (0-10 km)	932

Source: Census of India, 2011

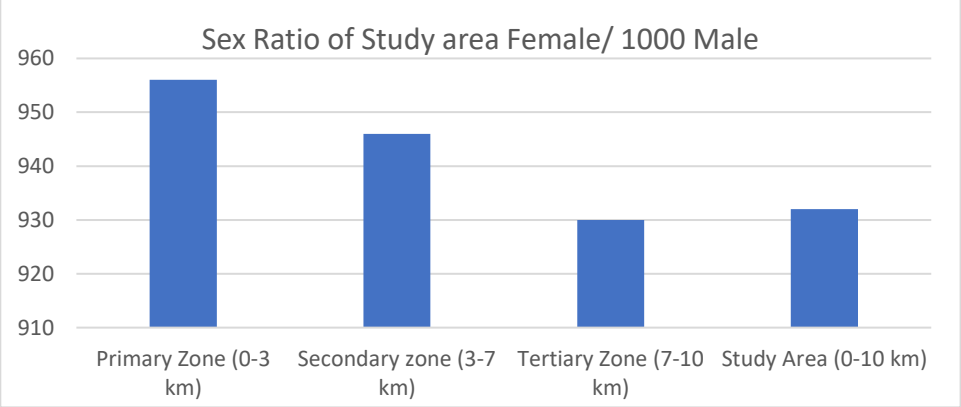


Figure 3.15: Sex ratio of the study area

On comparing the district sex ratio statistics with other peripheral areas, there has been notified improvements however despite that (awareness on social welfare schemes by the government), this variation has been referred to restricted sources of earning. Since families in most of these villages are involved at working in informal sector (as marginal labors) fertility rate is high causing higher proportion of men and women.

Vulnerable Group

While developing an action plan, it is very important to identify the population who fall under the marginalized and vulnerable groups and special attention has to be given towards these

groups while making action plans. Special provisions should be made for them. In the observed villages schedule caste (SC) population is 10.12% and Schedule Tribal population 9.83% and other Population 80.05% in total study area.

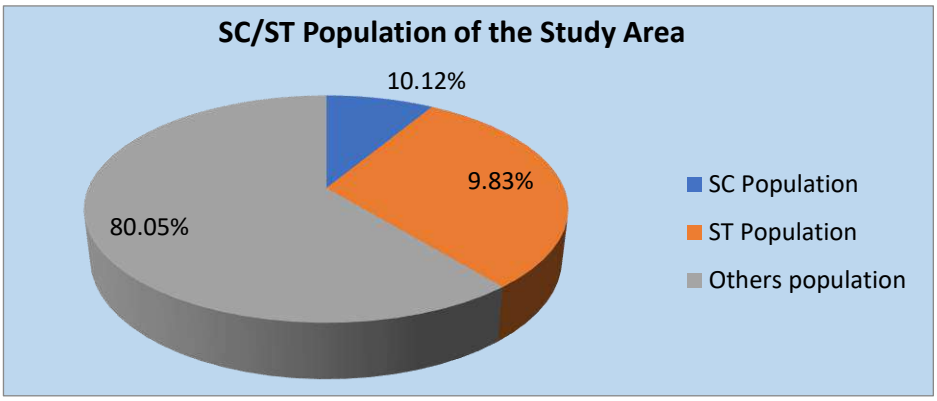


Figure 3.16: Vulnerable groups

Literacy Rate:

Literacy is the ability to read and write one's own name and further for knowledge and interest, write coherently, and think critically about the written word. The analysis of the literacy levels is done in the study area. The 10 km radius of study area demonstrates a literacy rate of 85.62 % as per census data 2011. The male literacy rate in the study area indicates 92.16 % whereas the female literacy rate, which is an important indicator for social change, is observed to be 78.68 % as per the census data 2011. This needs to focus on the region and enhance further development focusing on education.

Table 3.30: Literacy Rate of the Study area

Zone	No. of Villages	Male literacy Rate	Female literacy Rate	Total Literacy Rate
Primary Zone (0 - 3 Km)	13	83.63	55.77	69.93
Secondary Zone (3 - 7 Km)	28	82.56	56.03	69.60
Tertiary Zone (7 - 10 Km)	23	93.35	81.67	87.70
Overall Study Area (0-10 km)	**64**	**92.16**	**78.68**	**85.62**

Source: Census of India, 2011

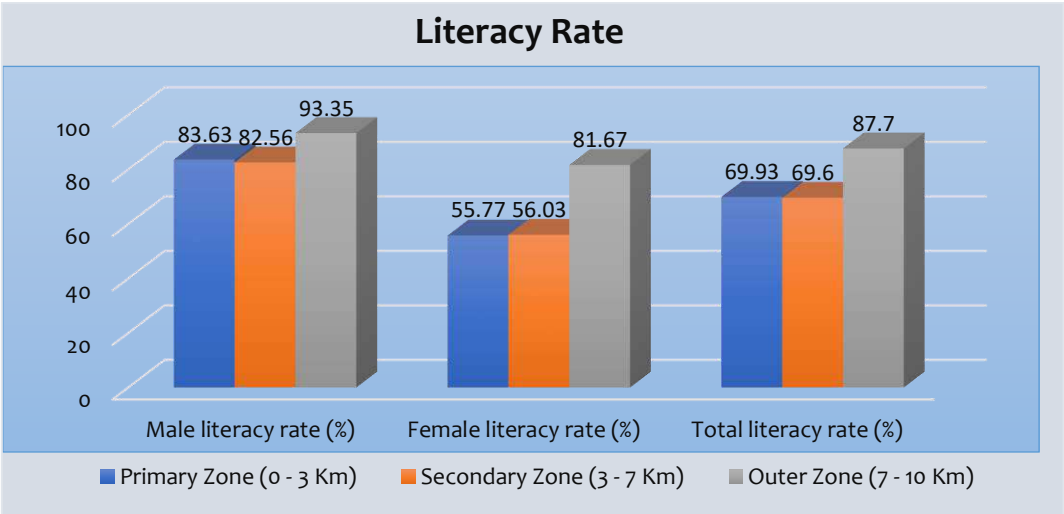


Figure 3.17: Gender wise Literacy Rate in the study area

Economic Structure

The economy of an area is defined by the occupational pattern and income level of the people in the area. The occupational structure of residents in the study area is studied with reference to work category. The population is divided occupation wise into three categories, viz., Total workers, Main workers and non-workers. The main workers include cultivators, agricultural labourers, those engaged in household industry and other services The marginal workers are those engaged in some work for a period of less than 180 days during the reference year. The non-workers include those engaged in unpaid household duties like, students, retired persons, dependents, beggars, vagrants etc. besides institutional inmates or all other non-workers who do not fall under the above categories.

Table 3.31: Work force of the study area

Zone	No. of Villages	Total Workers	%	Main Workers	%	Marginal Workers	%	Non-Workers	%
Primary Zone (0 - 3 Km)	13	7958	38.40	5946	28.69	2012	9.71	12766	61.60
Secondary Zone (3 - 7 Km)	28	18185	37.99	14219	29.71	3966	8.29	29677	62.01
Tertiary Zone (7 - 10 Km)	23	178050	34.99	164829	32.39	13221	2.60	330859	65.01
Study Area (10 Km)	**64**	**204193**	**35.36**	**184994**	**32.03**	**19199**	**3.32**	**373302**	**64.64**

Source: Census of India, 2011

The above table shows that out of the total working population, the percentage of main workers is 32.03%, while 3.32% are marginal workers. Number of working populations is 35.36 % and non-working population is 64.64 % in the study area. More percentage of main workers reflects a developing economy and growth of the region

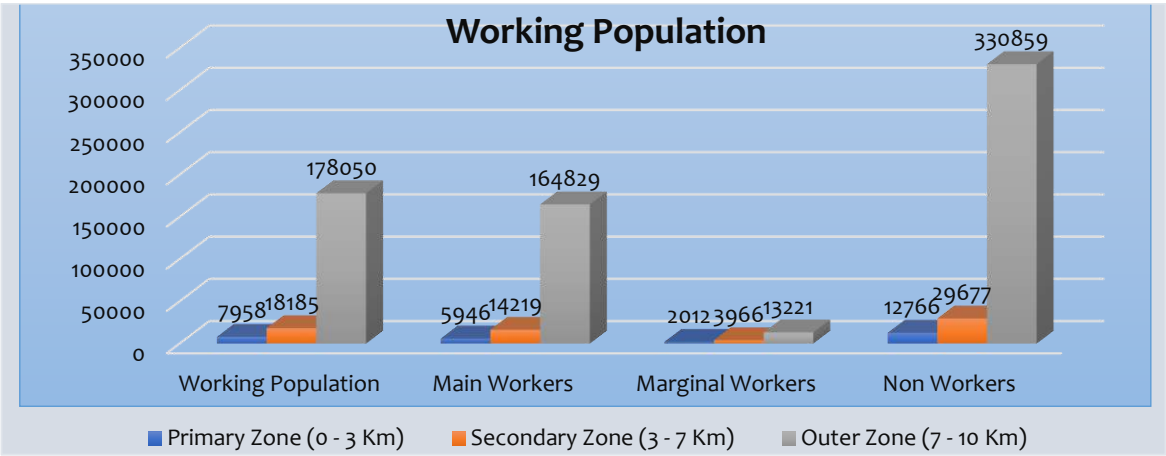


Figure 3.18: Working force in the study area

Basic Amenities

A better network of physical infrastructure facilities (well-built roads, rail links, irrigation, power and telecommunication, information technology, market-network and social infrastructure support, viz. health and education, water and sanitation, veterinary services and co-operative) is essential for the development of the rural economic.

A review of infrastructure facilities available in the area has been done based on the information from baseline survey of the study area. In this review, the villages which fall within

10Km radius around the plant site have been considered. Infrastructure facilities available in the area have been described in the subsequent sections as below:

Education Facilities

As per census 2011 Education facilities comprise primary, middle, secondary and senior secondary schools along with higher educational institutions like degree colleges, engineering colleges, medical colleges, etc. In the study area there are total 464 primary schools, 354 middle schools, 225 secondary schools and 104 senior secondary schools but not proper colleges for higher studies. Hence, higher education not good of the study area. The overall status of the study area depicts that the education is limited to only primary level or schooling only. In the villages, there are various primary school, middle school, secondary school and senior secondary school. But for higher studies, there is a need of more institutes or colleges providing higher level education.

Table 3.32: Education Facilities in the Study area

Zone	No. of Ward/Villages	Primary School	Middle School	Secondary School	Senior Secondary School
Primary Zone (0 - 3 Km)	13	17	11	8	2
Secondary Zone (3-7km)	28	62	47	25	9
Tertiary Zone (7-10km)	23	385	296	192	93
Study Area (10 Km)	**64**	**464**	**354**	**225**	**104**

Source: DCHB Census 2011, Rajasthan

Apart from the above, Udaipur City is having well established medical collages, Engineering collages, MBA, Law and other higher education institutes. The city is also having government as well as Private Schools with good infrastructure.

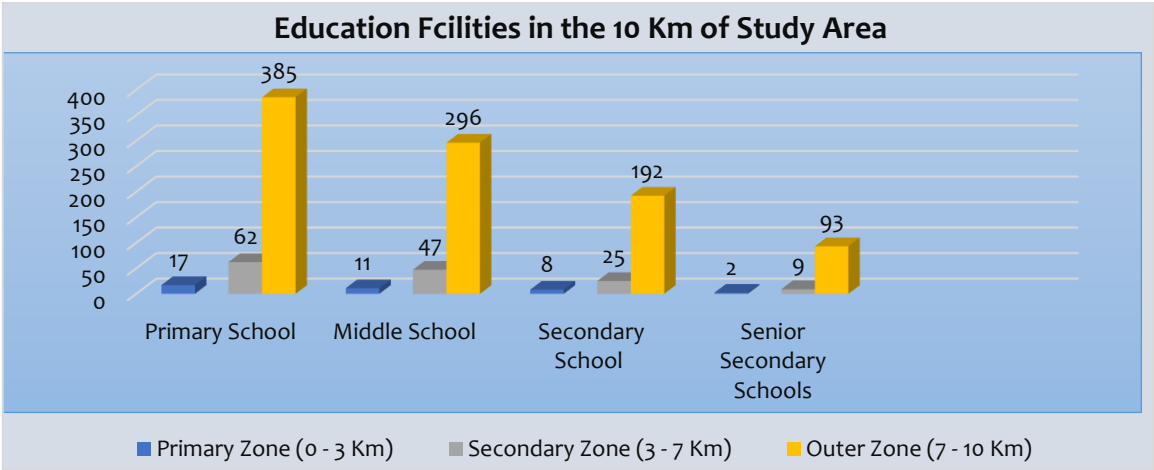


Figure 3.19: Educational facilities in the study area

To bring more skilled developed working population within the area, there is a need of higher educational facilities such as colleges, Vocational institutes etc. For the upliftment of the women in the area there is a need to develop women's polytechnic educational facilities which can encourage women's to sustain their livelihood.

Health/Medical Facilities:

Health is a premier asset of human capital, which is an important factor for the growth of any economy. It is a source of human welfare. Health and nutrition play a major role for developing a healthy society as it impacts the productivity of a person.

The health care facilities in the study area consist of Primary Health Centre, Primary Health Sub-Centre's; Maternity Child Centre; Dispensaries; Veterinary, Family health center and Non gov. Medicine Shops. The conditions of Health /Medical facilities in the area are average, because most of the facilities are not well equipped with the latest medical equipments, staff/ Doctors which results in the delayed accessibility of services to people. In 10 km study area, there is 1 Community Health Centre, 10 Primary Health Centre (PHC) and 28 Primary Health Sub Centres (PHSC) along with 21 Maternity Child Centres. The area is having few general medical stores with the general medicines for the care. For the welfare of the animals, the area is having 13 veterinary hospitals, 18 dispensaries, 31 Non Govt medical facilities and 259 non-Govt. medical facilities medicine shop.

In Udaipur City many Healthcare and Medical facilities are there like Magnus Hospital Udaipur, Paras Hospital, Saraswati Chikitsalya, Shivam Hospital, Chaudhary Hospital and medical research, Sunrise Hospital, Geetanjali Hospital, GBH Medical College and Hospital, etc. are some renowned Hospitals which provide specialized treatment. Healthcare Centres, including clinics, doctor's offices, urgent care centers, etc serves as first point of contact with a health professional and provide outpatient medical, nursing, dental and other types of care services.

Table - 3.33: Health/Medical Facilities in the Villages

Type of Facility	Community Health Centre	Primary Health Centre	Primary Health Sub Centre	Maternity Child Centre	Dispensary	Veterinary	Non-Govt medical facilities	Non-Govt. Medical facilities Medicine Shop
Number of Facilities	1	10	28	21	18	13	31	259

Source: Field Survey

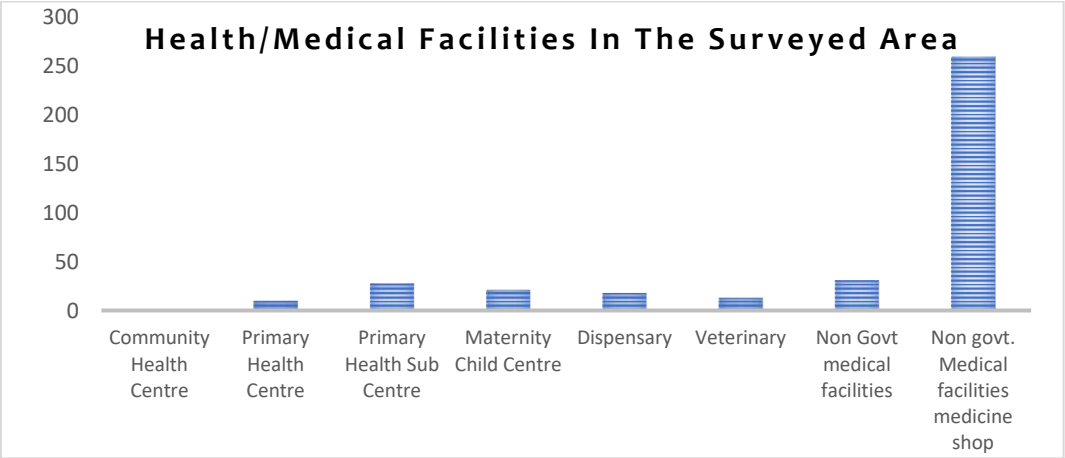


Figure 3.20: Healthcare facilities in the study area

Water resources and drinking water facilities:

People of the villages are availing drinking water facilities generally from the Hand Tap Water, Well Water, Tube wells / Borehole and Tank build for the collecting rainwater. Only one seasonal river is present within the study area which passes through secondary and tertiary zone. During summer scarcity, the water supply is discontinuous with the regions. Most of the villages have storage facilities for drinking water supply. The details of the zones having different water resources and facilities in the study area are given below:

Table 3.34: Water Facilities in the study area

Zone	No. of Villages	River /Canal	Tank/Pond/Lakes	Other status
Primary Zone (0 - 3Km)	13	NA	A	A
Secondary Zone (3-7Km)	28	A	A	A
Tertiary Zone (7-10km)	23	A	A	A
Study Area (10 Km)	**64**	A	A	A

Source: DCHB Census 2011, Rajasthan

Transport and Road Infrastructure Facilities:

Villages have fare road connectivity and Private bus operators operate transport service in the villages. Road condition of the villages is fairly good and the area is well connected with the two major highways such as NH- 27 (Adjacent to plant boundary in North direction), NH-48~ 2.5 km in West direction. As per the survey, in some villages, there are proper roads with the bus stops available for the people convenience.

The conditions of the roads at Udaipur town/City, Village Debari and Bichhri were observed to be satisfactory.

Tourism

Udaipur, formerly the capital of the Mewar Kingdom, is a city in the western Indian state of Rajasthan. The city of lakes Udaipur is located around azure water lakes and is hemmed in by lush green hills of Aravallis. The famous Lake Palace, located in the middle of Lake Pichola is one of the most beautiful sights of Udaipur. It is also home to Jaisamand Lake, claimed to be the second largest man-made sweet water lake in Asia. The beautiful City Palace and Sajjangarh (Monsoon Palace) add to the architectural beauty and grandeur of the city. The city is also known for its profusion of zinc and marble. Solar observatory in Lake Fateh Sagar is the only observatory in India located on an island and has been made on the pattern of Big Bear Lake in Southern California. The ten-day Shilpgram Festival which starts from 21 Dec to 30 Dec pulls in a large number of people interested in arts and crafts.

Tourism is an integral part of Rajasthan Economy which contributes about 15 per cent of the Rajasthan's Economy and provides benefits like foreign exchange earnings, regional development, infrastructure development and promotion of local handicrafts and cultural development. Livelihood of the villagers majorly depends on the tourism.

Electrification

All the villages in the study area were electrified. Electricity is available for the various domestic, non-domestic, industrial, agricultural and public lighting purposes. But being a rural area, the

electric supply is discontinuous most of the times and is supplied in shifts (eight hours in the morning or evening).

Other Infrastructural Facilities:

In the study area, other infrastructure facilities mainly for the communication like post offices, Radio stations, telephonic network connections, Television cable connections and other such as hotels, Anganwadi Centres are also available in the villages. As per the basic requirements, the villages have adequate market places to meet the daily requirements.

Inference of the Socio-economic Study:

- The Socio-Economic study provides the clear picture of demographic as well as economic attributes such as population, average household size, working, non-working population, literacy rate, sex ratio, occupation etc.
- Percentage of the male population is observed to be higher than women population with the study area. As observed, the majority of the villages are spatially distributed with the secondary zone of the study area. The sex ratio is 932 females of every 1000 males in the study area which is not very poor compared to the national sex ratio.
- As far as the literacy rate is concerned, the study area has an average level as the literacy rate of people is growing.
- *Basic Amenities within the study area:*

✓ **Education:** There are total 464 primary schools, 354 middle schools, 225 secondary schools and 104 senior secondary schools and 39 colleges and universities for higher studies present in the study area.

✓ ***Medical:*** *In 10 km study area, there is 1 Community Health Centre, 10 Primary Health Centre (PHC) and 28 Primary Health Sub Centres (PHSC) along with 21 Maternity Child Centres. The area is having few general medical stores with the general medicines for the care. For the welfare of the animals, the area is having 13 veterinary hospitals, 18 dispensaries,* 259 non-govt. medical facilities medicine shop.

✓ ***Drinking water and Electricity:*** People of the villages are availing drinking water facilities generally from the Hand Tap Water, Well Water, Tube wells / Borehole and Tank build for the collecting rainwater. During summers, the water supply to the villages is discontinuous. All the villages in the study area were electrified but with the discontinuous supply.

✓ ***Transport and Road infrastructure facilities:*** Road condition of the villages is fairly good and the area is well connected with the two major highways such as NH- 27, NH-48. The internal roads of the villages are mainly gravel and unpaved roads due to which daily communication becomes a problem for the inhabitants of the village. Therefore, few internal roads of the villages need to be developed to facilitate the easy movement of vehicles and the commuters.

- ✓ ***Other infrastructure for Basic Needs:*** In the study area, other infrastructure facilities mainly for the communication like post offices, Radio stations, telephonic network connections, Television cable connections and other such as hotels, Anganwadi Centers are also available in the villages. As per the basic requirements, the villages have adequate market places to meet the daily requirements.

3.9 CONCLUSION

To predict and evaluate the impacts of expansion within the existing Debari Zinc Smelter Complex on the surrounding area, it is vital to assess the baseline status of the environmental quality in the vicinity of the site. The environment baseline study was conducted by both collecting Primary and Secondary data collections during the summer season (March to May, 2022)

The baseline study conducted while considering the Abiotic factor such as Air, Water, Soil, land. It was found that the parameters monitored for Air, Noise, water, soil were well within the limits as per the prescribed standards by CPCB. Apart from monitoring, LULC study was also conducted using primary and secondary sources which revealed that majority of the study area is occupied by the agricultural land. Hence it can be concluded that the present baseline environment status of the study area will not be affected by the Expansion in existing Debari Zinc Smelter Complex by Hindustan Zinc Limited as the company will adopt adequate control measures to protect the surrounding environment and will contribute in development of the study areas.

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CHAPTER - 4

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.1 ENVIRONMENTAL IMPACT STUDY

The anticipated environmental impacts of the Proposed Expansion within the existing Debari Zinc Smelter project would be mainly due to the construction and operational activities. The environmental parameters likely to be affected are related to many factors, viz. physical, social, economic, agriculture and aesthetic.

The industrial operations can disturb the environment in various ways, such as change in air, noise level; water and soil quality of that particular area. While for the purpose of development and economic upliftment of people, there is need for establishment of industries, but these have to be environmentally friendly. Therefore, it is essential to assess the impacts of expansion project on different environmental and socio-economic parameters; so that, abatement measures could be planned in advance to minimize/ reduce, mitigate, offset or compensate for adverse impacts; and to enhance positive impacts wherever practicable.

4.2 METHODOLOGY OF IMPACT ASSESSMENT

The impact assessment has been undertaken following a systematic process that identifies, predicts and evaluates the impacts that the project could have on aspects of the physical, biological, social/ socio-economic and cultural environment, and identifies measures that the project will take to avoid, minimise/reduce, mitigate, offset or compensate for adverse impacts; and to enhance positive impacts where practicable. The stages of the impact assessment process comprise the following:

- *Impact identification:* to identify the potential impact of the project on the various environmental parameters.
- *Impact prediction: to determine what could potentially happen to resources/receptors as a consequence of the project and its associated activities.*
- *Impact evaluation: to evaluate the significance of the predicted impacts by considering their magnitude and likelihood of occurrence, and the sensitivity, value and/or importance of the affected resources/ receptors.*
- *Impact mitigation: to identify appropriate and justified measures to mitigate negative impacts and enhance positive impacts.*

4.3 BASIS OF IMPACT ASSESSMENT

The impact of the proposed expansion within the DZS would be assessed on the basis of their characteristics i.e., nature, type, extent, duration, intensity & frequency and its significance.

Characteristics of Impacts

The impact is described in terms of its characteristics such as nature, type etc. Impact characteristics are given in Table - 4.1.

Table - 4.1: Impact Characteristics

Characteristic	Classification	Description
Nature	Positive	When impact is considered to represent improvement to baseline or introduce a new

Characteristic	Classification	Description
		positive factor/change.
	Negative	When impact is considered to represent adverse change from the baseline or introduce a new undesirable factor/change.
	Neutral	When there is no impact to represent any change from the baseline and not introducing any new factor/change.
Type	Direct	Resulting from a direct interaction between a project activity and the receiving environment / receptors.
	Indirect	Resulting from other activities that happened as a consequence of the project.
	Cumulative	Impacts that act together with other impacts (including those from concurrent or planned future third-party activities) to affect the same resources and/or receptors as the Project.
Extent	Project Area	When impact due to the project related activities is restricted within the premises of project area i.e., core zone.
	Local	When impact due to the project related activities is restricted within the immediate surroundings i.e., upto 3 km radius.
	Zonal	When impact due to the project related activities is restricted within the study area i.e. up to 10 km radius.
	Regional	When an impact due to the project activity extends within as well as beyond 10 km radius.
Duration	Short - term	When the impact is usually temporary or last for a short time or will have an effect soon rather than in the distant future.
	Long- term	When impact would occur during the development of the project and either takes a long time or lasts a long time or cause a permanent change in the affected receptor/resource.
Intensity	Low	When resulting in slight changes of prevailing baseline conditions and quality of existing physical environment is good. Ecological environment as well as human receptors is not likely to be affected due to the proposed project activity.
	Medium	When resulting in changes of prevailing baseline conditions which are within the benchmark norms and quality of existing physical environment shows some signs of stress. Ecological environment as well as human receptors could be sensitive to change in quality of prevailing baseline condition, but human receptors retain an ability to adapt to change.
	High	When resulting in changes of prevailing baseline conditions which are exceeding the benchmark norms and quality of existing physical environment is already under stress. Ecological environment as well as human receptors would be impacted to the larger extent and the ability of human receptors to adapt to changes would be undermined.
Frequency	Remote (R)	When resulting in remote or one-off chance of an event due to an activity on a receptor/ resource.
	Occasional (O)	When an impact due to an activity is occurring intermittently from time to time on a receptor/resource.
	Periodic (P)	When an impact due to an activity is resulting on periodic basis for a week or a month on a resource/receptor.
	Continuous (C)	When an impact due to an activity is continuously resulting on a resource/receptor.

Significance of Impacts

Impacts are described in terms of 'significance'. Significance is a function of the magnitude & sensitivity / importance of the impact.

Classification of impact significance is given in Table - 4.2.

Table - 4.2: Significance of Impact

Significance	Description

Significance	Description
Insignificant	Negligible impact or where a resource or receptor (including people) will not be affected in any way by a particular activity, or the predicted effect is deemed to be 'negligible' or 'imperceptible' or is indistinguishable from natural background variations.
Minor	Where an effect will be experienced, but the impact is well within accepted standards/guidelines with or without mitigation.
Moderate	Where an effect will be experienced and the impact is within accepted standards/guidelines with mitigation.
Major	Impact where an accepted limit or standard may be exceeded or the impact occurs to the highly valued/sensitive resource/receptors.

Irreversible and Irretrievable commitments of environmental components

Determining the irreversible and irretrievable commitment of the resources is one of the major stages of impact evaluation, which gives an understanding about the potential impacts that are likely to affect future generations of the area and facilitates for adoption of proper mitigation measure regarding the same.

Table - 4.3: Irreversible and Irretrievable commitments of environmental components

Commitment of resources	Description
Irreversible	Irreversible commitment of resources refers to the impact or loss of the resources that cannot be recovered or reversed. Irreversible is a term that describes the loss of future options. It applies primarily to the impacts of use of nonrenewable resources or to those factors that are renewable only over long periods of time.
Irretrievable	Irretrievable is a term that applies to the loss of production, harvest, or use of natural resources. Irretrievable commitment of resources may be considered as the loss of resources as a result of change (both reversible & irreversible) due to any project activity that cannot be regained or recovered.

4.4 INTERACTION MATRIX

The interaction matrix enables a methodological identification of the potential interactions each project activity may have on the range of resources/receptors within the Area of Influence for the Project.

The interaction matrix for the project activities and likely impacted resources/receptors is presented in Table - 4.4 which covers potential interactions, regardless of probability of occurrence. The matrix consists of a list of resources/ receptors that could be affected against a list of project activities.

Entries in the matrix cells are tick marked to indicate whether:

- An interaction is not reasonably expected (blank);
- The interaction is reasonably possible and may lead to potential impact (tick marked).

Table - 4.4: Interaction Matrix

S.No.	Project Activity / Likely Impacted Resources / Receptors	*Pre-construction Phase*			Construction Phase					*Operation Phase*					*Miscellaneous*	
		Land Acquisition	Site Clearing	Civil works such as earth moving and building structures including temporary structures	Heavy Equipment operations	Disposal of construction and Municipal Solid Waste from Labors	Generation of Sewage	Influx of construction workers	Transportation of construction material	Raw Material transportation, storage and handling	Emissions from Operation of Metallurgic Process	Storage, Handling and Transport of products & by products	Abstraction of water	Waste and Effluent Management	Developmental activities carried out by company	Greenbelt Development
A.	**Physical**															
1.	Air			√	√				√	√	√	√				√
2.	Noise & / Vibration			√	√				√	√	√	√				√
3.	Land Use													√		√
4.	Topography															
5.	Geology															
6.	Drainage Pattern			√												
7.	Surface Water					√	√				√		√	√		
8.	Ground Water													√	√	
9.	Soil		√	√	√	√								√	√	√
B.	**Biological**															
1.	Flora		√			√				√				√		√
2.	Fauna		√					√						√		√
3.	NP/WLS/BR/reserves/Forests etc.															
C.	**Social / Socio-Economic**															
1.	Demography							√								
2.	Physical Displacement															
3.	Land Use (w.r.t. Population influx)							√								
4.	Habitation							√							√	
5.	Economy & Livelihood			√				√	√	√		√			√	
6.	Social & Cultural Structure							√							√	
7.	Infrastructure & Public Services			√											√	
8.	Public Health					√	√	√			√	√		√	√	

S.No.	Project Activity / Likely Impacted Resources / Receptors	*Pre-construction Phase*			Construction Phase					*Operation Phase*					*Miscellaneous*	
		Land Acquisition	Site Clearing	Civil works such as earth moving and building structures including temporary structures	Heavy Equipment operations	Disposal of construction and Municipal Solid Waste from Labors	Generation of Sewage	Influx of construction workers	Transportation of construction material	Raw Material transportation, storage and handling	Emissions from Operation of Metallurgic Process	Storage, Handling and Transport of products & by products	Abstraction of water	Waste and Effluent Management	Developmental activities carried out by company	Greenbelt Development
9.	Education							√							√	
10.	Agriculture														√	
11.	Transport Infrastructure			√	√			√	√	√					√	
D.	**Occupational Health**															
1.	Injury			√	√	√			√	√	√	√				
2.	Health					√	√		√	√	√	√		√		
3.	Non - routine risk				√	√				√	√	√				
	Legends		Show no interactions is reasonably							√	Show interactions reasonably possible with one of the outcomes may lead to potential impact					

4.5 IMPACTS DUE TO PROPOSED EXPANSION ACTIVITY

According to the interactions identified between project activities and resource/receptors as described in the above table, it is evident that the following aspects are likely to have impact due to the proposed expansion project (Table: 4.5) and therefore, to be considered for Impact Assessment:

Table - 4.5: Likely Impacted Resources / Receptors

S. No.	Likely Impacted Resources / Receptors	
1.	Physical	Air Quality
		Noise Level
		Ground water
		Surface Water
		Land Use
		Soil Environment
		Traffic Load
2.	Biological environment	Flora
		Fauna
3.	Socio economic environment	Demography
		Land use (w.r.t. population influx)
		Economy & Livelihood
		Social & Cultural Structure
		Infrastructure & Public Services
		Public Health
		Education
		Transport Infrastructure
4.	Occupation Health & Safety	Injury
		Health
		Non-Routine Risk

Source: Interaction Matrix

The impacts of expansion project on various environmental attributes were assessed during construction & operation phase of the project and are given in sections below.

4.6 ANTICIPATED IMPACT ON TOPOGRAPHY & LAND USE PATTERN AND MITIGATION MEASURES

- ***Anticipated Impacts***

  There will not be any significant impact / change in topography and land use pattern of the area due to expansion project.

  - The total area of Debari Zinc Smelter is 184.2 ha. and is under the possession of M/s. Hindustan Zinc Ltd. and the proposed expansion will be carried out within the existing premises of Debari Zinc Smelter.
  - Topography of the site is generally more or less flat with minor undulations in some area. During construction phase, some level of cutting and filling will need to be done to maintain an even topography within the plant area. No change is envisaged.
  - The present land use of the plant site is industrial; expansion will be done within the existing plant premises; therefore, there will be no permanent change in land use, only intensity will increase due to expansion project.

- ***Impact Evaluation***

  Impact Evaluation is given in table below:

Impact Evaluation for Change in Land Use Pattern

Impact Evaluation Element	No change in the existing land use due to proposed expansion project; only intensity will increase.			
Potential Effect/ Concern	Expansion will take place in the existing premises so there will be no potential effect on land use.			
Characteristics of Impacts				
Nature	Positive		***Negative***	Neutral
			√	
Type	***Direct***		Indirect	Cumulative
	√			
Extent	***Project Area***	Local	Zonal	Regional
	√			
Duration	Short - term		***Long- term***	
			√	
Intensity	*Low*		**Medium**	High
			√	
Frequency	Remote (R)	Occasional (O)	Periodic (P)	***Continuous (C)***
				√
Significance of Impact				
Significance	Insignificant	Minor	**Moderate**	Major
			√	

- ***Mitigation Measures***
  - All earth work will be completed in such a way so that the soil erosion and carryover of the materials in other areas are protected.
  - Excavated soil will be stored properly to avoid the spread of wind-blown dust and shall be reused for backfilling, landscape development and greenbelt maintenance.
  - Proper disposal of construction debris (if any) will be maintained so that top soil is not contaminated at the construction place.
  - Out of the total plant area (184.2 ha), 76.28 ha (41.41 %) area has already been developed. The same will be maintained and densed by doing gap plantation to achieve the plantation density @ 2500/ha.
  - Plantation outside plant area to be maintained for improvement in the land use of the study area.
  - The greenbelt and plantation will increase the aesthetic beauty and prevent soil erosion.

4.7 ANTICIPATED IMPACT ON AIR QUALITY AND MITIGATION MEASURES

Construction Phase

- ***Anticipated Impacts***

Increase in dust (Particulate Matter) and NO_x concentration due to Levelling activity and Heavy vehicular movement.

  - The main sources of dust emission are the movement of equipment at site, levelling, grading, earthwork and foundation works.
  - Fugitive dust emissions from vehicles and equipment to be deployed during the construction phase is also likely to result in marginal increase in the levels of SO_2, NO_x, PM, CO and un-burnt hydrocarbons.

- Loading and unloading activities will also contribute in deterioration of air quality.

The impact due to construction activities is mainly the health effects such as respiratory diseases However, the impacts will be for short duration and of minor nature. This will be confined within the plant boundary and is expected to be negligible outside the plant boundary. The impact will, however, be reversible, marginal and temporary in nature.

- **Mitigation *measures***

- Extensive dust extraction network are provided.
- Water spraying on roads and construction site will prevent fugitive dust.
- Proper maintenance of vehicle and construction equipment will help in controlling the emissions.
- Construction equipment having PUC Certificate will be deployed during the activity to restrict exhaust emission.
- Vehicles having construction materials will be covered with tarpaulin.
- Proper training of the drivers so as to ensure adherence to speed limit.
- A separate storage area will be demarcated for construction material to confine the dust dispersion.
- Covered storage facilities will be provided.
- Proper PPEs will be provided to workers to avoid accumulation of dust in respiratory tracts and prevent air borne diseases.
- Proper greenbelt development and plantation inside and outside the plant premises.

Operation Phase

- ***Anticipated* Impacts**

The major air pollutants due to expansion in Debari Zinc Smelter are the PM (Zinc melting furnaces: 50 mg/Nm3, oil fired Boilers: 600 mg/Nm^3, Slag grinding Plant: 50 mg/Nm3 and DG Sets: 75 mg/Nm^3), SO_2 (Sulphuric acid Plant II and III: 950 mg/Nm^3, 1.5 kg/ton of acid production and oil fired boiler: 600 mg/Nm^3), Acid Mist (Sulphuric acid Plant II and III: 50 mg/Nm^3), NO_x (oil fired boilers: 450 mg/Nm^3, DG Sets: 710 mg/Nm^3), NMHC (DG Sets: 100mg/Nm^3) & CO (DG Sets: 150mg/Nm^3).

The operational phase of the proposed expansion project comprises of various activities and the same will impact the air quality due to:

- Fugitive emissions
- Stack emissions

(A) Fugitive Emissions

Fugitive dust may be defined as "any solid particulate matter that becomes airborne by natural or man-made activities, excluding particulate matter emitted from an exhaust stack".

Factors that influence emissions

Factors affecting emissions include the following:

- Moisture content of the material

- Type of material processed
- Type of equipment
- Operating practices employed

Fugitive emissions in plant are due to various process and non-process related activities which are given below:

❖ *Process related activities*

✓ Material Handling and Transfer

- o Loading and unloading operation of raw material and finished product
- o Material Transfer Points

✓ Material Storage

❖ *Non-process related activities*

✓ Vehicular Traffic

- o Movement of raw material and finished product by trucks / trailer from main gate to designated place inside the plant and vice-versa.
- o Movement of personnel vehicles

(B) Stack Emissions

In plant site, the major emission from stack is Particulate Matter (PM) emissions. In addition, gaseous pollutants (SO_2, NO_x, Acid Mist and its compounds, NMHC and CO) are also emitted from the stacks and vehicular emissions.

Mitigation Measures

- o Additional Tail Gas Treatment (TGT) is proposed to minimize SO2 emissions from 1.5 to 1.0 Kg/MT of Sulphuric Acid production in 2nd roaster and proposed roaster.
- o The PM emission will be reduced by replacement of existing bag filter bags with upgraded/ PTFE coated bags, which will bring down PM emission.
- o Extensive dust extraction network consisting of Venturi Scrubbers and Bag Filters are provided.
- o Gas wash tower and Thiessen Disintegrator are provided to capture Furnace Gas.
- o Continuous monitoring system for SO_2.
- o Spraying of water is being continuously carried out at the various location viz., Belt conveyors, etc., to suppress the dust particles.
- o Ventilation system followed by bag filters, are provided in the metal tapping area to control work zone emissions.
- o Ash handling unit & disposal area and unloading point area are provided with water sprinklers to arrest the dust and fugitive sources of dust.
- o In order to minimize fugitive emission, Zn concentrate containing 8-10% moisture is being handled;
- o All existing Stacks are connected to CPCB & RSPCB Server.

- Mobile vacuum dust sweeping system on industrial roads and vacuum dust cleaning system for plant area exist at smelter to control airborne dust due to the vehicles movement. Regular road washing is being done on internal roads.
- Vehicular emissions are maintained as per standard.
- 41.41 % of the area is covered with greenbelt / plantation at site.

DG Sets

- Emissions from DG set are /will be dispersed through the stack;
- Adequate stack height has been maintained for the two existing DG sets, same will be followed for the proposed DG sets.

Hence, the overall quality of the ambient air will be maintained within the limit prescribed by CPCB / RSPCB after the commencement of the expansion of Zinc Smelter plant.

4.7.1 Air Quality Predictions through Mathematical Modelling

For obtaining quantitative value of impacts, modelling for air environment is carried out. Mathematical modelling is an established and accepted technique to predict the impacts. In this section, impacts on air environment due to emissions to be generated from the expansion project has been assessed.

Prediction of impacts on air environment has been carried out employing mathematical model based on a steady state. Gaussian plume dispersion model designed for multiple point sources for short term. In the present case, AERMOD version 10.2.1 dispersion model based on steady state Gaussian plume dispersion, designed for multiple sources and developed by United States Environmental Protection Agency [USEPA] has been used for simulations from Industrial sources. The concentrations have been predicted in all directions covering all types of weather conditions. Spatial distributions of all the pollutants are also presented in the form of Isopleths.

4.7.2 Pollutants/Model Options Considered for Computations

The model simulations deal with major pollutant Particulate Matter (PM), SO_2, Acid Mist, NO_x, CO and HC will be emitted from the expansion activity and Cumulative Impact Assessment on different environmental parameters due to the proposed expansion project are discussed below.

The proposed project is an expansion project, which falls under Category 'A' projects as per the EIA Notification, 2006 & as amended from time to time; Project or Activity '3(a)'-Metallurgical Industries (ferrous & non–ferrous) in which the Expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) at Village: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan) by M/s. Hindustan Zinc Limited is carried out within the existing plant premises and no additional area is required.

This expansion will be carried out in 2 phases, in 1st phase the capacity expansion will be done up to 1,20,000TPA along with Roaster installation and in the 2nd Phase, capacity will be further increased up to 1,40,000TPA.

4.7.3 Model Options Used for Computations

The options used for short-term computations in AERMOD are:

- The plume rise is estimated by Briggs formulae, but the final rise is always limited to that of the mixing layer;
- Stack tip down-wash is not considered;
- Buoyancy Induced Dispersion is used to describe the increase in plume dispersion during the ascension phase;
- Calms processing routine is used by default;
- Wind profile exponents is used by default, 'Irwin';
- Elevated terrain is used for computations;
- It is assumed that the pollutants do not undergo any physio-chemical transformation and that there is no pollutant removal by dry deposition;
- Washout by rain is not considered;
- Cartesian co-ordinate system has been used for computations; and
- The model computations have been done for total 20 km with 500-m interval.

4.7.3.1 Model Input Data

a) Meteorological Data

Meteorological inputs required are Temperature, Relative Humidity, Wind Speed and Wind Direction, Rainfall etc. which was recorded at site during Summer Season (March to May, 2022). Hourly Meteorological Data has been enclosed as ***Annexure – 11*** along with this EIA / EMP Report.

b) Stack Emissions

Periodic monitoring of the stack emissions is being/will be done to monitor the pollutant concentrations. Stack emission details are given in tables below.

Table - 4.6: Stack Emission Details in Proposed Expansion Project

Stack No.	Stack attached	Height from ground level (m)	Diameter (m)	Existing Emission (mg/Nm3)							Exit Velocity m/sec	Exhaust Gas		
				PM10	SO2	NOX	Acid Mist (HCL)	CO	NMHC	Lead		Temp (°K)	Temp (°C)	Volumetric Flow (nm^3/sec)
Existing Stack														
1	SAP-II(R2-TGT)	40	5.4	NIL	123	NIL	24.6	NIL	NIL	NIL	9.5	313	40	8.74
2	SAP-III (R-3)	100	1,55	NIL	119	NIL	25.7	NIL	NIL	NIL	9.5	318	45	27.78
3	MCTP	50	1.5	28.1	NIL	NIL	NIL	NIL	NIL	0.3	15	363	90	27.78
4	DG-1	65	1.12	45.2	NIL	310	NIL	119	42	NIL	15	313	40	-
5	DG-2	65	1.12	54.1	NIL	320	NIL	90	43	NIL	15	313	40	-
6	Induction furnace	31.2	0.6	24.4	NIL	NIL	NIL	NIL	NIL	NIL	9.5	318	45	4.58
7	Ajex furnace	30	0.6	26.2	NIL	NIL	NIL	NIL	NIL	NIL	10.5	313	40	4.31
8	Zinc Melting (Demag / Slag grinding) furnace	30	0.6	25.9	NIL	NIL	NIL	NIL	NIL	NIL	10	318	45	6.39
9	Aux Boiler (DG set) Running In Emergency only, not in operations since long time	30	1.2	--	NIL	NIL	NIL	NIL	NIL	NIL	10	313	40	-
10	Aux Boiler (R-2) Running In Emergency only	30	1	30	NIL	NIL	NIL	NIL	NIL	NIL	15	313	40	-
Proposed Stacks Roaster 3														
11	DG stack (1.2 MW)	30	0.5	75	NIL	710	NIL	150	100	NIL	15	313	40	-
12	TGT R-6	80	2.6	NIL	1.5 kg/ton	NIL	50	NIL	NIL	NIL	9.5	305	32	30.72
13	M&C	30	1.2	50	NIL	NIL	NIL	NIL	NIL	NIL	9.5	318	45	4.58
14	TGT (R-3)	80	2.6	NIL	1.5 kg/ton	NIL	NIL	NIL	NIL	NIL	9.5	305	32	30.72

4.7.3.2 Modelling Procedure

Prediction of ground level concentrations (GLC's) due to expansion of existing plant has been made by AERMOD version 10.2.1 as per CPCB guidelines. It is US-EPA approved model to predict the air quality. The model uses rural dispersion and regulatory defaults options as per guidelines on air quality models (PROBES/70/1997-1998). For this study, uniform polar receptors on flat terrain have been assumed. Meteorological inputs required are hourly wind speed and direction, ambient temperature, stability class, and mixing height.

4.7.3.3 Presentation of Results

In the present case, model simulations have been carried out using the hourly Triple Joint Frequency data. Short-term simulations were carried to estimate concentrations at the receptors to obtain an optimum description of variations in concentrations over the site in 10 km radius covering 16 directions. The incremental concentrations are estimated for the monitoring period. For each time scale, i.e. for 24 hr the model computes the highest concentrations observed during the period over all the measurement points.

Existing value has been covered in the Background Ambient Air Quality Monitoring.

Table 4.7(a): Ground Level Concentrations (Incremental & Resultant)

S. No.	AAQ Sampling Station	Parameters	Unit	Baseline (A)	Incremental GLC (B)	Post project Ambient Air Quality (A + B)	NAAQS* Standards
1.	Plant Site	$PM_{2.5}$	µg/m³	42.6	0.10	42.7	60
		PM_{10}	µg/m³	81.7	1.0	82.7	100
		SO_2	µg/m³	15.3	1.0	16.3	80
		NO_x	µg/m³	26.3	2.0	28.3	80
		CO	mg/m³	0.98	0.0007	0.98	4
2.	Near Village Bichhri	$PM_{2.5}$	µg/m³	38.9	0.50	39.4	60
		PM_{10}	µg/m³	77.5	1.0	78.5	100
		SO_2	µg/m³	13.4	2.0	15.4	80
		NO_x	µg/m³	23.5	1.0	24.5	80
		CO	mg/m³	0.75	0.0004	0.75	4
3.	Village Mandesar	$PM_{2.5}$	µg/m³	36.5	0.05	36.55	60
		PM_{10}	µg/m³	74.1	0.10	74.2	100
		SO_2	µg/m³	13.8	0.20	14.0	80
		NO_x	µg/m³	21.4	0.20	21.6	80
		CO	mg/m³	0.79	0.00005	0.79	4
4.	Near Panwari RF Area	$PM_{2.5}$	µg/m³	38.7	0.05	38.75	60
		PM_{10}	µg/m³	69.4	0.06	69.46	100
		SO_2	µg/m³	12.3	0.2	12.5	80
		NO_x	µg/m³	19.7	0.2	19.9	80
		CO	mg/m³	0.67	0	0.67	4
5.	Village Debari	$PM_{2.5}$	µg/m³	45.2	0.30	45.5	60
		PM_{10}	µg/m³	83.0	0.60	83.6	100
		SO_2	µg/m³	14.8	2.0	16.8	80
		NO_x	µg/m³	24.3	1.0	25.3	80
		CO	mg/m³	0.84	0.0002	0.84	4
6.	Udaipur (Pratap Nagar)	$PM_{2.5}$	µg/m³	51.3	0	51.3	60
		PM_{10}	µg/m³	88.1	0	88.1	100
		SO_2	µg/m³	16.6	0	16.6	80
		NO_x	µg/m³	28.2	0	28.2	80

S. No.	AAQ Sampling Station	Parameters	Unit	Baseline (A)	Incremental GLC (B)	Post project Ambient Air Quality (A + B)	NAAQS* Standards
		CO	mg/m³	1.12	0	1.12	4
7.	Village Lakadwas	$PM_{2.5}$	µg/m³	38.8	0	38.8	60
		PM_{10}	µg/m³	70.8	0	70.8	100
		SO_2	µg/m³	11.9	0.20	12.1	80
		NO_x	µg/m³	20.5	0	20.5	80
		CO	mg/m³	0.66	0	0.66	4
8.	Village Gowla	$PM_{2.5}$	µg/m³	40.1	0.30	40.4	60
		PM_{10}	µg/m³	73.9	1.0	74.9	100
		SO_2	µg/m³	12.7	1.0	13.7	80
		NO_x	µg/m³	22.8	1.0	23.8	80
		CO	mg/m³	0.73	0.0002	0.73	4

Pollution mitigation and management plan should be followed to curtail the impact of gaseous and dust emissions in the study area. The maximum predicted incremental GLCs at above receptors based on the cumulative impact of the expansion project, unimplemented facilities of DZS for $PM_{2.5}$, PM_{10}, SO_2, NO_x and CO are superimposed on the maximum monitored baseline concentrations recorded at all the sampling points and are likely to be found within the prescribed NAAQ standards. The maximum incremental ground level concentrations predicted for PM2.5 (0.89 µg/m3), PM10 (2.33µg/m3) were found adjacent to the plant boundary in East direction.

The maximum incremental ground level concentrations predicted for NOx (4.88 µg/m3) and CO (0.93 µg/m) and NMHC (0.62 µg/m3) were found within plant boundary.

The maximum incremental ground level concentrations predicted for SO2 (7.15 µg/m3) and Acid Mist (2.13 µg/m3) were found at ~1km in west direction from the plant site.

There will be minor threat to the other gaseous pollutants of the ambient air quality; however, concentration of particulate matter and SO2 is a subject of concern - though not immediate. Proper mitigation plan for pollution control will be implemented in the plant premises. Company will install Continuous emission monitoring systems for real time emission levels from the air pollution control equipment. In advent of any failure of APCE, plant will be shut down gradually as per the Standard Operating Procedures to avoid any impact on the surrounding environment.

Table 4.7(b): Ground Level Concentrations (Incremental & Resultant) for Proposed expansion project

Particular	Concentration (µg/m³)					CPCB NAAQS Standards µg/m³
	Baseline	Incremental	Resultant	Distance from plant boundary (Km)	Direction	
PM10	81.7	2.23	83.93	Adjacent to the plant boundary	East	100
PM2.5	42.6	0.89	43.49	Adjacent to the plant boundary	East	60
SO_2	15.3	7.15	21.95	~1	West	80
NO_2	26.3	4.88	31.18	Within plant premises	Within plant boundary	80
CO	980	0.93	980.93	Within plant premises	Within plant boundary	4000

* Apart from the above NMHC is predicted to 0.621 µg/m³ and Acid Mist 2.23 µg/m³

Emission during abnormal condition:

Abnormal condition will be declared when emission level exceeds prescribed emission standard due to following abnormal conditions;

- Non-functioning of one or more fields of the ESP / bags of bag filers
- Non-functioning of APCE systems.
- Damage of cover of conveyor belts.

  To control abnormal emission situation DZS will implement following measures:
- Installation of online emission monitoring device with alarm system to check real time emission value.
- Maintain minimum 30% excess spare of the critical pollution control equipment.
- Reduce plant running load up to such extend that emission level comes under prescribed standard. Shutdown of polluting unit to repair / replace of non-functioning section of the APCD.

Emission during emergency condition: Emergency condition will be declared when emission level exceeds prescribed emission standard due to complete failure of APCE. During this type of situation polluting unit will be completely shut down for repair / replace of APCE.

The isopleths showing ground level concentration of air pollutants for controlled scenario is given in figure below:

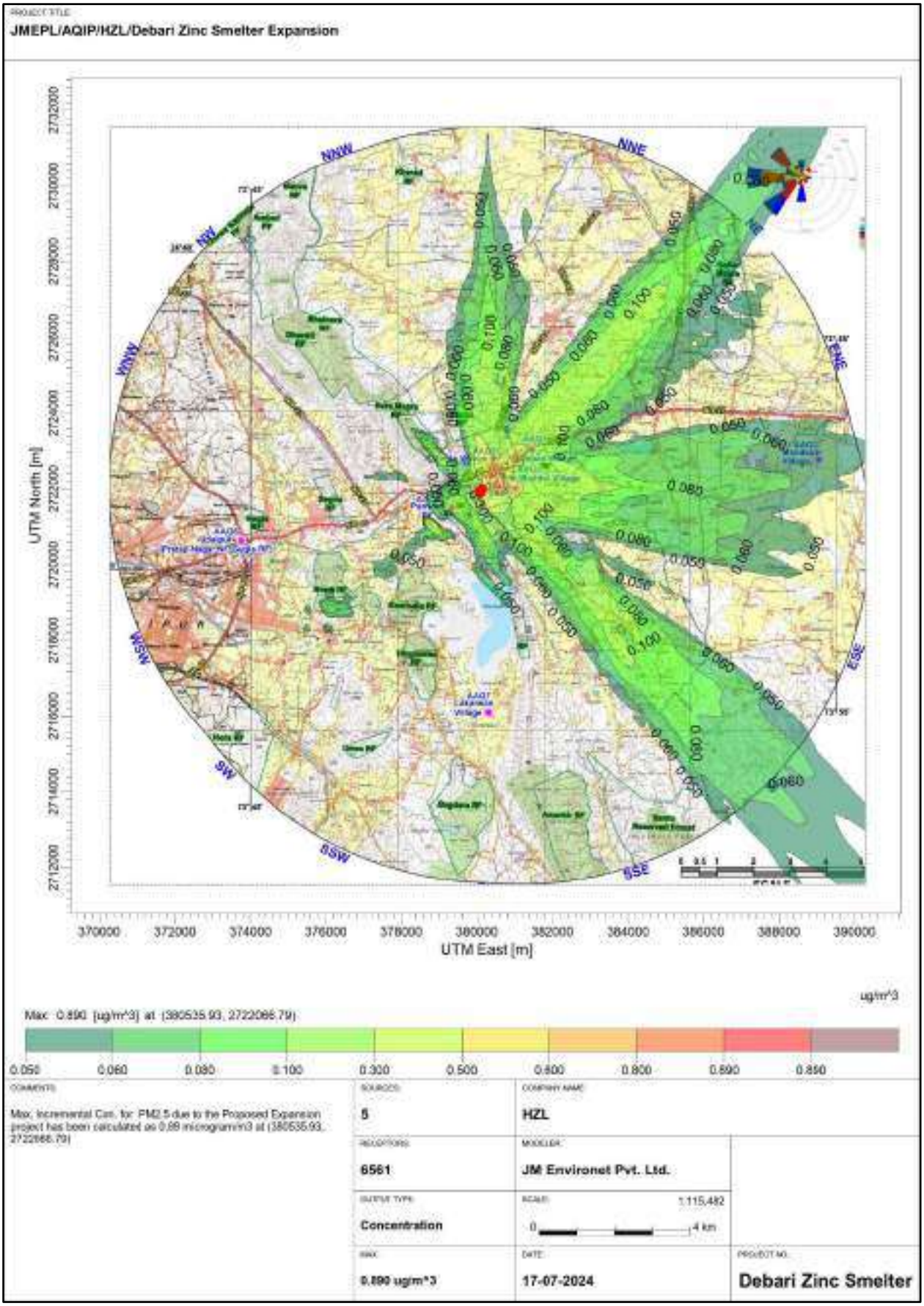


Figure 4.1: Isopleth showing the predicted incremental GLCs of $PM_{2.5}$

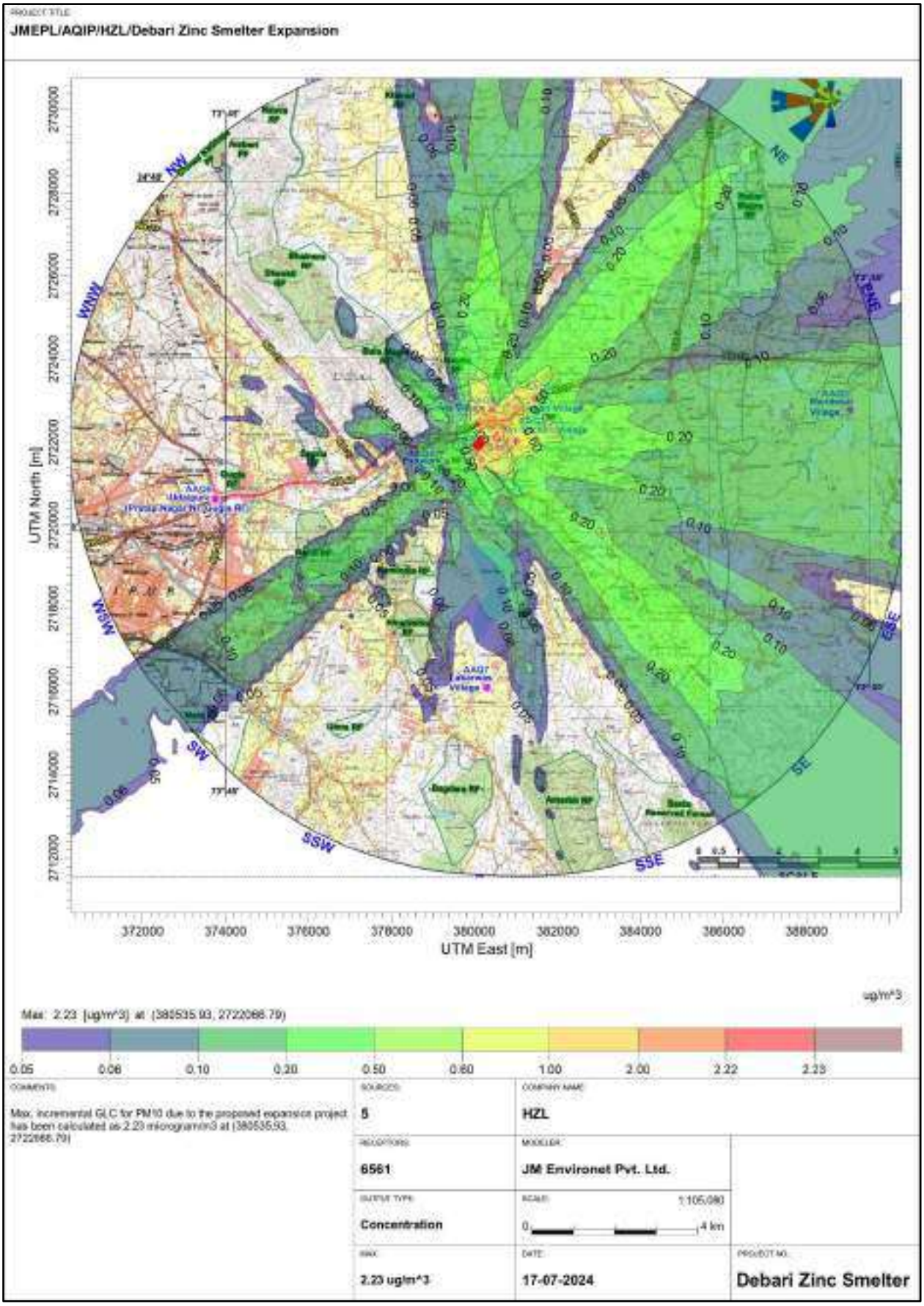


Figure 4.2: Isopleth showing the predicted incremental GLCs of PM_{10}

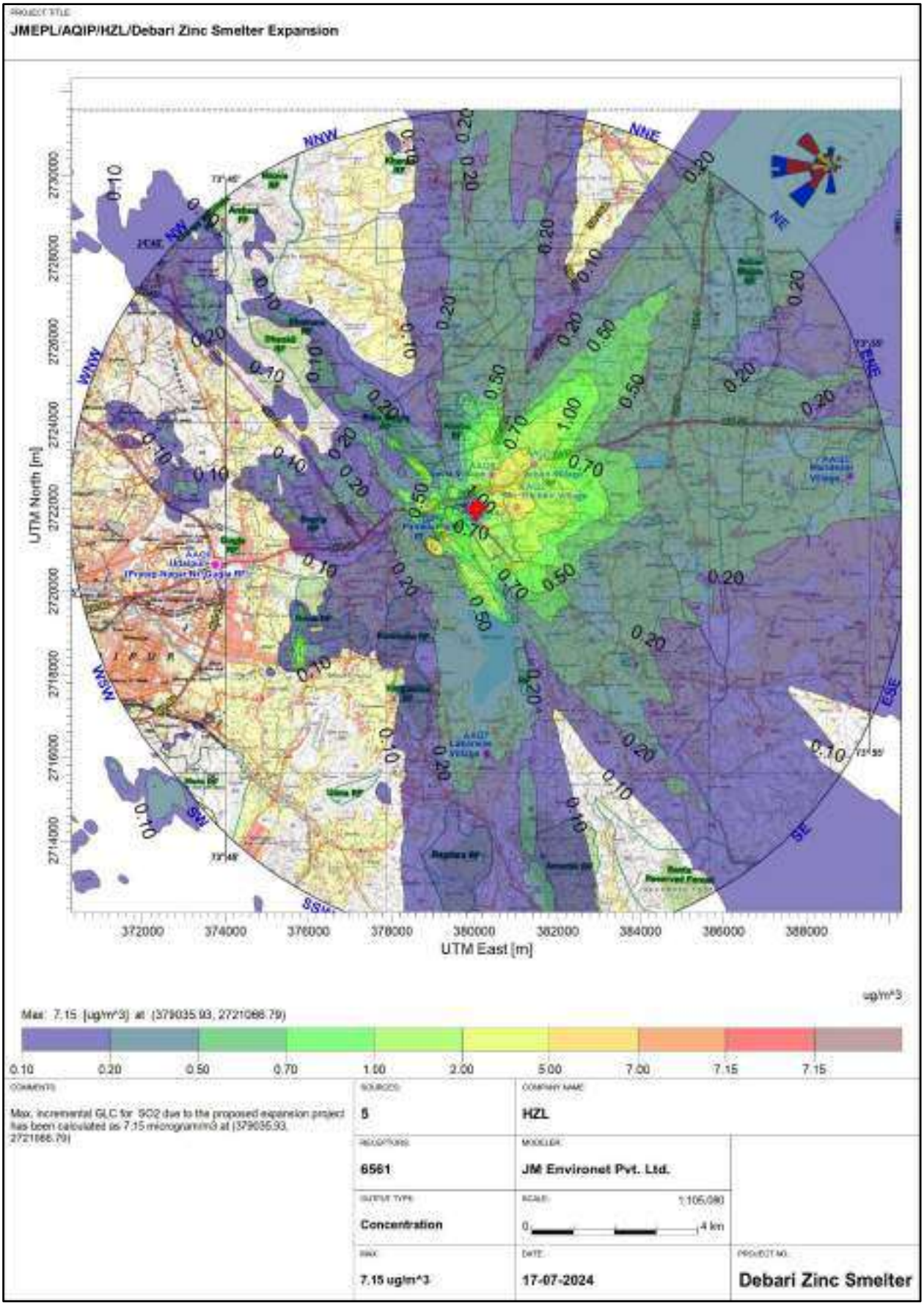


Figure 4.3: Isopleth showing the predicted incremental GLCs of SO_2

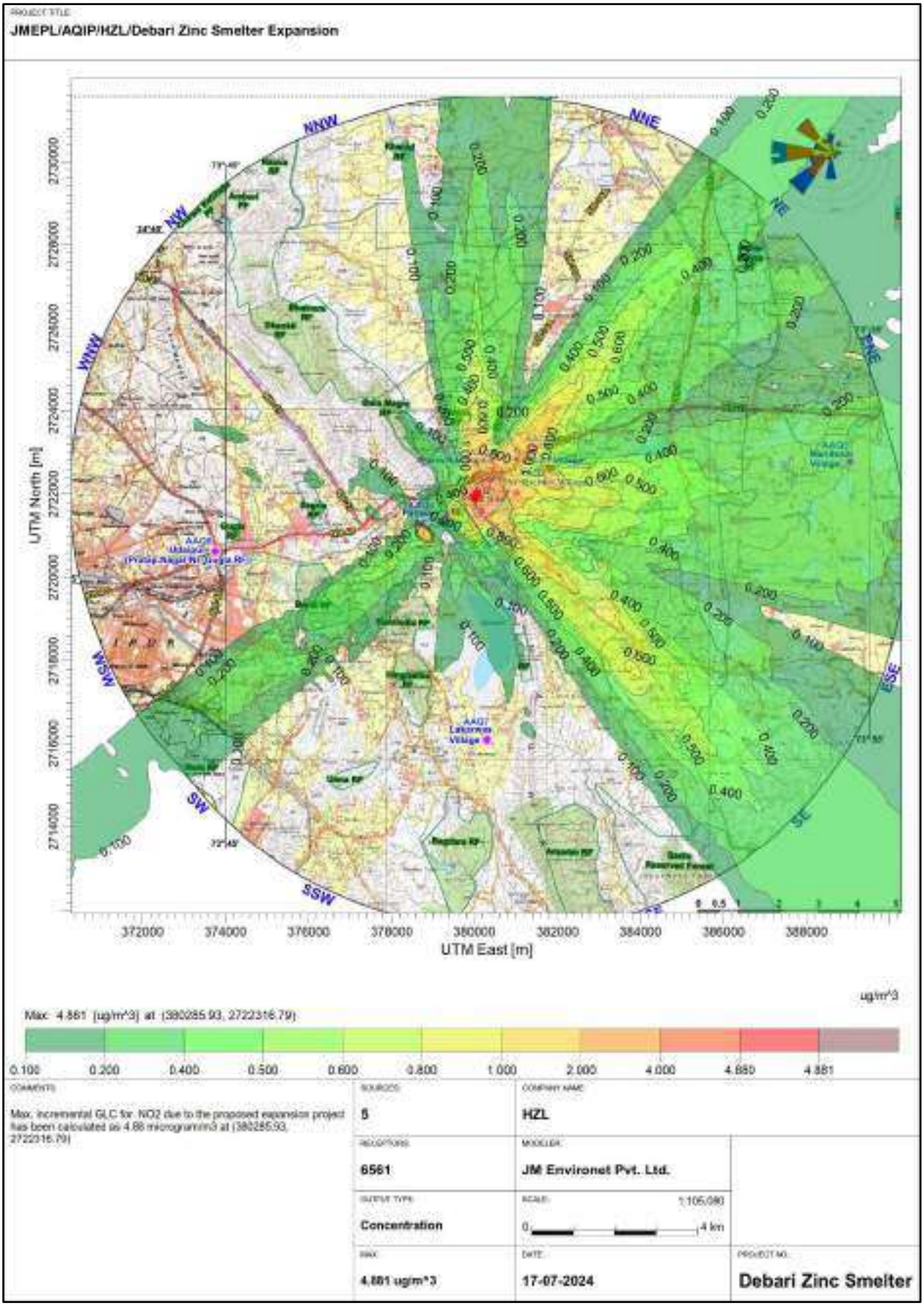


Figure 4.4: Isopleth showing the predicted incremental GLCs of NO_x

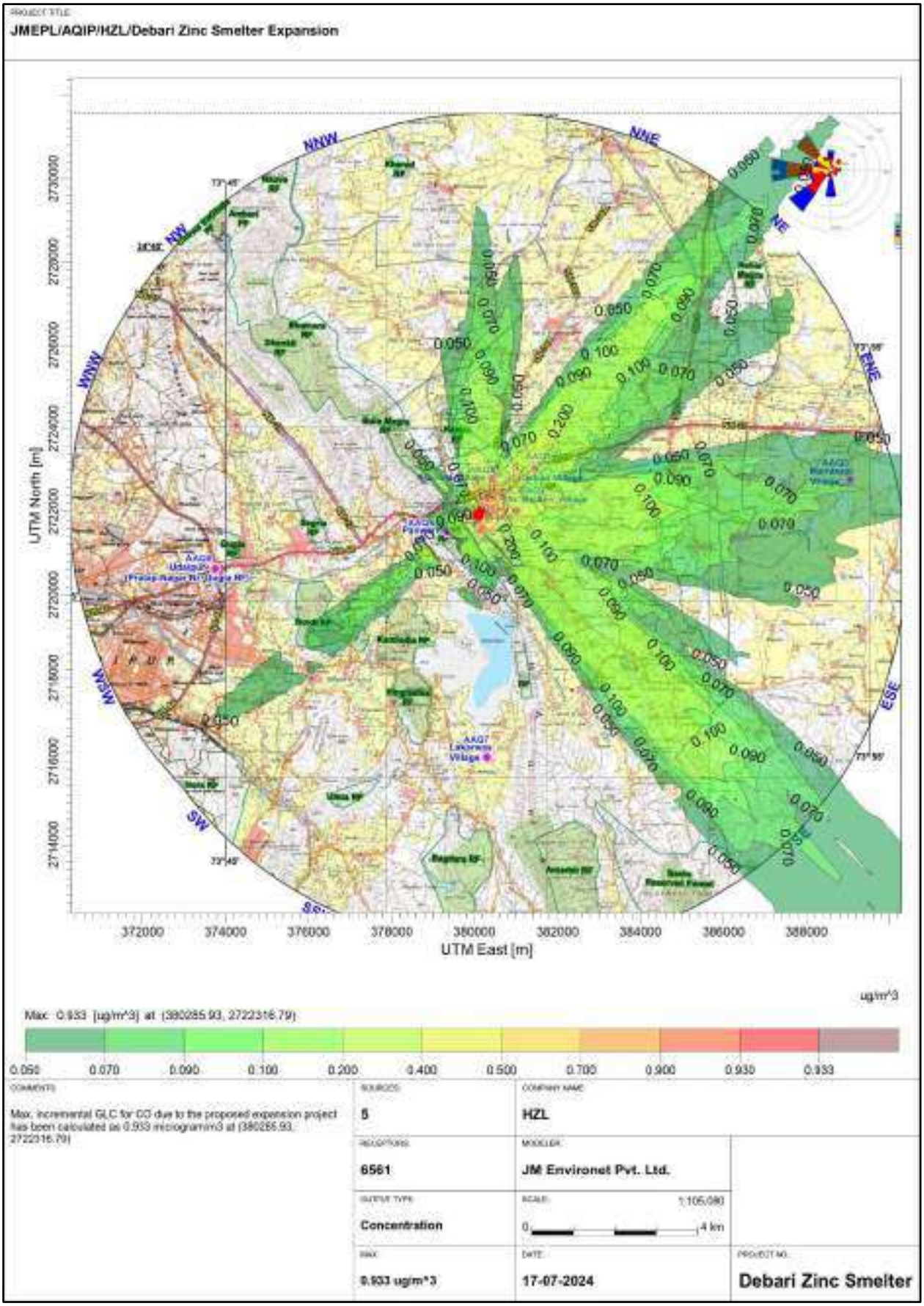


Figure 4.5: Isopleth showing the predicted incremental GLCs of CO

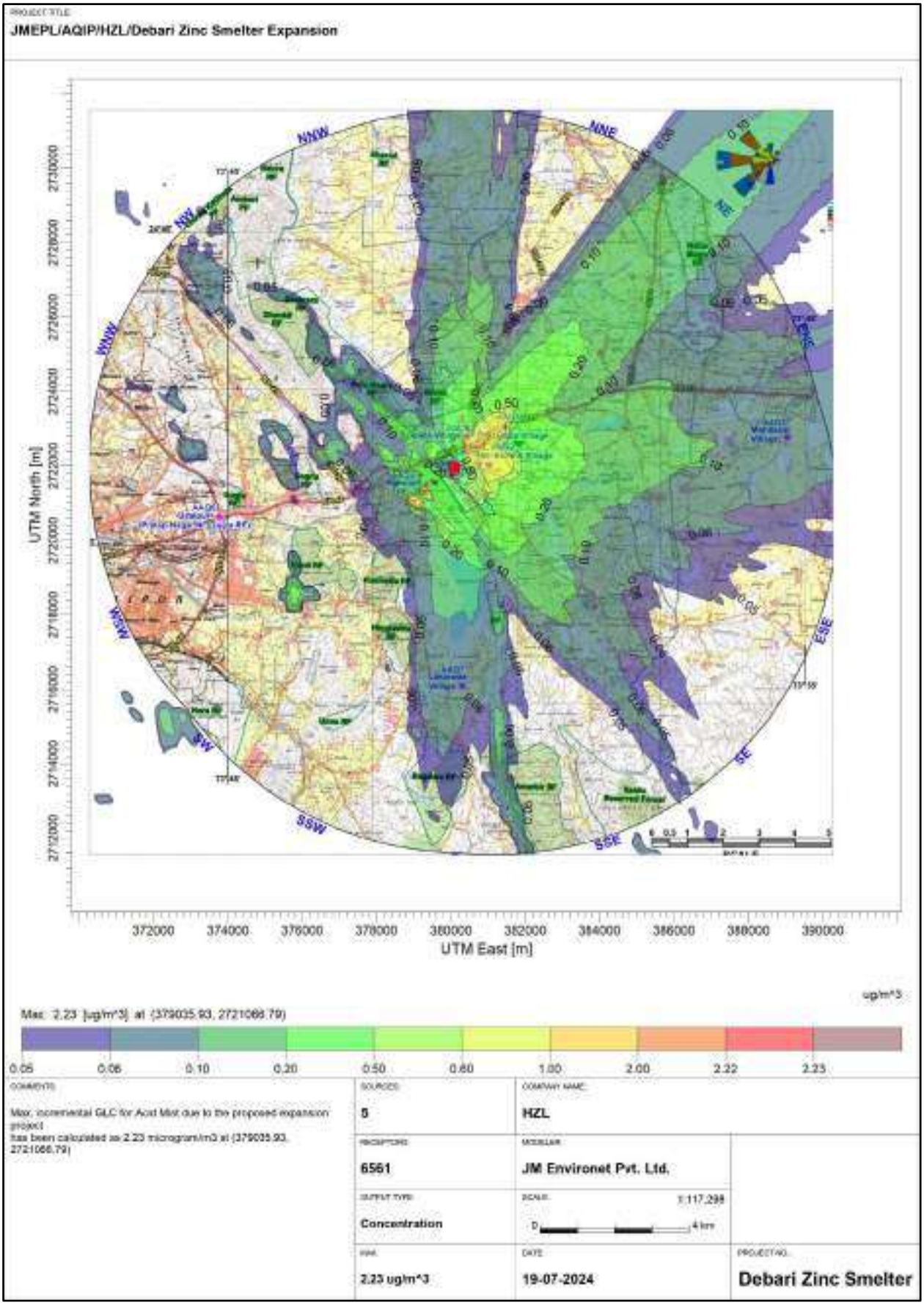


Figure 4.6: Isopleth showing the predicted incremental GLCs of Acid Mist

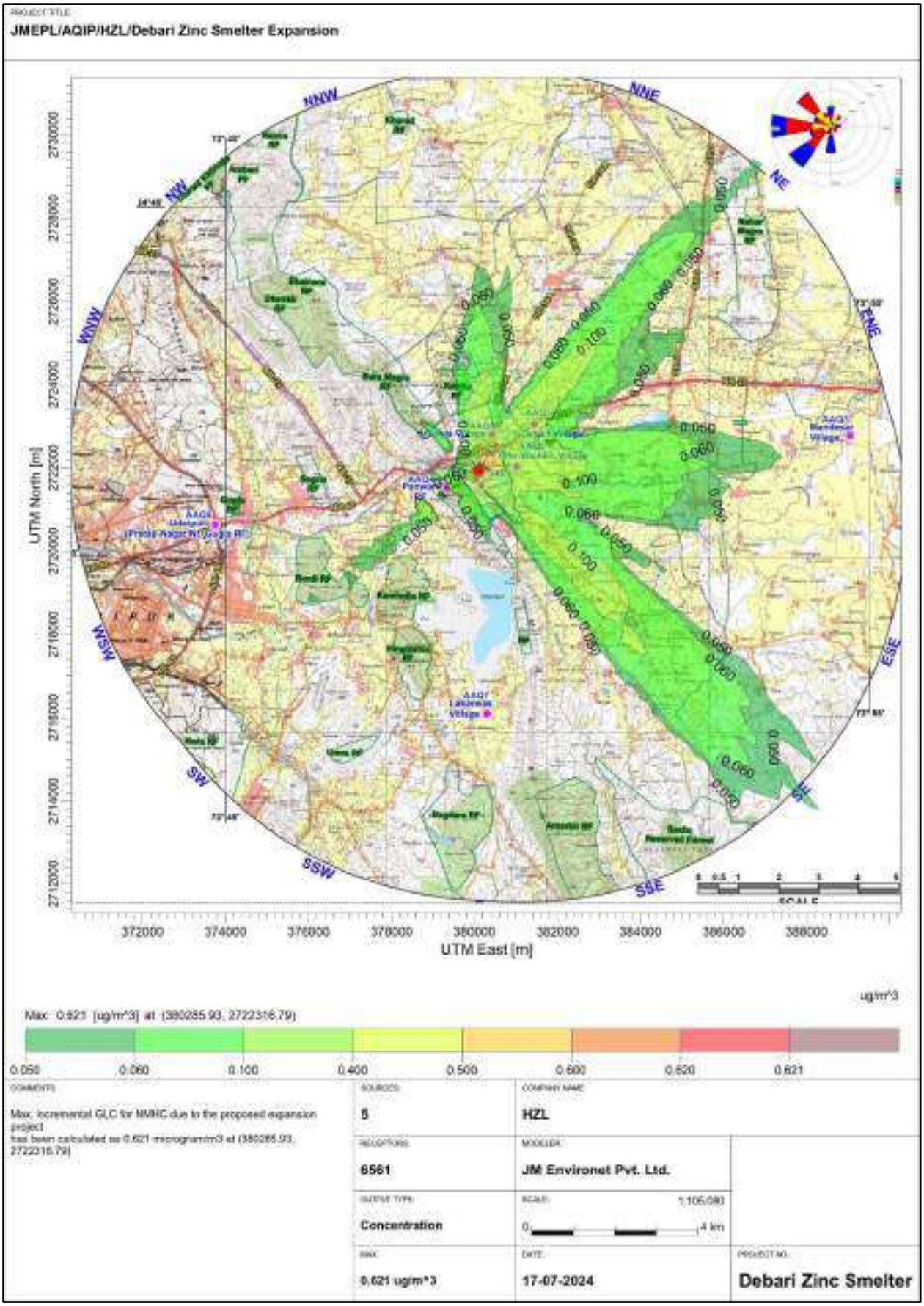


Figure 4.7: Isopleth showing the incremental GLCs of NMHC

Line Source Emission Modelling:

The impact of additional vehicular load on the air quality was predicated using the AERMOD version 10.2.1 as per CPCB guidelines. The maximum predicted incremental GLCs for different parameters are as given in the table below. The Isopleths showing the incremental GLCs of PM2.5, PM10, SO2, NO2, & CO are given as figure no. 4.8 – 4.12.

Table 4.7(c): Ground Level Concentrations (Incremental & Resultant) for Proposed expansion project from Line Source

Particular	Concentration (µg/m³)					NAAQS
	Baseline	Incremental (line Source)	Resultant	Distance from Plant Boundary (km)	Direction	
PM10	81.7	1.70	83.4	~ 8.2 km away from plant site	ENE	100
PM2.5	42.6	0.683	43.283	~ 8.2 km away from plant site	ENE	60
SO_2	15.3	0.548	15.848	~ 8.3 km away from plant site	ENE	80
NO_2	26.3	3.33	29.63	~ 8.5 km away from plant site	ENE	80
CO	980	4.618	984.618	~ 8.5 km away from plant site	ENE	4000

Source: Air Quality Impact Prediction Modelling

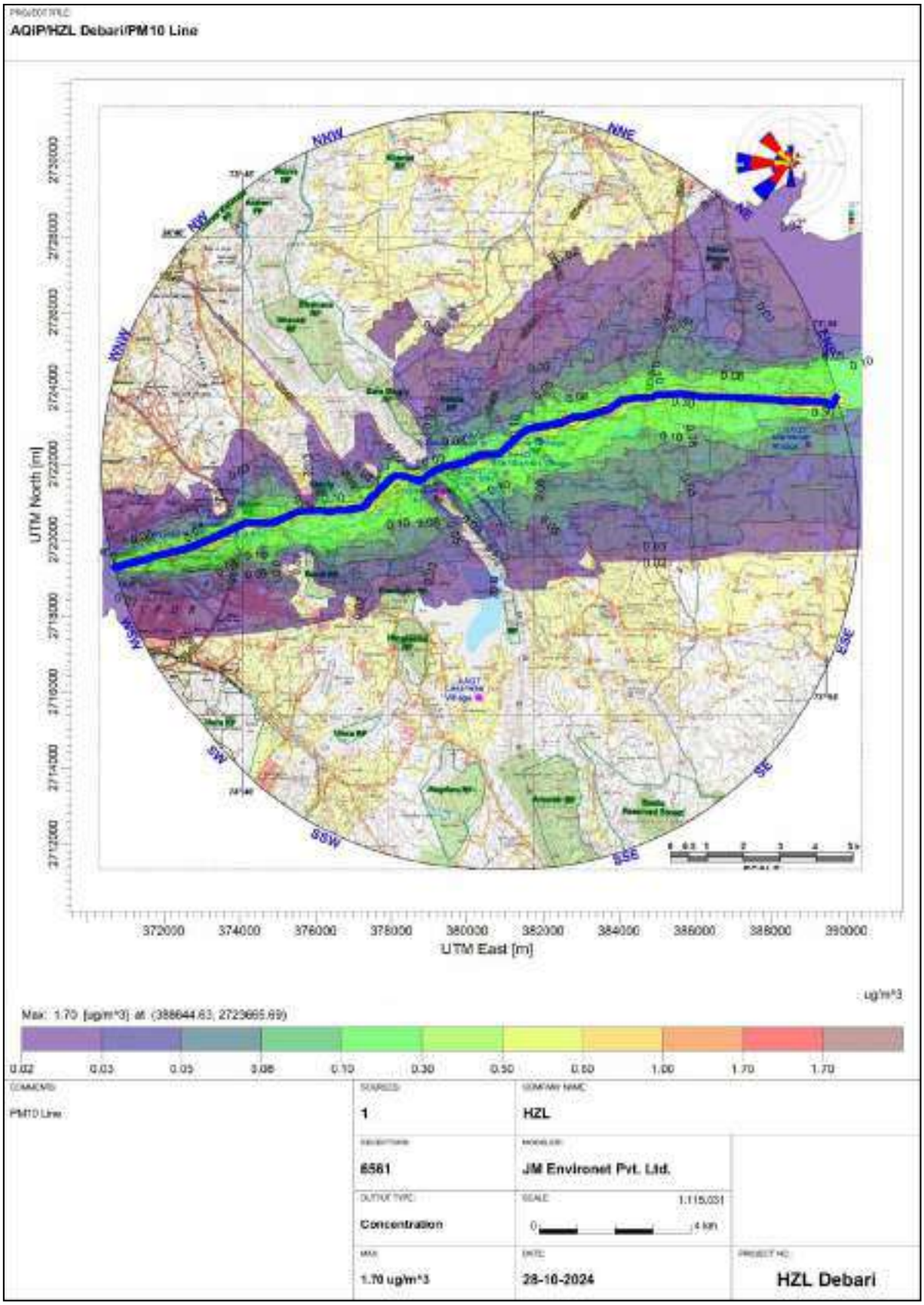


Figure 4.8: Isopleth Showing incremental GLC of PM10 due to Line Source for the proposed expansion project

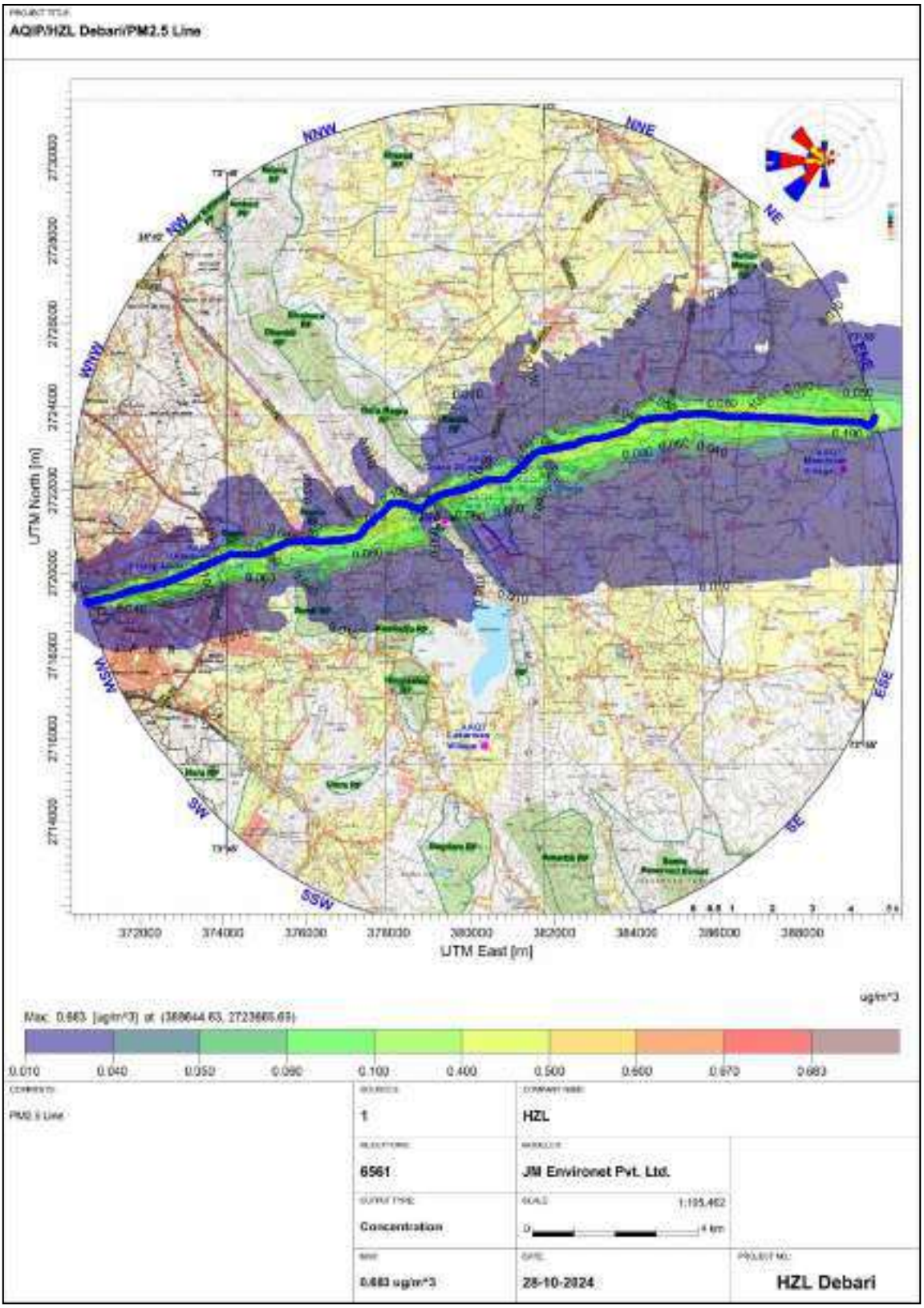


Figure 4.9: Isopleth Showing incremental GLC of PM2.5 due to Line Source for the proposed expansion project

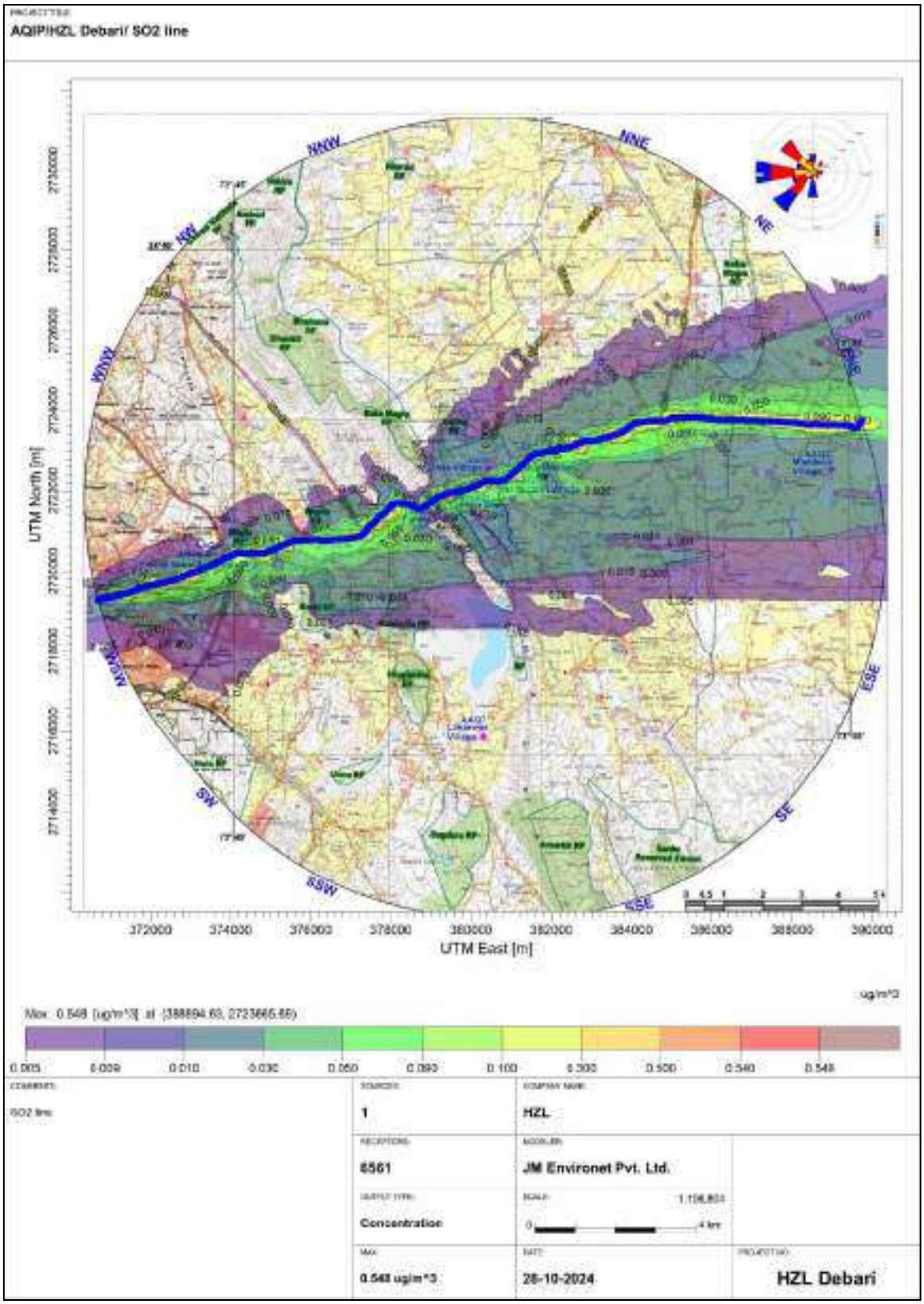


Figure 4.10: Isopleth Showing incremental GLC of SO2 due to Line Source for the proposed expansion project

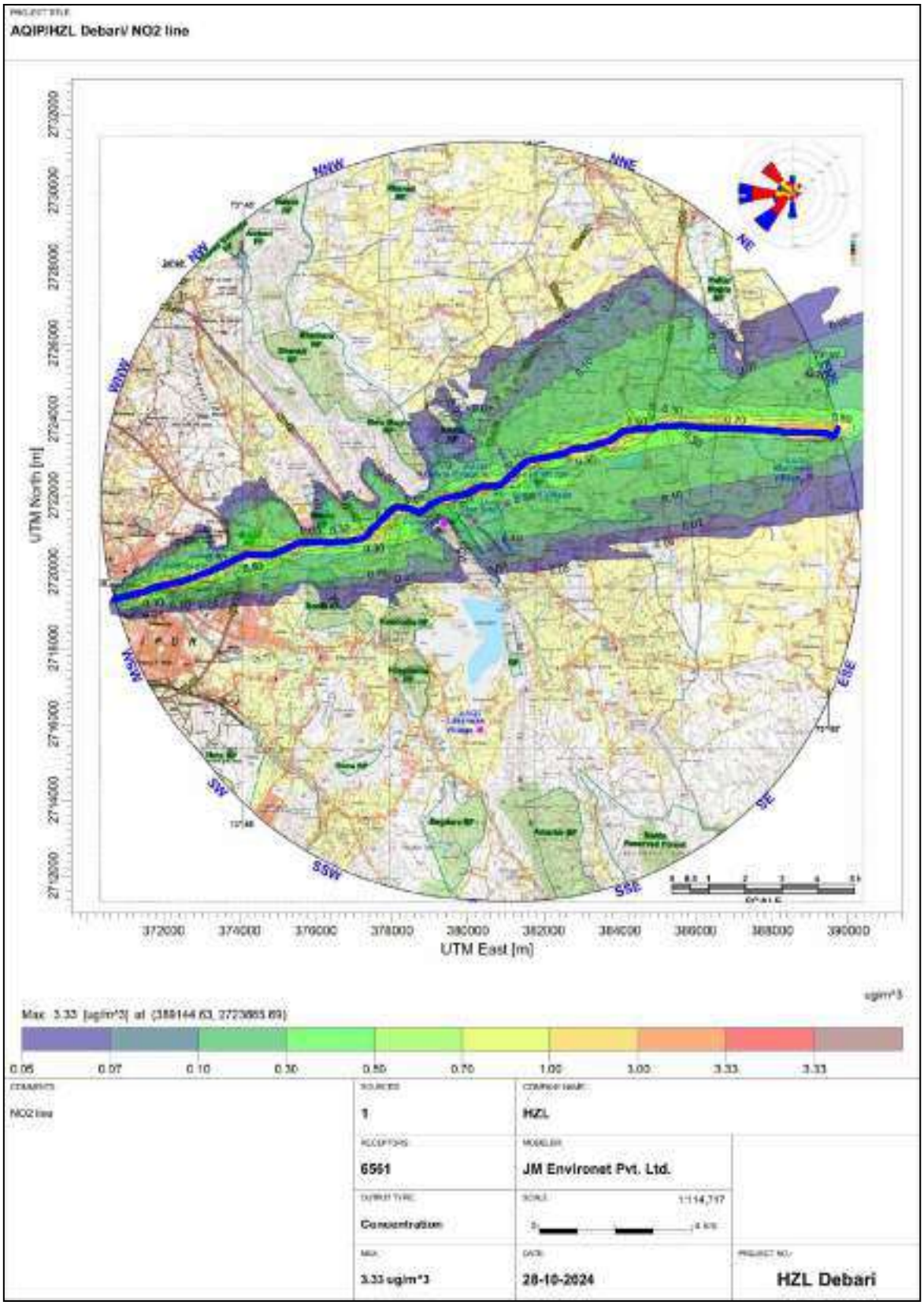


Figure 4.11: Isopleth Showing incremental GLC of NO2 due to Line Source for the proposed expansion project

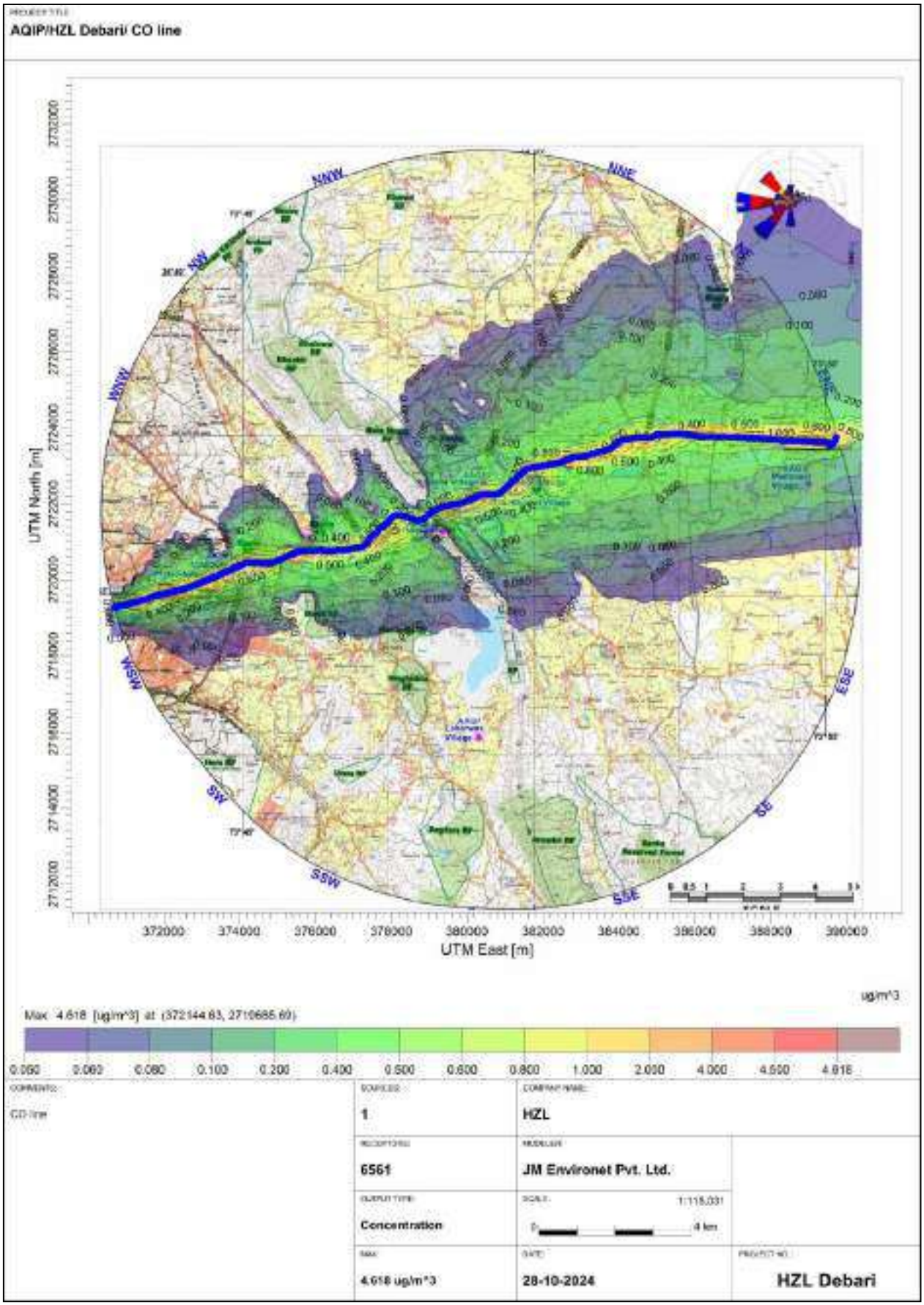


Figure 4.12: Isopleth Showing incremental GLC of CO due to Line Source for the proposed expansion project

Impact Evaluation

Ambient Air Quality monitoring results are given in Chapter - 3 of this EIA/EMP report. From this it is evident that AAQ results are within the prescribed norms. Impact evaluation is given in table below.

Impact Evaluation for Ambient Air Quality

Impact Evaluation Element	Change in Air Quality during construction (temporary) & operational phase of Expansion Project			
Potential Effect/ Concern	Impact on health of humans and nearby biological/ecological receptors due to point sources of air emissions including fugitive emissions due to proposed expansion project.			
Characteristics of Impacts				
Nature	Positive		***Negative***	Neutral
			√	
Type	***Direct***	Indirect	Cumulative	
	√			
Extent	*Project Area*	*Local*	**Zonal***	Regional
			√	
Duration	Short - term		***Long- term***	
			√	
Intensity	Low		***Medium***	High
			√	
Frequency	Remote (R)	Occasional (O)	Periodic (P)	***Continuous (C)***
				√
Significance of Impact				
Significance	Insignificant	Minor	**Moderate**	Major
			√	

**Impact due to point source & fugitive emissions will be local whereas the impact due to transportation will be zonal.*

- ***Mitigation Measures***

Fugitive Emissions and Pollution Control Facilities

Adequate pollution control measures have been / will be adopted to keep the fugitive emissions from all sources within the statutory norms, brief of the same is given below:

- Dust suppression system have been/ will be maintained to minimize fugitive dust emission in Zinc concentrate handling area & at various transfer points and closed conveyor belts have been /will be maintained for the transfer of material to reduce the fugitive emissions.
- Water sprinkling and cleaning of haul roads by vacuum cleaner is being / will be done regularly to control the fugitive emissions generated due to vehicular movement.
- The plant is being/ will be maintain dust collection and extraction system to control fugitive dust emissions at all the transfer points & loading /unloading areas.
- Bag filters have been / will be installed at all material transfer points.
- Vehicles and machineries are being / will be regularly maintained. Proper upkeep and maintenance of vehicles are being / will be done.
- PPE are being and will be provided to employees working in dust prone areas.
- Out of total area i.e., 184.2 ha of plant area, 76.28 ha (41.41%) has already been covered under greenbelt and plantation and same will be maintained by doing gap plantation to achieve the plantation density @ 2500/ha.

- Native Plant species have been and will be planted in consultation with local horticulturist.

Table 4.7(d): Pollution control Measures

S. No.	Section	Name of the Pollutant	Control Systems
1.	Slag Grinding	PM	Bag Filters attached with stack are provided to trap Particulate matter to meet the stipulated limit of 50 mg/Nm^3. The existing system will be utilized for the proposed expansion.
2.	Sulphuric Acid plant II & III	SO2 Acid Mist	Double Conversion Double Absorption (DCDA), Demister, Absorption towers, ESP, Gas Conditioning Plant, Scrubbers has been already installed to capture SO2 and Acid Mist. Same practice will be continued after proposed expansion.
3.	Zinc melting and Casting furnaces	PM	These units are provided with Bag Filters stacks to trap Particulate matter to meet the stipulated limit of 50 mg/Nm^3. The existing system will be utilized.
4.	Roaster	PM	Ventilation system has been provided in the Roaster Calcine handling and storage section followed by bag filters to maintain stack emissions less than 30 mg/Nm^3 of PM
5.	Leaching Plant	-	Leaching operations are carried out at elevated temperatures and to ensure atmospheric pressure, steam is not widely distributed in the working area. All vessels are equipped with proper venting system.
6.	Moore Cake Treatment Plant	PM and Lead	Bag Filters provided in the section are adequate to handle the expected load. The ventilation air discharge from the bag filter stack will meet the stipulated limit of 50 Mg/Nm^3.
7.	Fugitive Emissions	PM	Concentrate shed, concentrate unloading area shall be provided with water sprinklers to arrest the fugitive dust emissions.

Stack Emission

- Efficient Air Pollution Control Equipment (APCE) like Bag House/Bag Filter/ESP/Ventury Scrubber/DCDA (Double Conversion and Double Absorption Plant)/ Gas Conditioning Plant has been /will be installed at all major stacks to keep the emissions within the permissible limits.
- SO_2 emissions will be absorbed in pyro processing itself.
- Gas wash tower and Thiessen Disintegrator are provided to capture Furnace Gas
- All existing Stacks are connected to CPCB & RSPCB Server.
- Automatic shutdown will take place due to non-working of APCE.
- Double Conversion Double Absorption (DCDA) Acid Plant to maintain SO_2 emission within the prescribed norms of 1.5 kg/T of acid production.
- Additional Tail Gas Treatment (TGT) is proposed to minimize SO_2 emissions from 1.5 to 1.0 Kg /MT of Sulphuric Acid production in 2nd roaster and proposed roaster.

DG Sets

- Emissions from DG sets are /will be dispersed through the stack;
- Adequate stack height has been maintained for the existing DG sets, same will be followed for the proposed DG set as well.

Accidental Release

- All the stack has been/will be equipped with Continuous Online Monitoring Systems and connected with Central Control Room in the plant for monitoring the emissions.

- All the arrangements have been /will be done to avoid tripping in the APCEs along with interlocking system.
- Proper maintenance of Air Pollution Control Equipment is being / will be done periodically.

Hence, the overall quality of the ambient air will be maintained within the limit prescribed by CPCB / RSPCB after the commencement of the operation of expansion project.

4.8 ANTICIPATED IMPACT ON NOISE ENVIRONMENT AND MITIGATION MEASURES

Construction Phase

- ***Anticipated Impacts***

Increase in noise level due to construction equipment may cause irritation, disturbance in sleep, hearing problems etc.

- During construction phase, noise will be generated due to following activities / processes:
  - Movement /operation of transport and construction vehicles / equipment.
  - Transportation of equipment, materials and people.
  - Other important activities involved in construction stage such as drill, hammering, Cement mixing, heavy vehicle transportation, welding, excavation, Cut & fill during construction of expansion project. Earth work will be done for the construction purpose for installation of one new Roaster (3,00,000 TPA), one new DG Set (1.2 MW) and other allied facilities.
  - Piling work during laying down of foundation for infrastructure.
- The noise generated will be high due to construction activities, high noise levels can cause irritation and gradual hearing loss to construction laborer's if high levels of noise exposure are continuously experienced. Sudden exposure can cause irritation in ear drums and sudden loss in hearing whereas long term exposure will result in gradual ENT problems. Though the noise generation during construction phase will be temporary and will be limited to the plant site but workers who are directly exposed to it can be affected due to this.

- ***Mitigation Measures***

  - Selection of low noise generating machinery and equipment will be kept in good condition to keep the noise level within 90 dB(A).
  - Engineering specifications shall be stipulated during tendering as a condition to maintain noise level equal to or less than 75 dB(A) at 1 m from each source;
  - Provision of rubber padding/noise isolators/silencers to modulate the noise generated by machinery/equipment, wherever possible;
  - Provision of protective devices like ear muff/plugs to the workers;
  - Preventive maintenance of machinery/equipment and vehicles.
  - The high noise zones at site will be demarcated and provided with enclosures & barriers;
  - All employees shall be encouraged to cooperate in following safe work practices;

- Information on noise, the risks of exposure to noise and the appropriate control measures shall be displayed at the workplace;
- Greenbelt for attenuation of noise propagation and Periodical noise monitoring is being/ will be carried out.

Operation Phase

Anticipated Impacts

- The expansion project will result in increase in noise levels within the plant area, which will be generated from the operation of machineries and equipment such as Roasting Plant, Casting plant and D.G. Set etc.; and from vehicular movements for transportation of construction material and other ancillary activities.
- The noise generated may cause a significant impact on workers and surrounding residents and if exceeds the permissible levels for a continuous period of time, this may lead to loss of attention/concentration resulting in accidents also reducing the efficiency of working staff.
- However, noise level at the plant boundary is being/will be maintained below 75 dB (A) in day time and below 70 dB (A) in night time but near to the machineries i.e. DG sets is comparatively high which is likely to have impact on the ear drums of the persons working in high noise area.

Impact Evaluation

Ambient Noise Level monitoring results are given in Chapter - 3 of this EIA/EMP report. From this, it is evident that results are well within the prescribed norms. Impact evaluation is given in table below.

Impact Evaluation for Ambient Noise Level

Impact Evaluation Element	Change in Noise Level due to the construction & operational activities during expansion in DZS Complex.			
Potential Effect/ Concern	Impact on health of humans and biological factors/receptors due to noise generated due to the proposed expansion project during day and night time and also on occupational health of the workers exposed to noise.			
Characteristics of Impacts				
Nature	Positive		***Negative***	Neutral
			√	
Type	***Direct***	Indirect	Cumulative	
	√			
Extent	*Project Area*	***Local***	Zonal	Regional
		√		
Duration	*Short – term*		**Long- term**	
			√	
Intensity	Low		***Medium***	High
			√	
Frequency	Remote (R)	Occasional (O)	Periodic (P)	**Continuous (C)**
				√
Significance of Impact				
Significance	Insignificant	Minor	**Moderate**	Major
			√	

Mitigation measures

- For the proposed expansion project, installation of equipment/ machinery will be with low generation of noise as per design and also, will be housed in a closed system. Therefore, noise level of the surrounding area will not increase significantly.
- Following noise abatement measures will also be taken:
  - Machine operators and Persons working just close to machine are being / will be provided with PPE viz. Ear plugs / Ear muffs etc.
  - Proper maintenance, oiling and greasing of machines at regular intervals is being / will be done to reduce generation of noise.
  - D.G. sets are being /will be provided with acoustic enclosures to control the noise level within the prescribed limit.
  - Greenbelt along the plant boundary has been developed The plant boundary is thickly vegetated with species of wide canopy. The same will maintained and densed by doing gap plantation to achieve the plantation density @ 2500/ha.
  - Regular monitoring of noise level is being / will be carried out and corrective measures in concerned machinery will be adopted accordingly.
  - The predominant noise levels are confined to the work zones in the plant.
  - Shock absorbing techniques are adopted to reduce impact;
  - Inlet and outlet mufflers are provided, which are easy to design and construct;
  - Reflection of noise is reduced by constructing roofs walls and floors with absorbing material.
  - Cumulative noise exposure of workers never exceed 90 dB (A) for 8-hrs shifts.

4.9 ANTICIPATED IMPACT ON WATER QUALITY AND MITIGATION MEASURES

Construction Phase

***Anticipated* Impacts**

Water requirement at construction phase will be mainly for construction of civil works, dust suppression and drinking purpose. Water requirement at construction phase of proposed expansion activities at plant site will be fulfilled from the existing source. Impact on water quality during construction phase will be mainly due to sewage generated from the work station of construction workers. For the construction workers temporary sanitation facility will be provided (Portable STP) for the disposal of sewage generated. As the construction work mainly include mechanical fabrication there will be less requirement of water for construction work. The overall impact on water environment during construction phase due to proposed expansion project is likely to be temporary, short term and insignificant.

Domestic waste water during construction phase will be treated in septic tanks followed by soak pit and by completion of expansion project it will be treated in the sewage treatment plant.

The treated water will be reused for gardening purpose within the plant premises. There will not be any discharge from the site during the construction stage which can have any impact on the

water quality of the surrounding area. The following anticipated impacts on water quality could occur during construction phase:

- Increase in suspended solids due to soil run-off during heavy precipitation due to loose soil at construction site.
- Domestic waste water will be generated during construction activities and stagnant water or water logging for a long time may leads to various water borne diseases & unpleasant smell in nearby area.

Mitigation *Measures*

- Storm water drains have been provided at site. The drains will be properly aligned in conformity with the site drainage pattern so that the alteration is kept to the minimum and flooding or soil erosion does not occur.
- Provision of separate storm water system to collect and store run-off water during rainy season and utilization of the same in the process to reduce the fresh water requirement.
- The proposed expansion will be carried out within the existing plant premises. No additional land will be required for the same. There are three seasonal nallahs passing through the plant site from west (nearby hill) to the east direction, which remain active during rains only. No development / construction will be carried out for the proposed expansion project within 50 m distance along the edge of these nallas or any other water body falling in the study area.
- Domestic Waste water generated due to construction activities is being/will be treated in existing STP and treated water is being /will be used in process/Plantation.
- Construction workers will be brought from nearby villages so that domestic water is saved in many ways due to temporary requirements only.
- No discharge of any kind will be done inside or outside plant premises in any water body. Thus, there are/will not be any discharge from the site which can have any impact on the water quality of the surrounding areas.
- Record of water consumption on daily basis will be maintained as per present practice.

Operation Phase

- ***Anticipated* Impacts**

- Total existing water requirement for the project is 8000 KLD. After the expansion project, 1046 KLD additional water will be required for the proposed expansion; which will be sourced from Udaipur STP. Therefore, no additional water Fresh water will be required for the proposed expansion project.
- Water requirements will be met from Udai Sagar and Manasi Wakal Dam and 45 MLD STP installed to treat the sewage generated from Udaipur city.
- No ground water abstraction is being done and will not be done for the proposed expansion project.

- No wastewater is being/ will be discharged outside the plant as we are maintaining Zero Liquid Discharge, no additional waste water will be generated after expansion as we will utilize internal water in expansion.
- Total wastewater generated from DZS plant after expansion is 3494 KLD, out of which 3000 KLD is being treated in RO-ZLD unit and remaining 494 KLD is being used in the process after treatment in ETP.
- Total effluent generation after expansion will be 5194 KLD. For which, debottlenecking to improve the efficiency of existing ETP is envisaged and additional capacity of 2000 KLD RO-ZLD unit will be installed to the effluent.
- The effluents, cooling water generated during operational process, if not treated properly and discharged carelessly on ground, soil or water bodies can enter into ground water through leaching. Surface water bodies are affected as the pollutants will have the tendency to increase silting due to suspended solids, taste, odour, temperature rise, DO, oil slicks etc. It will result is loss of aquatic fauna and long-term change in characteristics of water bodies present in the vicinity. The discharge will also harm the soil flora and fauna and result in reduction of fertility of soil.

- ***Impact Evaluation***

Impact evaluation is given in table below.

Impact Evaluation for Water Environment

Impact Evaluation Element	No major change in water level as well quality due to proposed expansion project.			
Potential Effect/ Concern	No major impact on water environment as no discharge of waste water will be there.			
Characteristics of Impacts				
Nature	Positive		***Negative***	Neutral
			√	
Type	***Direct***	Indirect	Cumulative	
	√			
Extent	**Project Area**	*Local*	Zonal	Regional
	√			
Duration	Short - term		***Long- term***	
			√	
Intensity	Low		***Medium***	High
			√	
Frequency	Remote (R)	Occasional (O)	Periodic (P)	**Continuous (C)**
				√
Significance of Impact				
Significance	Insignificant	Minor	**Moderate**	Major
			√	

- ***Mitigation Measures***

- The existing plant is a Zero Liquid discharge Facility and after expansion it will continue to be a zero Liquid discharge facility.
- Industrial effluent is being / will be treated in existing ETPs (5760 KLD).
- Storm water management practice will be continued as existing.

- Continuous attempt is being/ will be made to optimize/reduce the use of water and to avoid wastage and leakage of water.
- Waste water generated from the domestic activities like from canteen, Toilet, Rest room will be treated in STP having 200 KLD capacity.
- Water from STP is being/ will be used in greenbelt & dust suppression.
- For inspection, cleaning and maintenance of sewer lines, manholes of reinforced concrete construction shall be provided at every bend, junction point of change in slope or diameter and on straight sections of pipes at intervals not exceeding 30 meters.
- Existing Rain Water Harvesting System shall be maintained and strengthen. Maximum use of harvested water will be for plant use. Details are given in chapter 7, section 7.2.7 of this EIA/EMP Report.
- There are three seasonal nallahs passing through the plant site from west (nearby hill) to the east direction, which remain active during rains only. There will be no disturbance to these nallahs due to the proposed expansion project.
- Trunk drains (0.5 m wide & 0.5 m depth) along the internal roads will be created. All the drains will be interlinked with higher size drain 1 m wide & 1 m depth that will be connected with 1 nos. storm water reservoir/Guard Pond. The contaminated particle matters will be deposited as slurry to bottom of reservoir. Excess water during heavy rain fall will be discharged into the natural drain.

Conservation measures to Protect water bodies present within the study area

There are mainly 13 surface water bodies present within 10 km of study area. There are three seasonal nallahas passing through the plant site, which have run off water from the nearby hill in west direction during rains only. Apart from these some seasonal ponds, nallahs and water channels are also present with in the study area which do not contain water throughout the year, these are active during rainy season only. The major water bodies with elevation and distance & direction from the plant site are given in Table below.

Surface elevations of the surface water bodies existing within the study area

S. No.	Water Body	Approx. Distance & Direction from Plant Site	Surface Elevation (m)
1.	Karget Canal	~2.5 km in SE direction from Plant site	546
2.	Udai Sagar Middle Canal	~0.5 km in East direction from Plant site	541
3.	Berach River	~1.5 km in SSE direction from Plant site	523
4.	Udaisagar Lake	~1 km in SW direction from Plant site	544
5.	Udai Sagar Right Canal	~ 1.5 km in ESE direction from Plant site	527
6.	Dabok Pond	~3 km in ENE direction from Plant site	541
7.	Ahar Nadi	~ 3.5 km in SW direction from Plant site	542
8.	Udai Sagar Left Canal	~5.5 km in NE direction from Plant site	553
9.	Vela Nala	~6.5 km in ENE direction from Plant site	512
10.	Khemli Talav	~8 km in NNE direction from Plant site	530
11.	Bagdara Talav	~ 8 km in SSW direction from Plant site	537
12.	Gadela Nadi	~ 9 km in NNE direction from Plant site	514
13.	Ganeshpura pond	~8.5 km in West direction from Plant site	583

Source: SOI Toposheet and Google Earth Imagery

The conservation measures to be taken for protection of water bodies located around the plant site are as follows:

- Total wastewater generated from DZS plant after expansion is 4994 KLD, out of which 4500 KLD is being treated in RO-ZLD unit and remaining 494 KLD is being used in the process after treatment in ETP.
- Debottlenecking to improve the efficiency of existing ETP is envisaged and additional capacity of 2000 KLD RO-ZLD unit will be installed to treat the effluent.
- No wastewater is being/ will be discharged outside the plant as we are maintaining Zero Liquid Discharge, and after expansion it will continue to be a zero Liquid discharge facility.
- Water requirements will be met from Udai Sagar and Manasi Wakal Dam and 45 MLD STP installed to treat the sewage generated from Udaipur city. No ground water abstraction is being done and will not be done for the proposed expansion project.
- Waste water generated from the domestic activities like from canteen, Toilet, Rest room will be treated in STP having 200 KLD capacity. Water from STP is being/ will be used in greenbelt & dust suppression.
- Existing Rain Water Harvesting System shall be maintained and strengthen. Maximum use of harvested water will be for plant use.
- Trunk drains (0.5 m wide & 0.5 m depth) along the internal roads will be created. All the drains will be interlinked with higher size drain 1 m wide & 1 m depth that will be connected with 1 nos. storm water reservoir/Guard Pond. The runoff within the plant site will be diverted through the drains to the water harvesting pond which prevents the runoff of the plant from mixing into the nearby water bodies.
- All Storage areas has been/will be provided with proper drains to prevent wash offs from reaching the downstream of nearby surface water bodies.
- The other waste has been/will be disposed safely in the designated areas.
- The existing natural greenbelt along the river is kept untouched which acts as a barrier.
- The water from water bodies around plant will be regularly sampled and tested for any contamination and appropriate control measures will be adopted accordingly.

There are three seasonal nallahs passing through the plant site from west (nearby hill) to the east direction, which have run off water from the nearby hill during rains only. Following measures will be taken for protection of these nallah:

S. No.	Particular	Mitigation Measures
Nallah		
1.	1st Nallah, 2nd Nallah and 3rd Nallah Passing through the plant premises	There are three seasonal nallahs passing through the plant site from west (nearby hill) to the east direction, which have run off water from the nearby hill during rains only. Following measures will be taken for protection of these nallah: • 1st Nallah enters in to the colony from the nearby hill in the west direction and passes through the plant site along the Moore Cake Treatment plant towards east direction. This nallah has been concreated and stone pitched along the slopes. The run off from the nallah is collected, desilted and finally discharged outside the plant premises at its natural course. • 2nd Nallah passes through the plant site entering from the west direction in the colony towards east and has been diverted to merge with the 1st nallah almost at the centre of the plant. Course correction of the same will be done as per requirement for smooth go through of the water stream within the plant premises. • 3rd Nallah also transects the plant site from west to east between the solar plant and Jarosite Pond III. The nallah has been kept intact and the same will continue for the proposed expansion project. • There will be no disturbance to these nallahs due to the proposed expansion project. • The existing natural greenbelt along the nallah is being/will be kept untouched which acts as a barrier to pollutants. • The runoff within the plant site will be diverted through the drains to the water harvesting pond which prevents the runoff of the plant from mixing into the nearby water bodies.

4.10 ANTICIPATED IMPACT ON SOIL QUALITY AND MITIGATION MEASURES

Construction Phase

- ***Anticipated Impacts:***
  - During construction activity, the impact on soil will be limited to the construction site only and would be mainly due to the left-out of construction material used resulting in soil deterioration.
  - If construction material will be disposed off on land, then it can modify the soil quality to various extent and top soil will get affected. Due to the accumulation of cement, used for construction purpose, on the top soil results in the lack of oxygen and hence, reducing the soil porosity, which will result in loss of fertility.
  - Compaction is a common problem during the construction activity due to the movement of large number of heavy machineries over the soil.
  - There will be deteriorating soil quality and decrease in vegetation abundance. It will result in pH, alkalinity, and heavy metal content modifications and can affect the vegetation growth of that area.
- ***Mitigation Measures:***
  - Careful design, planning and good site management would minimize wastage of materials such as concrete, mortars and cement grouts.

- Construction wastes will be segregated as much as possible at plant site itself to increase the feasibility of recycling concrete and masonry as filling material and steel pieces as saleable scrap.
- Litter disposal and collection points will be established around the work sites.
- The construction spoils will be temporarily stored at designated dumpsite located inside the plant premises.
- To reduce the soil compaction, working on the wet soil will be avoided.
- Empty packaging materials, drums, glass, tin, paper, plastic, pet bottles, wood, thermocol and other packaging materials, etc. will be disposed through local recyclers.
- The existing industrial shed will be utilized for the expansion project.
- Discharge of any kind of pollutant will be strictly prohibited during construction period.

Operation Phase

- ***Anticipated Impacts:***
  - Degradation of soil quality may take place due to the settling of air borne dust, contamination due to the effluent discharge, material spillage, unscientific disposal of solid and hazardous waste, if any.
  - This may lead to change in physico-chemical characteristics of soil of the area.
- ***Impact Evaluation***

Impact evaluation is given in table below:

Impact Evaluation for Soil Environment

Impact Evaluation Element	Change in Physico-chemical characteristics of soil.			
Potential Effect/ Concern	Impact on soil quality of nearby areas due to settling of air borne dust, contamination due to the effluent discharge, material spillage, unscientific disposal of solid and hazardous waste, if any.			
Characteristics of Impacts				
Nature	Positive		***Negative***	Neutral
			√	
Type	***Direct***	Indirect	Cumulative	
	√			
Extent	Project Area	***Local***	Zonal	Regional
		√		
Duration	Short - term		***Long- term***	
			√	
Intensity	Low		***Medium***	High
			√	
Frequency	Remote (R)	Occasional (O)	Periodic (P)	**Continuous (C)**
				√
Significance of Impact				
Significance	Insignificant	Minor	**Moderate**	Major
			√	

- ***Mitigation Measures***
  - Efficient Air Pollution Control Equipment (APCE) like Bag House / Bag Filter / ESP / Ventury Scrubber/DCDA (Double Conversion and Double Absorption Plant)/ Gas Conditioning Plant

has been /will be installed at all major stacks to keep the emissions within the permissible limits. Adequate stack height helps to control dust emissions.

- Solid and hazardous waste is being/will be disposed of as per prevailing rules.
- A horticulturist is being / will be engaged to ensure soil quality improvement in the plant area, by adequate manuring and fertilizing. Therefore, no adverse impact on the soil quality of the area is anticipated.
- Besides, soil samples are being / will be collected and tested at regular intervals from the nearby areas. This will help in mitigation of any harmful impact on soil due to the project activity, if any.
- No solid or liquid discharge will be disposed off on soil.

4.11 ANTICIPATED IMPACT ON BIOLOGICAL ENVIRONMENT AND MITIGATION MEASURES

There is no National Park, Sanctuary, Biosphere Reserve, Migratory Corridor of wild animals exists within 10 km radius study area.

- Letter from DCF, Wildlife, Udaipur vide letter no. No.F()Survey/DCF/Udaipur North/4680 dated 14.07.2014 and vide letter no. No.F9()Survey/DCF/WL/2022-23/1635 dated 01.03.2023 regarding no National Park & Sanctuary falling within10 km radius study area of plant site. The Copy of the same is enclosed herewith with this EIA/EMP report as ***Annexure 7B(i&ii).***
- List of Flora and Fauna existing within the study area has been authenticated by DCF, Udaipur vide letter dated 23.03.2023. The same has been enclosed herewith this EIA/EMP report as ***Annexure 7A.***
- As per the authenticated list, total 9 Schedule 1 species i.e., *Panthera pardus (Leopard), Vulpes bengalensis (Indian Fox), Canis aureus (Golden Jackal), Felis chaus (Jungle Cat), Herpestes smithii (Ruddy Mongoose), Hyaena hyaena (Striped Hyena), Hystrix indica (Indian Crested Porcupine), Daboia russelii (Russell's Viper), Pavo cristatus (Indian Peafowl)* found within the study area during survey.
- Wildlife conservation plan for the above species has been prepared and submitted to DCF, Udiapur for authentication from CWW, Udaipur vide letter dated 30.03.2023. The receipt of the same is enclosed herewith with this EIA/EMP report as ***Annexure 7C(i).*** Receipt of revised Wildlife conservation plan submitted to DCF, Udaipur for authentication from CWW, Udaipur on 30.07.2024 is enclosed herewith with this EIA/EMP report as ***Annexure 7C(ii).*** Final Report of wildlife conservation plan submitted for approval on 30.07.2024 has been attached as ***Annexure 7d*** with this EIA/EMP report.

20 Reserve Forest and 2 Protected Forest lies within 10 km of the study area which are given as below:

- Panwari RF (Khasara No. 4509, 4510 and 4511 of plant area falls under Panwari Forest)
- RF (~1.0 km in ENE direction from plant site)
- Kantia RF (Khasara No. 4522 and 4523 of plant area falls under Kantia Forest)
- Kamlodia RF (~2.0 km in SW direction from plant site)

- RF (~2.0 km in South direction from Plant site)
- Bara Magra RF (~1.0 km in NNW direction from plant site)
- Bhainsra RF (~3.5 km in NNW direction from plant site)
- Segria RF (~3.5km in West direction from plant site)
- Hinglashia RF (~3.5 km in SW direction from plant site)
- Bordi RF (~3.5 km in WSW direction from plant site)
- Dhenkli RF (~4.5 km in NW direction from plant site)
- Gugla RF (~5.5 km in West direction from plant site)
- Umra RF (~6.5 km in SW direction from plant site)
- Bagdara RF (~8.0 km in SSW direction from plant site)
- Santu RF (~6.5 km in SSE direction from plant site)
- Nahar Magra RF (~6.5 km in NE direction from plant site)
- Amberi PF (~8.5 km in NW direction from plant site)
- Amarbir RF (~7.0 km in SSE direction from plant site)
- Nauva RF (~8.0 km in NNW direction from plant site)
- Hora RF (~8.5 km in SW direction from Plant site)
- Kheradi RF (~8.5 km in NNW direction from plant site)
- Chirwa Ka Ghata (~9.0 Km in NNW direction from plant site)

No Wetland site notified under Ramsar Convention, is falling within 10 km radius study area. However, Udai Sagar Lake (~1.0 km in SSW direction from Plant site) has been listed as Wetland by State Wetland Authority, Rajasthan.

(source: https://environment.rajasthan.gov.in/content/environment/en/state-wetland-authority/list-of-identified-wetlands.html)

- ***Anticipated Impacts:***
  - Particulate matter emissions from stack and fugitive emissions due to transportation activity & material handling may degrade the soil quality of surrounding environment that may affect the biodiversity of surrounding environment.
  - Particulate matter emission may cause migration of wild animals and birds.
  - Fugitive emissions (dust) may impact the terrestrial flora. The settlement of dust on the laminar surface of plants can impede the efficiency of photo-transduction and thereby, affect the productivity of plants. In some of the plant, it may also smother the leaf surface blocking stomata, resulting in reduced transpiration.
  - Increased noise level due to running of machinery may scare the wild fauna and force them to migrate to other areas.
- ***Impact Evaluation***

Impact evaluation is given in table below.

Impact Evaluation for Biological Resources

Impact Evaluation	Change in the biological resources of the area due to the proposed expansion

Element	project operation & generation of emissions.			
Potential Effect/ Concern	Loss of habitat, Impact on health of biological receptors due to the emissions including fugitive dust emissions during operation activities.			
Characteristics of Impacts				
Nature	Positive		***Negative***	Neutral
			√	
Type	***Direct***	Indirect	Cumulative	
	√			
Extent	Project Area	***Local***	Zonal	Regional
		√		
Duration	Short – term		***Long- term***	
			√	
Intensity	***Low***		Medium	High
	√			
Frequency	Remote (R)	Occasional (O)	Periodic (P)	**Continuous (C)**
				√
Significance of Impact				
Significance	Insignificant	**Minor**	Moderate	Major
		√		

- ***Mitigation Measures:***
  - Wildlife conservation plan for the Schedule 1 species i.e., *Panthera pardus* (Leopard), *Vulpes bengalensis* (Indian Fox), *Canis aureus* (Golden Jackal), *Felis chaus* (Jungle Cat), *Herpestes smithii* (Ruddy Mongoose), *Hyaena hyaena* (Striped Hyena), *Hystrix indica* (Indian Crested Porcupine), *Daboia russelii* (Russell's Viper), *Pavo cristatus* (Indian Peafowl) has been prepared.
  - The plant site does not fall in any wetland area. Udai Sagar lake (~1 km in SW direction from Plant site) is geographically separated from the plant site by Panwari RF (Hill area). The proposed expansion will be carried out within the existing plant premises. As there is no wetland site existing in immediate proximity of the plant site, no significant adverse impact on the wetland area due to the proposed expansion project is envisaged.
  - Scaling up the greenbelt development and plantation in and around the project site to control the spread of particulate emissions and noise.
  - The total plant area is 184.2 ha. Out of the total plant area 76.28 ha (41.41 %) area has already been developed under greenbelt/ plantation, to provide a hindrance to dust particles dispersing outside plant premises. The same will be maintained and made denser by doing gap plantation.
  - Efficient Air Pollution Control Equipment (APCE) like Bag House / Bag Filter / ESP / Ventury Scrubber/DCDA (Double Conversion and Double Absorption Plant)/ Gas Conditioning Plant has been /will be installed at all major stacks to keep the emissions within the permissible limits. Adequate stack height helps to control dust emissions.
  - Use of water sprinkler on material storage and handling areas to control fugitive emissions in the surrounding environment.
  - Using paved roads for transportation to minimize fugitive emissions.
  - Transporting material in covered truck/closed truck and storing it under tarpaulin cover.

- Transport vehicles and machinery will be properly maintained and periodically checked for pollution level to reduce noise and gaseous emission in the surrounding environment.

4.12 ANTICIPATED IMPACT ON SOCIO-ECONOMIC ENVIRONMENT AND MITIGATION MEASURES

Construction Phase

Anticipated Impacts

- The social impact during the construction phase will be beneficial in nature. Expansion project will result in growth of the surrounding areas by increased employment opportunities in the region including ancillary development and supporting infrastructure.
- Local people will be given preference for employment based on their skill and experience.
- About 65 nos. of people will get employment by the expansion project resulting in the ancillary development and growth. Unskilled/semi-skilled manpower will be sourced from the local area and skilled manpower will be sourced from outside/local.
- Addition to above 400 nos. of manpower is being used for project.
- Further due to expansion project, influx of working community will generate an indirect employment through development of nearby market/ shops, trade centers, activities, transportation etc.
- Population influx during the construction phase might introduce various water and vector borne diseases or will lead to other unhygienic conditions in the area by disturbing existing sanitation infrastructure.
- Rapid diverse population influx at the plant site might create unusual behavioural activity such as worker-community conflicts, increase violence such as theft/ stabbing, and increased consumption of drugs/alcohol within the area.
- Impacts on the health of nearby villagers can be envisaged due to the short-term exposure to fugitive dust generated during transportation activities resulting in increased eye irritation, nausea, headache etc.
- Impacts on the health due to the soil erosion and transportation activities leading to short term exposure resulting in increased eye irritation, nausea, headache etc.

Mitigation Measures

- Deploying of mobile toilets or the construction of temporary toilets will be done near to the construction site with the adequate water supply.
- Awareness programme will be conducted before the monsoon season regarding the spread of water borne/ vector diseases.
- Mosquito repellents will be provided in the nearby villages and at construction site to avoid the spread of diseases.
- To overcome behavioural impact, proper site in charge with timely supervision will be done. In advance, facilities with equipped medical and safety services will be provided to take a control over the incident/violence if any caused.

- To overcome behavioural impact, supervision will be done by site in charge. In advance, emergency cell will be formed with fully equipped communication system, medical and safety services to take control over the incident/violence caused.
- Further, to improve the living standards and livelihood conditions, HZL will take an initiative as a part of CSR activities by conducting various programmes and capacity building training.
- Hindustan Zinc Limited is committed to contribute in the development of basic needs of the local area like education, Health & family welfare, women empowerment, skill development, Natural resource management, water conservation, roads etc. through its socio-economic development plan.
- An amount of Rs. 35.27 Crores has been earmarked for Socio-Economic development activities within the study area during 3 years and Rs. 7.11 Crores for adoption of two villages i.e., Debari and Bichhri for model village development. Details are given in section 8.5 of chapter 8 of this EIA/EMP Report.

Operation Phase

Project potential impacts on socio-economic environment are summarized below and categorized either as positive / beneficial or negative / adverse impacts.

- ***Anticipated Impacts***
  - Long term exposure to the pollutants such as PM, SO_x, NO_x, Acid Mist and Lead have a potential to create health impacts such as risk of cardiovascular and respiratory disease, eye irritation, bronchitis, lung damage, increased heart ailments etc.
  - Other impacts, associated with the expansion of Debari Zinc Smelter will create a positive impact as it will result in the overall development of the area in respect to the infrastructure development, educational growth, health facilities etc. as a part of the CSR activity.
  - Additionally, 65 people will be given employment during the operational phase, thereby generating employment and improving living standards.
- ***Impact Evaluation***

Impact evaluation is given in table below.

Impact Evaluation for Socio-economic Environment

Impact Evaluation Element	Impact on socio economics due to the expansion project.			
Potential Effect/ Concern	Expansion project will provide direct & indirect employment opportunities to the local residents, which will help to increase their earning and better living standard as well as further up-liftment of socio-economic status of the area.			
Characteristics *of Impacts*				
Nature	**Positive**		Negative	Neutral
	√			
Type	***Direct***	Indirect	Cumulative	
	√			
Extent	Project Area	Local	***Zonal***	Regional
			√	
Duration	Short – term		***Long- term***	
			√	

Intensity	Low		***Medium***	High
			√	
Frequency	Remote (R)	Occasional (O)	Periodic (P)	***Continuous (C)***
				√
Significance of Impact				
Significance	Insignificant	Minor	**Moderate**	Major
			√	

- ***Mitigation measures:***
  - Efficient Air Pollution Control Equipment (APCE) like Bag House / Bag Filter / ESP / Ventury Scrubber/DCDA (Double Conversion and Double Absorption Plant)/ Gas Conditioning Plant has been /will be installed at all major stacks to keep the emissions within the permissible limits. Adequate stack height helps to control dust emissions. To reduce fugitive emission from vehicles and machineries will be regularly monitored and maintained.
  - M/s. HZL has a well-developed occupational health centre at site and a Hospital at Colony for its employees.
  - Continuous Emission Monitoring Systems (CEMS) have been / will be installed at all major stacks.
  - There will be generation of direct and indirect employment opportunities in the region. Preference will be given to the local people as per their eligibility. Business opportunities for local community will be available like transport of Raw material, maintenance & house-keeping contract work etc.
  - Increased revenue to the State & Central exchequer from the plant.

4.12.1 Mitigation Measures for Environmental Sensitive Areas within 02 Km Radius of the Plant Site

There are mainly 23 worship places, 16 educational institutions, 3 villages within 2 km radius of project site. 1 post office, 1 hospital within plant site & 3 nalas are crossing the project site. The Environmental Sensitive areas present within 01 Km of the plant site and mitigation measures suggested are given in below table 4.8(a) & 4.8(b):

Table 4.8(a): Environmental Sensitive area within 01 Km of the plant site

S. No.	Name of the ESA	Approx. aerial distance from the main Plant boundary (Km)	Direction from the Plant boundary
Places of Worship			
1.	Masjid Debari	Inside the plant boundary	-
2.	Shiv Mandir	Inside the plant boundary	-
3.	Shiv Hanuman Temple	0.10	WSW
4.	Dargah, Chilla meera Datar	0.20	WNW
5.	Khimach Mata Mandir	0.30	ENE
6.	Shiv Mandir	0.38	WNW
7.	Ghata wala Mataji temple Debari	0.60	WNW
8.	Khimajh Mata ji, Paliwala Shyam	0.60	SSE
9.	Kheda Devi Matarani	0.73	SSE
10.	Pipali wala bavji	0.74	SSE
11.	Shri Dharamaji Temple, Bichhadi, Udaipur	0.82	ESE
12.	Mahadev Temple	0.83	NNW
13.	Shri Aaliya wala shyam temple, Bichhadi	0.98	SE
14.	Sati Mataji Mandir	0.98	SW
15.	Pali vala Bavji temple	0.99	East

16.	Dharmaraj Temple Debari	1.42	W
17.	Sashwat Dham	1.49	NE
18.	Kamaleshwar Mahadev	1.53	SW
19.	Bherunath Temple	1.55	South
20.	Shiva Temple	1.60	South
21.	Dhuni Mata Temple, Nohara	1.61	WSW
22.	Trimukhi Bawri Wale Baba Saheb	1.90	West
23.	Hanuman Ji Temple	1.98	WSW
Educations			
1.	Bright Future Academy	Inside the plant boundary	-
2.	G.S.S.S. Zinc Smelter,debari	Inside the plant boundary	-
3.	G.U.P.S. Udaipur Choraha	0.05	South
4.	GPS Gowla	0.05	North
5.	Aashish Shishu Niketan School	0.06	WNW
6.	Synergy Institute of Nursing	0.50	NW
7.	Heaven Star Public School	0.54	North
8.	Kalka Mata Ji Ka Mandir, Aagnvadi Kendra Nohra	0.62	SSE
9.	Government Primary School Phootia	0.66	North
10.	G.S.Sec.S. Bichadi	0.75	SE
11.	Aakash Gyan Public School	0.81	ESE
12.	Aravali Teacher Training College	0.89	West
13.	Government Primary School Thoria Mangri	0.91	East
14.	Pacific Dental College	1.08	W
15.	St. Paul School	1.18	NE
16.	Maharaja College of Mangement	1.82	WNW
Post office			
1.	Zinc Smelter Post Office	Inside the plant boundary	-
Hospitals			
1.	Apollo Pharmacy Debari HZL Hospital	Inside the plant boundary	-
Villages			
1.	Gowla	0.4	North
2.	Bichhari	0.75	SE
3.	Debari	1.0	NE
Water Bodies			
1.	1st Nallah	-	-
2.	2nd Nallah	-	-
3.	3rd Nallah	-	-

Table 4.8(b): Mitigation Measures for Environmental Sensitive Areas within 01 Km of the plant site

S. No.	Name of the ESA	Mitigation Measures
Reserved / Protected Forest (PF) within 10 km radius		
1.	Panwari RF, RF, Kantia RF, Kamlodia RF, RF in South, Bara Magra RF, Bhainsra RF, Segria RF, Hinglashia RF, Bordi RF, Dhenkli RF, Gugla RF, Umra RF, Bagdara RF, Santu RF, Nahar Magra RF, Amberi PF, Amarbir RF, Nauva RF, Hora RF, Kheradi RF & Chirwa Ka Ghata	• Speed limit of the vehicles passing in the vicinity will be maintained at 15 kmph. • Out of total area i.e., 184.2 ha of plant area, 76.28 ha (41.41%) has already been covered under greenbelt plantation and same will be maintained by doing gap plantation to achieve the plantation density @ 2500/ha along the plant boundary. • 10 m wide 3 tier greenbelt will be strengthened all along the plant periphery. • Additional plantation of 28000 Nos has been done in colony area which is adjacent to project site (west direction) in current FY 2023-24. • Acoustic enclosures will be ensured in design stage to control noise from probable high noise generating equipment's .

S. No.	Name of the ESA	Mitigation Measures
		• Regular AAQ monitoring will be carried out under post project compliance monitoring to ensure that AAQ parameters are well within the prescribed limits. • No wastewater is being/ will be discharged outside the plant as we are maintaining Zero Liquid Discharge and after expansion also it will continue to be a zero Liquid discharge facility. • Bio-degradable waste is being composted and non-degradable waste is being disposed off suitably. The total hazardous waste generated from the project will be sent to CTDF, Udaipur, or registered recycler or used for reprocessing/coprocessing.
Educational Institutions		
1.	Government Primary School Thoria Mangri, Government Primary School Phootia, Heaven Star Public School, Bright Future Academy, G.U.P.S.Udaisagar Choraha, GPS Gowla, Aashish Shishu Niketan S.School, G.S.Sec.S.Bichadi, Aakash Gyan Public School and G.S.S.S. Zinc Samelter, etc	• The speed limit of the vehicles passing near the schools will be maintained at 15 kmph. • Out of total area i.e., 184.2 ha of plant area, 76.28 ha (41.41%) has already been covered under greenbelt plantation and same will be maintained by doing gap plantation to achieve the plantation density @ 2500/ha along the plant boundary towards schools. • Additional plantation of 28000 Nos has been done in colony area which is adjacent to project site (west direction) in current FY 2023-24. • Acoustic enclosures will be ensured in design stage to control noise from probable high noise generating equipment's . • Regular noise level and AAQ monitoring will be carried out near the school under post project compliance monitoring to ensure that Noise levels and AAQ parameters are well within the prescribed limits in that area. • No wastewater is being/ will be discharged outside the plant as we are maintaining Zero Liquid Discharge and after expansion also it will continue to be a zero Liquid discharge facility. • Suitable greenery/plantation will be developed near the school boundaries in consultation with local administration. • Bio-degradable waste is being composted and non-degradable waste is being disposed off suitably. The total hazardous waste generated from the project will be sent to CTDF, Udaipur, or registered recycler or used for reprocessing/coprocessing.
Places of Worship & Post Offices		
1.	Masjid debari, Shiv Mandir, Ghata wala Mataji temple Debari, Shiv Mandir, Shri Aaliya wala shyam temple, Bichhadi, Pipali wala bavji, Khimajh Mata ji, Paliwala Shyam, Shri Dharmaji Temple , Bichhadi, Udaipur, Pali vala Bavji temple, Zinc Smelter Post Office	• 10 m wide 3 tier greenbelt will be strengthened all along the plant periphery. • Speed limit of the vehicles passing near to worship place will be maintained at 15 kmph. Moreover, it would be ensured to manage heavy traffic movement during night hours. • Out of total area i.e., 184.2 ha of plant area, 76.28 ha (41.41%) has already been covered under greenbelt and plantation and same will be maintained by doing gap plantation to achieve the plantation density @ 2500/ha. • Additional plantation of 28000 Nos has been done in colony area which is adjacent to project site (west direction) in current FY 2023-24. • Greenbelt plantation will be strengthened all along the plant periphery. • Regular noise level, water, air and soil monitoring will be carried out near the habitation area under post project compliance monitoring to ensure that all the parameters of noise, water, air and soil are well within the prescribed limits in that area. • Acoustic enclosures will be ensured in design stage to control

S. No.	Name of the ESA	Mitigation Measures
		noise from probable high noise generating equipment's . • Bio-degradable waste is being composted and non-degradable waste is being disposed off suitably. The total hazardous waste generated from the project will be sent to CTDF, Udaipur, or registered recycler or used for reprocessing/coprocessing.
Villages		
1.	Bichhri, Debari and Gowla	• Out of total area i.e., 184.2 ha of plant area, 76.28 ha (41.41%) has already been covered under greenbelt and plantation and same will be maintained by doing gap plantation to achieve the plantation density @ 2500/ha. • Additional plantation of 28000 Nos has been done in colony area which is adjacent to project site (west direction) in current FY 2023-24. • Greenbelt plantation will be strengthened all along the plant periphery. • Speed limit of the vehicles passing near to habitation Area will be maintained at 15 kmph. • Acoustic enclosures will be ensured in design stage to control noise from probable high noise generating equipment's . • Regular noise level and AAQ monitoring will be carried out near the habitation area under post project compliance monitoring to ensure that Noise levels and AAQ parameters are well within the prescribed limits in that area. • Bio-degradable waste is being composted and non-degradable waste is being disposed off suitably. The total hazardous waste generated from the project will be sent to CTDF, Udaipur, or registered recycler or used for reprocessing/coprocessing. • Suitable greenery/plantation will be developed near the boundary of villages in consultation with the village panchayat.

4.13 ANTICIPATED IMPACT ON OCCUPATIONAL HEALTH AND MITIGATION MEASURES

Hazards associated with Debari Zinc Smelter are as follows:

- Exposure to dust,
- Exposure to high temperatures,
- Noise exposure,
- Physical hazards,
- Chemical hazards and other industrial hygiene issues, and
- Others

These mainly impact on those working within the industry, although health hazards can also impact on local communities.

- ***Exposure to Dust***

Exposure to fine particulates associated with Operational activities in most of the dust-generating stages of Plant, but most notably due to material handling, transportation or material transfer. Workers with long term exposure to fine particulate dust are at risk of pneumoconiosis, emphysema, bronchitis, and fibrosis.

Methods to prevent and control exposure to dust include the following:

- Control of dust through implementation of good housekeeping and maintenance;

- Use of air–conditioned, closed cabins;
- Use of PPE, as appropriate (e.g. masks and respirators) to address residual exposures following adoption of the above-referenced process and engineering controls.

- ***Exposure to High Temperatures***

The principal exposures to heat in this sector occur during Handling of hot molten metal, exposure to furnaces, etc.

Recommended prevention and control techniques include the following:

- Shielding surfaces where workers proximity and close contact with hot equipment is expected, using Personal Protective Equipment (PPE), as needed (e.g. insulated gloves and shoes);
- Minimizing the work time required in high temperature environments by implementing shorter shifts at these locations.
- Schedule hot jobs for the cooler part of the day
- Monitor workers who are at risk of heat stress
- Provide rest periods with water breaks

- ***Noise and Vibration Exposure***

Exhaust fans, DG Set, Boilers, Roaster, Calcine handling unit, Crushers, compressors, and motors etc., are the main sources of noise and vibrations in Plant. Control of noise emissions will include the use of silencers for ID fans, acoustic enclosures for mill operators, noise barriers, and, if noise cannot be reduced to acceptable levels, personal hearing protection (ear plugs/muffs).

- ***Physical hazards***

Anticipated Impacts

Injuries during Project operation are typically related to the following slips, tripling, and falls; contact with falling / moving objects; and lifting / over-exertion.

Due to contact with, or trapped in, moving machinery, activities related to maintenance of equipments, including stacks, fans, coolers, belt conveyors etc. Such hazards may include the following:

- Falling / impact with objects;
- Hot surface burns; and
- Transportation
- Contact with allergic substances.

Following management measures are being / will be ensured to prevent the physical hazards in the plant:

- Any person working on equipment with moving parts personally ensures the equipment is de-energized, isolated and locked/tagged out.
- Any person working from a position with the potential risk for a fall from height uses fall protection.

- Prescribed PPE is being / will be provided to all workers exposed to open processes or systems.
- In case of any accident immediate & proper medical care is being / will be provided at the plant site.

High Risk Categories	Prevention
Contractors	Contractor Safety Management
Young/Temporary Employees	Special Safety Induction
Direct Causes	
Traffic and Mobile Plant	Driver Training
Falls from Heights, Objects falling from Heights	Safety Procedures for Work at Heights, Overhead Protection
Caught in Starting/Moving Equipment	Plant Isolation Procedures

Details of OHS Test conducted

Details of various test conducted is given below:

Spirometry							
Year	*Total Employees*	*VC (litres)*	*EV 1*	*EV 1/ FVC %*	*EFR (litres/sec)*	*Conclusion*	*Chest X- Ray*
2020-21	1311	WNL	WNL	WNL	WNL	WNL	WNL
2021-22	1379	WNL	WNL	WNL	WNL	WNL	WNL
2022-23	1422	WNL	WNL	WNL	WNL	WNL	WNL

Audiometry			
Year	*Total Employees*	*Right Ear*	*Left Ear*
2020-21	1311	WNL	WNL
2021-22	1379	WNL	WNL
2022-23	1422	WNL	WNL

Biochemical parameter (Urine)						
Name of Dept.	*Total Employees*	*Sp. gravity*	*pH*	*RBC*	*Proteins*	*Sugar*
2020-21	1311	WNL	WNL	Nil	Nil	Nil
2021-22	1379	WNL	WNL	Nil	Nil	Nil
2022-23	1422	WNL	WNL	Nil	Nil	Nil

Biochemical parameter (Blood)						
Name of Dept.	*Total Employees*	*CBC*	*Lipid Profile*	*Renel Profile*	*Liver Function Test*	*Blood Sugar*
2020-21	1311	WNL	WNL	WNL	WNL	WNL
2021-22	1379	WNL	WNL	WNL	WNL	WNL
2022-23	1422	WNL	WNL	WNL	WNL	WNL

Circulatory system					Vision			
Name of Dept.	Total Employees	Pulse	ECG	BP	Right Eye	Left Eye	Colour Blindness	Squint
2020-21	1311	Normal	WNL	Normal	Normal	Normal	NIL	Normal
2021-22	1379	Normal	WNL	Normal	Normal	Normal	NIL	Normal
2022-23	1422	Normal	WNL	Normal	Normal	Normal	NIL	Normal

WNL = Within Normal Limits

4.14 ANTICIPATED IMPACT DUE TO TRANSPORTATION OF RAW MATERIAL AND FINISHED PRODUCT AND MITIGATION MEASURES

Existing Transportation Details

Plant site is well connected with NH–27. Nearest Railway Station is Debari Railway Station which is about ~1.5 km in NNW direction from the plant site. Nearest Airport is Maharana Pratap Airport - Udaipur which is approx. 5.8 km in East direction from the plant site.

Mode of Transportation of Raw Material, Fuel & waste materials:

- Transportation of raw material, fuel and finished products is being and will be done 100% by road.
- 18-28 Ton capacity of Trucks are being / will be used for the transportation of materials.

Existing Traffic Survey

Traffic survey has been conducted for 24 hours at NH - 27 (~0.8 Km in WNW direction from the Plant Site). The traffic survey monitoring was done in March 2022 to predict the future traffic growth and the load on the plant road and surroundings due to the expansion project.

Table - 4.9: Locations of Traffic Survey Conducted for the Project

S. No.	Traffic Survey Location	Geographical Coordinates	Type of Carriageway	Distance & direction from the plant site
1.	NH 27	24°36'17.96"N 73° 48'14.67"E	6 Lane (Divided)	~0.8 Km in WNW direction from the Plant site

The above mentioned locations / selected survey points are shown in Figure - 4.8.

Measurements of Traffic density were made continuously for 24 hours by visual observation and counting of vehicles under four categories, viz., heavy motor vehicles, light motor vehicles, two/four wheelers and others. Total numbers of vehicles per hour under the four categories were determined. The details of the traffic volume count have been provided in Table 4.8 given below:

Figure 4.13: Map showing location of Traffic Survey Point

Table - 4.9 (A): Traffic Volume Count Survey (NH - 27)

TIME OF MONITORING	TYPE OF VEHICLE						
	MOTOR CYCLE / SCOOTER (up & down)	PASSENGER CAR/VAN/ AUTO RICKSHAW (up & down)	TRACTOR (up & down)	TRUCKS/ Trollers (up & down)	BUSES (up & down)	CYCLES / CYCLE RICKSHAW (up & down)	Total
06.00 AM to 07.00 AM	162	298	2	417	22	6	907
07.00 AM to 08.00 AM	213	337	1	396	16	11	974
08.00 AM to 09.00 AM	309	413	5	378	9	19	1133
09.00 AM to 10.00 AM	298	469	2	403	6	5	1183
10.00 AM to 11.00 AM	178	423	0	326	8	6	941
11.00 AM to 12.00 AM	197	326	1	297	9	3	833

TIME OF MONITORING	TYPE OF VEHICLE						
	MOTOR CYCLE / SCOOTER (up & down)	PASSENGER CAR/VAN/ AUTO RICKSHAW (up & down)	TRACTOR (up & down)	TRUCKS/ Trollers (up & down)	BUSES (up & down)	CYCLES / CYCLE RICKSHAW (up & down)	Total
12.00 AM to 01.00 PM	203	415	3	365	11	6	1003
01.00 PM to 02.00 PM	313	465	6	387	6	5	1182
02.00 PM to 03.00 PM	298	423	3	413	7	5	1149
03.00 PM to 04.00 PM	277	503	1	399	3	0	1183
04.00 PM to 05.00 PM	303	476	0	427	6	11	1223
05.00 PM to 06.00 PM	413	536	2	431	2	22	1406
06.00 PM to 07.00 PM	215	467	0	487	6	19	1194
07.00 PM to 08.00 PM	167	397	0	465	9	0	1038
08.00 PM to 09.00 PM	89	413	0	508	16	0	1026
09.00 PM to 10.00 PM	23	378	0	598	22	0	1021
10.00 PM to 11.00 PM	8	269	0	609	38	0	924
11.00 PM to 12.00 PM	5	213	0	628	19	0	865
12.00 PM to 01.00 AM	0	198	0	578	18	0	794
01.00 AM to 02.00 AM	0	202	0	529	12	0	743
02.00 AM to 03.00 AM	0	165	0	597	9	0	771
03.00 AM to 04.00 AM	0	178	1	463	6	0	648
04.00 AM to 05.00 AM	5	129	0	412	22	0	568
05.00 AM to 06.00 AM	13	237	3	309	33	1	596
TOTAL	**3689**	**8330**	**30**	**10822**	**315**	**119**	**23305**

*Source: Traffic Survey

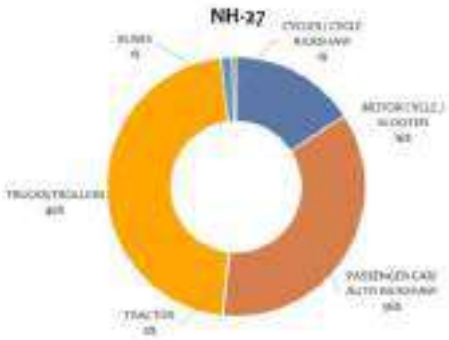


Figure 4.14: Traffic Volume Count

Figure 4.9 depicts that majority of vehicles running in the road are Motor Cycle / Scooter, Car/ Auto-rickshaw, Cycle, Buses / Truck and Tractor.

Table - 4.9(B): Traffic Volume Count

S. No.	Vehicle Type	No. of vehicles / day (NH-27)
1.	Motor Cycle / Scooter	3689
2.	Passenger Car/ Van/ Auto Rickshaw	8330
3.	Tractor	30
4.	Buses/Trucks	10822
5.	Trailer Truck	315
6.	Cycles / Cycle Rickshaw	119
Total		**23305**

Source: Traffic Survey

Table4.10(A): No. of Vehicles with respect to PCU for Traffic Survey Point- (NH-27)

S. No.	Vehicle type	Number of Vehicles / days	PCU Factor	PCU/day	PCU/hr
1.	Motor Cycle / Scooter	3689	0.75	2766.75	115.3
2.	Passenger Car/ Van/ Auto Rickshaw	8330	1	8330	347.1
3.	Tractor	30	4.5	135	5.6
4.	Buses/Trucks	10822	3.7	40041.4	1668.4
5.	Trailer	315	5	1575	65.6
6.	Cycles/ Cycle Rickshaw	119	0.5	59.5	2.5
7.	**Total**	**23305**		52907.65	2204.5

**Source: Guideline for Capacity of Roads in Rural & Urban Areas 1990. Table 1 Page no. 10*

Table 4.10(B): Existing Traffic Scenario and LOS (Level of Service)

S. No.	Traffic survey points	V (Volume in PCU/ hr)	C (Capacity in PCU/ hr)	Proposed V/C Ratio	LOS
1.	NH 27	2204.5	5400	0.408	C

**Source: Guideline for Capacity of Roads in Rural & Urban Areas 1990. Table 4 Page no. 10*

Capacity as per IRC: 64-1990

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

Additional Traffic due to Expansion Project

Major raw materials for Zinc Smelter Plant manufacturing is Zinc concentrate; which will be transported from HZL mines. Raw materials and finished product for the proposed expansion project will be transported by road. Due to expansion project, there will be additional trucks to the existing traffic volume. Adequate parking facilities will be provided to accommodate additional trucks within the plant premises.

Additional Traffic during operation of the plant due to raw material and finished products transportation has been given in Table - 4.11.

Table - 4.11(A): Additional Inward Traffic due to the Raw Material Transportation to the Zinc Smelter Plant*

S. No.	Name of Raw Materials	Quantity		% of transportation	Source	Type of vehicle and Capacity in Tonnes	No. of Trips (Trucks / Day)
		TPA	TPD				
1.	Zinc concentrate/Calcine	196013	537.02	100	HZL Mines	By covered truck (Capacity: 28 T)	19.2 (~ 19)
2.	Zinc Oxide /Zinc Dust /Zinc Bearing material/ Zinc Dross	2255 (P1: 1183; P2: 1072)	6.18	100	HZL Smelter	By covered truck (Capacity: 22 T)	0.18 (~1)
3.	High Silver Lead (HSL)	1500	4.11	100	HZL Smelter	By covered truck (Capacity: 30 T)	0.14 (~1)
4.	Zinc Dust	5500 (P1: 4800; P2: 700)	15.06	100	HZL Smelter	By covered truck (Capacity: 22 T)	0.68 (~1)
5.	Zinc Sulphate	10394 (P1: 9283; P2: 1111)	28.48	100	Ancillary	By covered truck (Capacity: 20 T)	1.43 (~1)
6.	Pyro metallurgic Slag	60,000	164.38	100	HZL Smelter	By covered truck (20)	6.85 (~7)
7.	Moore Cake	50,000	136.99	100		By covered truck (20)	6.85` (~7)
8.	Coke fines	25,200	69	100	Indigenous /Imported	By covered truck (Capacity: 18 T)	3.83 (~4)

S. No.	Name of Raw Materials	Quantity		% of transportation	Source	Type of vehicle and Capacity in Tonnes	No. of Trips (Trucks / Day)
		TPA	TPD				
9.	LGLC (low grade silver crust/cake)	30,000	82.2	100	HZLs, DSC and CLZS Smelter	By covered truck (Capacity: 28 T)	2.93 (~3)
	Total						**44**

**Considering 100% by Road to Calculate Maximum Pollution Load with 365 working days*

Table - 4.11(B): Additional Outwards Traffic Details from the Zinc Smelter Plant

S. No.	Name of Products	Quantity		% of transportation	Type of vehicle and Capacity in Tonnes	No of Trips (Trucks / Day)
		TPA	TPD			
1.	Zinc Cathode/Zinc Ingots/zinc alloy	40000	109.6	100	By covered truck (Capacity: 40 T)	2.74 (~3)
2.	Calcine dispatch to other unit	155000	424.66	100	By covered truck (Capacity: 32 T)	13.3 (~ 13)
3.	Cadmium Sponge	124	0.34	100	By covered truck (Capacity: 18 T)	0.018 (~ 1)
4.	Sulphuric acid	159000	435.62	100	By Closed tanker (Capacity: 18 T)	24.2 (~ 24)
5.	Calomel	6	0.02	100	By covered truck (Capacity: 30 T)	0.001 (~1)
6.	Sodium sulphate/chloride/compound	5000	13.7	100	By covered truck (Capacity: 25 T)	0.548 (~1)
	Total					**43**

**Considering 100% by Road to Calculate Maximum Pollution Load with 365 working days*

Table - 4.11(C): Additional Outwards Traffic Details (Solid & Hazardous waste Transportation)

S.No.	Type of Waste Quantity (Unit)	Additional	% of transportation	Type of vehicle and Capacity	No of Trips (Trucks/Year)
1.	Spent catalyst	41	100	By covered truck	3
2.	Empty barrels / containers / liners contaminated with hazardous chemicals/wastes	5	100	By covered truck	0.3 (~ 1)
3.	Chemical sludge from water treatment (ETP Cake)	6789	100	By covered truck	452.6 (~ 453)
4.	Anode Mud	402	100	By covered truck	26.8 (~ 27)
5.	Cooler Cake	399	100	By covered truck	26.6 (~ 27)
6.	Purification cake	1360	100	By covered truck	90.7 (~ 91)
7.	Process Residue	800	100	By covered truck	53.3 (~ 53)
8.	Zinc Ash skimming /dross	2255	100	By covered truck	150.3 (~ 150)
9.	Clarifier cake /Calcium salts from RO-ZLD	7300	100	By covered truck	486.7 (~ 487)
10.	Jarosite (OW)	38722	100	By covered truck	2581.5 (~ 2582)

S.No.	Type of Waste Quantity (Unit)	Additional	% of transportation	Type of vehicle and Capacity	No of Trips (Trucks/Year)
11.	Discarded Asbestos sheet	350	100	By covered truck	23.3 (~ 23)
12.	Insulation Waste/glass wool	100	100	By covered truck	6.7 (~ 7)
					Total: 3904 Trucks/Year (10.7 Trucks/Day)

**Considering 100% by Road to Calculate Maximum Pollution Load with 365 working days*

- Total No. of trucks / tankers per day (inward) = 44
- Total No. of trucks/tankers per day (outward) = 43 (Zn Smelter) + 11 (Solid & Hazardous Waste)
- Total No. of trucks / tankers per day = 98
- Increase in PCU / day = 98 X 3.7 = 362.6

Table - 4.11(D): Modified Traffic Scenario and LOS (Level of Service)

S. No.	Road	Increased PCU / hr.	V (Volume in PCU/hr.)	C (Capacity in PCU/hr.)	Existing V/C Ratio	LOS
1.	NH – 27	362.6/ 24 = 15.1	2204.5 + 15.1 = 2219.6	5400	0.41	C

Traffic Projection & Impact due to Transportation:

Due to the proposed expansion project, there will be addition of Heavy and Light motor vehicles in the existing traffic.

The LOS value is "*Good*" for NH - 27. The LOS will remain same as "C" after the proposed expansion project. Thus, it can be concluded that the present road network is good enough to bear the increased traffic load. However, internal and nearby roads will be maintained as and when needed to facilitate transportation.

Besides this, M/s. Hindustan Zinc Ltd. is being / will take all appropriate measures to reduce the impact of transportation and to minimize the traffic flow to the best possible extent resulting in low level of dust, noise and gaseous emissions.

- ***Anticipated Impacts***
  - Increase in the Road traffic density may result in deteriorating the ambient air quality.
  - Rapid Movement of heavy duty vehicles may cause in increase noise level.
  - No direct impact is envisaged on the flora and fauna of the vicinity area due to noise/ or the vibrations, slight impact could be observed on the nearby biodiversity.
  - Increased traffic volume may increase the probability of accidental incidences in the area.
  - Increased traffic may cause accidental incidences and public health problems.
- ***Impact Evaluation***

Impact evaluation is given in table below.

Impact Evaluation due to Transportation of Raw Material and Products

Impact Evaluation Element	Change in traffic density due to transportation of raw material and products by road.		
Potential Effect/ Concern	Increased load on existing transportation infrastructure and air emissions due to transportation of material.		
Characteristics of Impacts			
Nature	Positive	***Negative***	Neutral
		√	

Type	***Direct***	Indirect	Cumulative	
	√			
Extent	Plant Area	*Local*	Zonal	***Regional***
				√
Duration	*Short – term*		**Long- term**	
			√	
Intensity	Low		***Medium***	High
			√	
Frequency	Remote (R)	Occasional (O)	Periodic (P)	***Continuous (C)***
				√
Significance of Impact				
Significance	Insignificant	Minor	**Moderate**	Major
			√	

- ***Mitigation Measures***
  - Vehicles with PUC Certificate will be hired.
  - Vehicles will be covered with a tarpaulin and not over loaded.
  - Un- necessary blowing of horn is being / will be avoided.
  - Roads are maintained in good condition to reduce noise due to traffic as well as fugitive emissions.
  - Greenbelt of appropriate quality and width has been developed.
  - To avoid accidents, the speed of vehicles is kept low near habitation areas.
  - Same practice will continue for future expansion.

4.15 IMPACT DUE TO SOLID AND HAZARDOUS WASTE GENERATION

Construction Phase

- ***Anticipated Impacts***
  - Site clearing waste during preparation and levelling phase will be generated such as waste vegetation, surface soil, shrubs, stumps and rubbish from site due to levelling which may result in soil and water contamination.
  - Left over construction material such as soil, cement, iron rods/ cutting may deteriorate soil, air and land quality.
- ***Mitigative Measures***
  - The waste generated due to site clearing prior to the construction phase will be mainly utilized in the levelling.
  - Left over construction material having a high recycling value and reuse value thus will be sold to the respective recyclers.
  - Dry & wet solid waste generated by the construction workers will be managed by placing proper segregated litter bins and will be transferred to the identified nearby secondary stations. Recyclable contents will be sold to recyclers and organic waste will be composted.

Operation Phase

- ***Anticipated Impacts***
  - Additional quantity of HW to be generated due to the expansion, include: Spent catalyst (41 TPA), Empty barrels/containers etc. (5 TPA), Chemical sludge from water treatment (5500

TPA), Anode Mud (402TPA), Cooler Cake (399 TPA), Purification Cake (1360 TPA), Process residue (800 TPA), Zinc Ash skimming /dross (2255 TPA), Jarosite (38722 TPA), Discarded asbestos sheet (350 TPA), Insulated waste or glass wool (100 TPA), Clarifier cake (7300 TPA), Slag generated from MCTP (50,000 TPA) etc.

- Other wastes like packing material (5 TPA), E- waste (0.75 TPA), items from Occupational Health Centre (50 Kg) generated from the plant site will be disposed to registered recyclers.

- ***Impact Evaluation***

Impact evaluation is given in table below.

Impact Evaluation due to solid and Hazardous Waste Generation

Impact Evaluation Element	Change in the soil and water property due to generation of Solid and Hazardous waste			
Potential Effect/ Concern	Impacts on the soil and water quality due to solid and hazardous waste generation.			
Characteristics of Impacts				
Nature	Positive		***Negative***	Neutral
			√	
Type	***Direct***	Indirect	Cumulative	
	√			
Extent	**Plant Area**	Local	Zonal	Regional
	√			
Duration	Short - term		***Long- term***	
			√	
Intensity	Low		***Medium***	High
			√	
Frequency	Remote (R)	Occasional (O)	Periodic (P)	***Continuous (C)***
				√
Significance of Impact				
Significance	Insignificant	Minor	**Moderate**	Major
			√	

- ***Mitigative Measures***
  - The organic waste is being treated at existing Organic Waste Convertor (OWC) and converted into manure while other waste like paper, cardboard etc. is being disposed to Nagar Parishad designated site after segregation. Bio-degradable waste is being composted and non-degradable waste is being disposed off suitably. Same practice will continue for the proposed expansion.
  - The total hazardous waste generated from the proposed expansion project will include: - Spent Catalysts (68 TPA), Empty barrels/containers/liners contaminated with hazardous chemicals/waste (15 TPA), Chemical Sludge from water (ETP Cake) (24789 TPA), Cooler Cake (1416 TPA) and Waste or residues containing oil (970 TPA) will be sent to CTDF, Udaipur, or registered recycler or used for reprocessing/coprocessing.
  - Process residue (2000 TPA), Purification Cake (2929 TPA), Used oil/spent oil (55 TPA), Resin from water purification (2 TPA) will be reused in the process or will be sold to the registered recyclers.
  - Anode Mud (1902 TPA) will be Co processing in cement plant /Registered recycler/Reprocessing / CTDF Udaipur. Filters contaminated with oil (2 TPA) will be sent to CTDF Udaipur or will be Co-incinerated in the Cement Kiln.
  - Additional hazardous waste generated due to the proposed expansion includes: Clarifier Cake/Calcium salts from RO-ZLD (7300 TPA), Insulation Waste/glass wool (100 TPA), Discarded Asbestos sheet (350 TPA), other solid waste like Slag generated from MCTP (50,000 TPA).

- Zinc ash skimming/dross (7505TPA) will be Reuse in process/sales to registered recyclers.
- Jarosite (123383 TPA) is being and will be sent to cement industries.
- Municipal solid waste generated from the plant is being and will be segregated and disposed off scientifically.

Details regarding the hazardous and non-hazardous waste which is being/will be generated in the plant along with their quantities are given in Table No. 4.12.

Table - 4.12: Details of Solid and Hazardous Waste Generation and their mitigation

S. No.	Material	Schedule	Category	UOM	Existing	Proposed		Total Additional	Total after expansion	Management Practice
						Phase I	Phase II			
1	Spent catalyst	I	17.2	TPA	27	41	0	41	68	CTDF Udaipur/ Registered recycler/ Reprocessing
2	Empty barrels / containers / liners contaminated with hazardous chemicals/wastes	I	33.1	TPA	10	3	2	5	15	CTDF Udaipur/Registered Recycler/Reuse after decontamination
3	Chemical sludge from water treatment (ETP Cake)	I	35.3	TPA	18000	6789	0	6789	24789	CTDF Udaipur/ Coprocessing in cement plant /Registered recycler/Reprocessing
4	Used Oil/spent oil	I	5.1	TPA	55	-	-	-	55	Sales to registered recycler
5	Filters contaminated with oil	I	5.2	TPA	2	-	-	-	2	CTDF Udaipur/Utilization for co processing in cement plant/Registered Recycler
6	Anode Mud	I	7.2	TPA	1500	99	303	402	1902	Co processing in cement plant /Registered recycler/Reprocessing / CTDF Udaipur
7	Cooler Cake	I	7.2	TPA	1017	204	195	399	1416	CTDF Udaipur/Co processing in cement plant /Registered recycler/Reprocessing
8	Purification Cake	I	7.2	TPA	1569	942	418	1360	2929	Reuse in process/sales to registered recyclers / CTDF Udaipur
9	Process Residue	I	7.2	TPA	1200	450	350	800	2000	CTDF Udaipur/Co processing in cement plant /Registered recycler/Reproce

S. No.	Material	Schedule	Category	UOM	Existing	Proposed		Total Additional	Total after expansion	Management Practice
						Phase I	Phase II			
										ssing
10	Resin from water purification	I	35.2	TPA	2	0	0	-	2	Sales to registered recyclers/CTDF Udaipur
11	Zinc Ash skimming /dross	IV	14	TPA	5250	1183	1072	2255	7505	Reuse in process/sales to registered recyclers
12	Clarifier cake /Calcium salts from RO-ZLD	I	35.3	TPA	-	7300	0	7300	7300	CTDF Udaipur/ Reuse in process/sales to registered recyclers/ Co processing in cement plant
13	Jarosite (OW)	Other waste		TPA	84661	21095	17627	38722	123383	Co processing in cement plant/Reprocessing /Recycling
14	Discarded Asbestos sheet	I	15.2	TPA	-	350	0	350	350	CTDF Udaipur
15	Insulation Waste/glass wool	I		TPA	-	100	-	100	100	CTDF Udaipur
16	Slag generated from MCTP	Other Waste		TPA	-	50000	-	50,000	50,000	Road construction and levelling of surface.
17	Wastes or residues containing oil	I	5.2	TPA	970	-	-	-	970	CTDF Udaipur
18	Zinc Dross/Zinc fines or dust or ash or skimmings in dispersible form	I	6.2	TPA	5250	2255		2255	7505	Sale to registered recycler

Hazardous Waste authorization vide no. F(HSW)/Udaipur (Girwa)/7034(1)/2022-2023/7463-7465 dated 17.03.2023

4.16 SUMMARY AND CONCLUSION

Though every development activity has some negative impact on the environment of the plant area, however, with the use of proper mitigation measures and environment management systems negative impacts will be checked to acceptable levels. In this expansion project activity use of latest technology, appropriate pollution control equipment, proper operation and densification and maintenance of greenbelt development (41.41 % of the total plant area) will help in reducing the generation at source not to cause any significant impact on the environment and human health of the study area.

CHAPTER- 5

ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

5.1 GENERAL

A comparison of alternatives helps to determine the best method of achieving the project objectives with minimum environmental impacts or indicates the most environment friendly and cost-effective options.

5.2 ANALYSIS OF TECHNOLOGY

Hindustan Zinc Limited (HZL) is using one of the best and proven technologies for the existing Debari Zinc Smelter. Unit wise details are given as under:

1. Zinc Smelter (1,00,000 TPA Zinc): The main sections for this process route are Roasting Plant, Gas Cleaning section, Sulphuric Acid Plant, Leaching Plant, Purification Plant, Cell House and Melting and Casting plant.
2. Solar Power Plants having 12.50 MW capacity.
3. Waste heat recovery Boiler of 8 MW.
4. Emergency DG sets with total capacity of 14.80 MW.

The upgradation in the existing process technology have been proposed for the proposed expansion under clause 7(ii) of EIA Notification project as given under:

1. **Change of Product Mix in Zinc Smelter Plant: (1,00,000 TPA to 1,40,000 TPA):** At present Debari Zinc Smelter is having a capacity of 1,00,000 TPA of Zinc refinery. HZL wants to increase this capacity to 1,40,000 TPA at Debari Zinc Smelter in two phases. In 1st phase the capacity expansion will be done up to 1,20,000 TPA (20%) and in the 2nd phase capacity will be further increase up to 1,40,000 TPA (40%) by Modernization of process by installation of new state of art with latest technology equipment's to improve efficiency. Recovery, reduction in power consumption & GHG emission as well as elimination of manual activities.
2. **Installation of New Roaster**: By adding 1 Roaster (3,00,000TPA), expelling the sulphur as SO_2 gas and subsequently recovering as sulphuric acid in acid plant.
3. **Waste Heat Recovery Boiler:** A new waste heat recovery boiler will be installed with proposed roaster which will generate 10 MW of Power.

Modernization of Technology

HZL is improving its previous technology for sustainable use of natural resources and conservation of environment for the existing Debari Zinc Smelter. This could be achieved by installation of New cellhouse equipped with fully automated Crane, Auto stripping machine, Anode flattening machine along with highly efficient rectifiers and transformers to meet the requirement at electrolysis New Leaching & Purification plant will be installed equipped with series of reactors, thickeners, Spiral Heat Exchanger and automatic filter press. Further to ensure the SHG grade final finished good production, installation of new 24 TPH M&C will be done. In addition to this roaster of capacity 300000TPA calcine is proposed to be installed along with Sulphuric acid plant capacity of 289000 TPA to treat the SO_2

laden off gases from proposed roaster within the existing premises of Debari Zinc Smelter. Following upgradation will be done in technology to improve efficiency:

- **Improvement in power rating:** At present, existing cells are smaller and as per cell design the gap between anode and cathode is 37 mm is being maintained, where's as in proposed jumbo cells, the same gap will be of 45-48 mm. Hence, lower distance between anode to cathode is resulted in shorts and ultimately resulting of power loss. Such power loss will be reduced and current saved from the same will be utilized to produce metal.

  At present the power rating varies from 6.46 to 7.04 MT/MW. FY 22-23 the power Rating was 7.04 MT/MW. After the revamping the estimated power rating in Phase-1 will be 7.15 by above changes in cell house. Further, power rating of 7.30 MT/MW will be achieved by operational excellence in Leaching & Purification section which is By optimizing impurity like Fe, Cu, Cd, Sb level electrolyte i.e, by improving process CpK.
- **Improvement in Recovery:** At present the existing Zinc recovery is 95.5% and Estimated Zinc recovery will be 96.8%. This will be achieved through following:

  Reduction of Zn loss in Jarosite:
  - Increased retention time in all the sections of Leaching. to prevent losses of Zn in Jarosite (from 4.0% to 2.8%).
  - Technological upgradation in leaching reactors design.
  - Installation of Hydrofoil agitator in all the leaching reactors.
  - Installation of calcine dosing weigh-feeders for online weighment tracking and pH analyzers.

  Reduction in losses through ETP cake (from 10.0 % to 8.1 %):

  By introducing online cell cleaning, anode flattening, Magnesium removal circuit.
- **Sustainable Waste Management**
  - Increase in PF cake generation is envisaged due to increase in the concentration of elements like Cu:0.09 to 0.10 % and Cd: 0.17 to 0.18 %. The same will be sent to registered recyclers to further recovery of metal.
  - Anode mud generated from the process will reduce from 1.6% to 1.4% of zinc metal production. The anode mud will be recycled in process to maintained required level Mn is electrolyte and Zinc. The remaining will be sent to registered recyclers for further recovery of metals.
  - Generation of ETP cake will be reduced by circulating volume of process in system in proposed expansion which is now going to ETP for treatment. Filtrate generated from Jarosite filtration will be recycled in process, which will be either recycled in MCTP for recovery of zinc or sent to TSDF for sustainable disposal.
  - Increase in Jarosite generation is envisaged due to increase in Fe: 8.3 to 8.8 %, Pb: 1.7 to 2.5 %, Silica: 1.8 to 3.0 % in raw material. 100 % Jarosite continued to be sent to cement industries as part of circular economy which will reduce environmental liability /concerns of leachate and PM emission due to handling and storage in the from Jarofix.

- Zero procurement of lime & cement for stabilization (3 % of lime and 10 % of cement) hereby avoids consumption of natural resources.

➢ **No increase in Freshwater Consumption**

The existing total water requirement of the plant is 8000 KLD. Which included 6950 KLD industrial & 1050 KLD Domestic water. Additional 1600 KLD of effluent is envisaged from proposed projects and for which capacity of existing 3000 KLD RO-ZLD/MVR unit will be increased to 5000 KLD by expansion.

The additional water requirement will be fulfilled by-

- Use of CSTP water from Udaipur Sewage treatment plant
- Debottlenecking /Replacement of existing equipment is planned to improve ETP operational efficiency.
- All trade effluent is being & will be treated in ETP followed by RO- ZLD with MVR unit and zero discharge is being & will be ensured.

There will be ZERO fresh water consumption after this project.

➢ **Reduction in GHG Emission**

- Power consumption will be reduced by installing new jumbo cell house. Power rating will be improved.
- Dependency on fossil fuel for power generation will be reduced and power will be generated from renewable energy sources like solar power & waste heat recovery boiler (WHRB).
- 8 MW of energy is already generated through WHRB and a new waste heat recovery boiler will be installed which will generate 10 MW of energy.
- 20 MW power will be generated through Solar power plant (12.5 existing & 7.5 additional after expansion).
- Total contribution of renewable energy will be 34.5 % after proposed expansion project.

5.3 NO PROJECT SCENARIO & ANALYSIS OF ALTERNATIVE SITE

Selection of location in this case is not applicable as the project is for expansion of existing Plant within the existing plant premises. The existing plant area is 184.2 ha; no additional area will be required for expansion of the project. The complete land is under the possession of the company, hence there will be no need for selecting an alternative site. The other location assessment factors like environmental sensitivity of location and resource availability have given positive inferences which are mentioned below:

I. ENVIRONMENT SENSITIVITY OF THE LOCATION

Environment sensitivities present in the study area of 10 km around the project site are given in Chapter 3 of the report.

The location is having following advantages:

- Availability of land
- Availability of Power
- Availability of water from Mansi Wakal Dam and STP Udaipur.
- Convenient Rail & Road links. Nearest railway station i.e., Debari RS (~1.7 km in NW direction from plant site)

- Major raw materials like Zinc concentrate, Calcine (ZnO), Zinc Dross/ Ash/ Zinc bearing waste, High Silver Lead (HSL), Zinc dust, Zinc sulphate, Pyro metallurgic slag, Moore Cake, Coke fines, low grade silver crust cake are available.
- Both skilled and unskilled labour is available near the site.
- Good connectivity for transportation of inward and outward materials through NH-27 (Adjacent to Plant Boundary in North direction from plant site).
- Already established industrial environment and necessary infrastructure.
- Using the Eco-friendly Clean Technology.
- Economies of scale will result in lower operating cost.

II. RESOURCE AVAILABILITY

A good number of industrial units are already operating in the areas surrounding the project area. The site is well connected with communication facilities like telephone, fax, wireless and telex and as such, no constraints are envisaged in this aspect as the Tehsil and District headquarters are near to the site. The power requirement of the existing project is 90 MW. After expansion, the total power requirement will be 110 MW which will be sourced from Captive Power Plants of sister units/WHRB/ Solar Power plant. Water is sourced from Mansi Wakal Dam and STP Udaipur through pipelines.

Any anticipated adverse impacts from the key production and emissions or effluents shall be managed by implementing the following control practices for the proposed expansion project:

- All statutory requirements, guidelines and recommendations of RSPCB/CPCB/MoEFCC shall be complied.
- To control primary & secondary emissions and to keep stack emissions within norm suitable high efficiency pollution control devices like ESP, bag filter, etc. are used
- Several measures shall be taken to control fugitive emissions.
- Waste water shall be treated and used within the plant premises (re-circulating cooling systems). No waste water shall be discharged outside the premises i.e., adopting 'Zero effluent discharge'.
- Solid waste to be generated shall either be utilized or disposed-off in environment friendly manner so as to minimize environmental impacts.
- Continuous efforts shall be made for improvement of the socio-economic status of the surrounding area.

5.4 CONCLUSION

The existing plant area is 184.2 ha, no additional area will be required for expansion of the project under clause 7(ii) of EIA Notification. The complete land is under the possession of the company; hence no alternative site has been considered for the proposed expansion project.

CHAPTER - 6

ENVIRONMENTAL MONITORING PROGRAMME

6.1 INTRODUCTION

Post-project monitoring is essential to keep check on the environmental status of the area. The project will regularly monitor quality status of the various environmental components. The Post project compliance monitoring will be carried out for the proposed expansion project on a regular basis as per CPCB norms to:

- Know the level of pollution within the plant site and nearby areas
- Examine the efficiency of pollution control system adopted at the plant site
- To satisfy the statutory and community obligations

Details regarding Corporate Environment Policy, Environment Management Cell and other administrative measures adopted for project have been incorporated in Chapter 10 of this EIA / EMP Report.

6.2 MEASUREMENT METHODOLOGIES

6.2.1 INSTRUMENTS TO BE USED

The following instruments are being / will be used for environmental monitoring for the expansion project**:**

1. Weather Monitoring Station (WMS)
2. Respirable Dust Sampler (RDS)
3. Fine Particulate Sampler (FPS)
4. Stack Monitoring Kit for PM, SO_2, NO_2, Acid Mist, Pb measurement
5. Sound Level Meter
6. Water Level Indicator
7. Online continuous emission monitoring devices (CEMS, CAAQMS, CEQMS)

The various experimental procedures followed for sample analysis are given below:

Table - 6.1: Standardized test procedures

Attributes	Measurement method	Test procedure
A. Meteorological data		
Wind Speed; Wind Direction; Max. Temperature; Min. Temperature; Dry bulb temperature; Wet Bulb temperature; Relative Humidity; Rainfall; Cloud cover	IS 5182 Part 1-20 Automatic Weather Monitoring station.	-
B. Ambient air environment		
PM10 & PM2.5	Gravimetric method	As per CPCB guidelines

Attributes	Measurement method	Test procedure
SO_2	EPA Modified West & Geake method	Absorption in Potassium Tetra Chloromercurate followed by Colorimetric estimation using P-Rosaniline hydrochloride and Formaldehyde (IS: 5182 Part - II).
NO_2	Modified Jacob & Hochheiser (Na-Arsenite)	Absorption in NaOH and then estimated colorimetrically with sulphanilamide and N (I-Nepthyle) Ethylene diamine Dihydrochloride and Hydrogen Peroxide (CPCB Method).
C. Stack monitoring		
PM	Gravimetric method	As per CPCB guidelines
SO_2	As Per IS-11255 part (2) 1985 (Absorbing Solution of H_2O_2, Isopropanol Reagent)	Absorption in H_2O_2, Isopropanol followed by Colorimetric estimation using Sulphuric acid and Barium Chloride as Per IS-11255 part (2) 1985
NO_2	As Per IS-11255 part (7) 2005 with NO_x flask assembly.	Absorption of Sample in NO_x flask assembly Followed by Colorimetric estimation using Phenol-di-sulphonic acid and other reagent as Per IS-11255 part (7) 2005
Acid Mist	USEPA Method 8, March-2017	Absorption in 80% IPA and 3% H_2O_2 Followed by titrate with Berium perchlorate using thorin indicator for end point
NMHC	IS 5182 Part 21	Collected sample in tedler by using slow pump. After received sample in laboratory inject in Gas Chromatography flame ionization detector (GC – FID) using micro syringe.
Pb	US EPA Method - 29:2017	Absorption in 5% HNO3+10% H2O2 followed by digestion on hotplate after extraction analyze using GFAAS (atomic absorption spectroscopy) for concentration
D. Fugitive emission		
PM	Gravimetric method	As per CPCB guidelines
E. Water environment		
Ground Water pH, Turbidity, Colour, Odour, Taste, TDS, Total Hardness, Calcium hardness, Magnesium hardness, Chloride, Fluoride, Sulphate, Nitrates, Alkalinity, Iron, Copper, Manganese	As per IS 10500-2012	Samples for water quality should be collected and analyzed as per: IS: 2488 (Part 1-5) methods for sampling and testing of Industrial effluents. Standard methods for examination of water and wastewater analysis published by American Public Health Association.
Surface Water pH, Turbidity, Colour, Odour, Taste, TDS, Total Hardness, Calcium hardness, Magnesium hardness, Chloride, Fluoride, Sulphate, Nitrates, Alkalinity, Iron, Copper, Manganese	IS:2296 (Class C) or as prescribed by CPCB/ SPCB/ MoEF&CC	Samples for water quality should be collected and analyzed as per: IS: 2488 (Part 1-5) methods for sampling and testing of Industrial effluents. Standard methods for examination of water and wastewater analysis published by American Public Health Association.
Waste Water	Potentiometric, Gravimetric, Titrimetric,	Samples for water quality should be collected and analyzed as per: IS: 3025 (Part-

Attributes	Measurement method	Test procedure
pH, TSS, Oil & Grease, Total Residual Chlorine, Ammonical Nitrogen, BOD, COD, Nitrate (as NO3), Pb, Cd, Cu, Zn, Ni, CN, F, P and S.	Photometric as well as Atomic absorption techniques are used for given parameters.	1) and Standard methods for examination of water and wastewater analysis published by American Public Health Association.
F. Noise monitoring (Ambient and Work Zone)		
Noise levels at Day & night time - Leq dB (A)	IS: 4954-1968 as adopted by CPCB.	As per CPCB guidelines
G. Soil Environment		
pH, Soil Texture, Calcium, Sodium, Potassium, Zinc, Manganese, Phoshorus, Lead, Cadmium and Chromium etc.	Composite sample from the site for Physio-chemical parameters	Collected and analyzed as per soil analysis reference book, M.I. Jackson and soil analysis reference book by C.A. Black
H. Occupational Health		
Spirometry, Audiometry, Biochemical Parameter (Urine, Blood), Circulatory, and Vision test etc.	As per Factory act, amended as on date	As per Factory act, amended as on date

6.2.2 MONITORING FREQUENCY AND LOCATIONS

The frequency of monitoring will be different for different components. The monitoring frequency and locations are decided as per conditions of EC & CTO.

The location of the monitoring stations is selected on the basis of prevailing micro – meteorological conditions of the area like; wind direction & wind speed, relative humidity, temperature.

AAQM stations at site (including minimum 1 location in upwind side and more sites in downwind side / impact zone) to assess ambient air quality of the area. Fugitive emission monitoring being/will be done at least once in every quarter, to identify the contamination in ambient air and necessary action will be taken immediately to reduce the same within standard norms. Noise level monitoring will be carried out on plant site and in high noise generating area within the plant site. Water & soil monitoring locations will be decided based on general slope of the area & drainage pattern. Locations for the post project monitoring after the expansion project are given in the table below:

Table - 6.2: Frequency for post project monitoring

S. No.	Aspect	Monitoring parameters	Location	Schedule and frequency of monitoring	Responsibility
CONSTRUCTION PHASE					
1.	Ambient Air Quality Monitoring	PM_{10}, $PM_{2.5}$, SO_2, NO_2	Work Zone-Construction site	Quarterly	HZL/ NABL Accredited Laboratory

S. No.	Aspect	Monitoring parameters	Location	Schedule and frequency of monitoring	Responsibility
2.	Noise Level Monitoring	Noise Level	Work zone-construction site	Quarterly	HZL/ NABL Accredited Laboratory
3.	Ground water monitoring	As per IS : 10500-2012	Construction site	Pre-Monsoon & Post Monsoon	NABL Accredited Laboratory
	OPERATIONAL PHASE				
4.	Meteorological data	Dry bulb temp, wet bulb temp, relative humidity, wind speed, wind direction and rainfall	Permanent station in plant premises. The wind sensor is preferably at 10 m height above the ground without any surrounding hindrances that may affect the free flow of wind	1 No. Online metrological station.	HZL
5.	Ambient Air Quality	PM_{10}, $PM_{2.5}$, SO_2, NO_2 CO (As per NAAQS 2009)	Plant premises and in nearby villages	4 Nos. continuous ambient air quality monitoring stations (CAAQMS) have already been installed after getting site approval from SPCB (PM_{10}, $PM_{2.5}$, SO_2, NO_2, CO at an angle of 120^0 each). Manual ambient air quality monitoring will be conducted at 4 different locations around the plant area by NABL Accredited Laboratory- Quarterly	HZL / NABL Accredited Laboratory
6.	Stack Emission Monitoring	PM, SO_2, NO_X, Acid Mist, Pb	At all major combustion-based stacks.	Online continuous monitoring system will be there for proposed unit as per CPCB directions. In absence of online system, manual monitoring as per CTO condition. Quarterly	Online continuous monitoring system/ NABL accredited lab

S. No.	Aspect	Monitoring parameters	Location	Schedule and frequency of monitoring	Responsibility
7.	Performance Evaluation of pollution control equipment		All pollution control devices	Annually	HZL
8.	Fugitive Emission		Locations across Raw Material Handling area, storage area, Silos, near control rooms, workshop, yards, junction houses, etc.	Quarterly	HZL
9.	Noise Level Monitoring		Inside the plant boundary	Quarterly	HZL
10.	Water Quality/effluents	Water quality of surface and ground as per IS: 10500-2012 except radioactivity	Ground water & Surface water	Six monthly	HZL/ NABL accredited lab
		Effluent- pH, TSS, TDS, BOD, COD	ETP/STP - Outlet	ETP/STP- daily effluent quality monitoring by own lab (pH, COD & TSS- Daily basis TDS & BOD – Weekly). Online water flow meter and web camera as per CPCB guideline will be installed.	HZL
11.	Soil quality for fertility	N, P, K, organic matter, water holding capacity, density, texture, etc.	One location inside the plant area	Yearly	NABL accredited lab
12.	Inventory of hazardous waste		Within plant	Yearly or as directed by SPCB	HZL
13.	Medical check-up of employees		Nearby hospitals/ Health Centre/On-site Occupational health Centre	Half Yearly	HZL
14.	Water Consumption		At all consumer points through water meter	Continuous through water meter	HZL

CEMS, CAAQMS & EQMS

As per the circular issued by CPCB *vide* letter no B-29016/04/06/PCI-II dated 23rd Dec., 2016. CPCB has specified the requirement for installation of OCEMS along with parameters to be monitored. OCEMS have been installed as per the directions and specified parameters are being monitored and data is transmitted regularly. Same practice will continue for the proposed expansion project as well.

Apart from the above, CAAQMS and CEQMS have also been installed within the plant for continuous monitoring of ambient air quality and effluent parameters, respectively, and data is transmitted to SPCB/CPCB server on continuous basis.

6.3 DATA ANALYSIS

Monitoring data analysis will be done by MoEFCC approved laboratory as per CPCB guidelines & timely submitted to concerned authority (specified in Environment Clearance Letter issued by MoEFCC, New Delhi and Consent issued by RSPCB) on regular basis.

6.4 REPORTING SCHEDULE

Environmental Monitoring Program is being / will be conducted for various environmental components as per the conditions stipulated in Environmental Clearance Letter issued by MoEFCC, New Delhi & Consent to Establish / Consent to Operate issued by RSPCB.

Six monthly compliance reports are being / will be submitted on regular basis to IRO, MoEFCC, Jaipur by 1st of June and 1st of December. Quarterly compliance Report for conditions stipulated in CTO / CTE is being / will be submitted to RSPCB on regular basis.

6.5 EMERGENCY PROCEDURES

Company has adopted emergency procedures for Environmental Monitoring as mentioned below:

Planned Preventive Maintenance

Maintenance programs has been established at the facility for the following equipment systems:

- Process equipment
- Environmental process equipment
- Continuous monitors
- Laboratory equipment
- Sampling equipment

Procedure

- Preventive maintenance inspection program as per schedule
- Annual maintenance or Half-yearly shutdown.

Emissions to Atmosphere

In the event of an emission of Dust from any of potential emission points the following action is being / will be taken. The Emergency Response Team Leader on duty should be notified immediately, by

telephone or by use of the internal communication system. The Leader will decide on what action to take:

- Identifying the source of the Emission
- Shutting down Production if necessary
- Contacting relevant members of staff and management
- Contacting the Local Authority
- Deciding with management what corrective action is deemed necessary

Revision of Emergency Procedure

The Emergency Procedure will be reviewed and updated as necessary to reflect legislative changes or changes to the Company's operation. These changes will be communicated to all employees through directors, managers, supervisors or environmental communications.

6.6 BUDGETARY PROVISION FOR ENVIRONMENTAL MONITORING

Environmental monitoring budget is being / will be decided by the environmental management cell according to the requirements of the industry. EMC will be inspecting the necessity & availability of the materials, technologies, services & maintenance works. There will be regular review of records in order to detect any gaps and an appropriate budgetary allocation will be made on the basis of it:

Cost for Environmental Management Plan

- ✓ Capital Cost: Rs. 600.628 Crores/-
- ✓ Recurring Cost: Rs. 70 Crores / annum

CHAPTER - 7

ADDITIONAL STUDIES

7.1 INTRODUCTION

As per EIA Notification dated 14thSept. 2006, and its subsequent amendments; in reference to the Ministry's O.M. dated 11th April, 2022 regarding grant of EC under para 7(ii) of EIA Notification, 2006, amended from time to time for which EIA/EMP Report has been prepared as per standard TOR Points for carrying out the Environmental Impact Assessment (EIA) study for "Proposed Expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) through modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time At Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan).

The Following Additional Studies are required to be carried out for the expansion project:

1. Public Hearing
2. Hydro-geological Study and Rainwater Harvesting Plan
3. Risk Assessment and Disaster Management Plan

7.2 Public Hearing

The Public Hearing was conducted for the project on 30.04.2007, for the expansion of Zinc Smelter (80,000 TPA to 1,00,000 TPA) at Village: Debari, Tehsil: Girwa, District: Udaipur (Rajasthan). A summary of issues raised during the earlier public consultation dated 30.04.2007 with implementation status is enclosed as ***Annexure 15*** of the EIA/EMP report.

M/s. Hindustan Zinc Limited is proposing for "Proposed Expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) through modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time At Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan)". The proposed expansion project is exempted from the public hearing as per the MOEFCC, OM dated 11th April., 2022, para 5 current proposal scenario falls under Scenario II.

The expansion will be carried out in 2 phases, in 1st phase the capacity expansion will be achieved up to 1,20,000 TPA (20%) through modernization with the installation of state-of-the-art jumbo cell house, higher capacity reactors & thickeners in the L&P section and Roaster. In Phase-2, capacity will be further increased up to 1,40,000TPA (40%) by debottlenecking, improvement in current, melting efficiency & metal recovery.

7.3 HYDRO-GEOLOGICAL STUDY AND RAINWATER HARVESTING PLAN

This section of the chapter provides an assessment of the environmental setting of the proposed expansion project in terms of hydrogeology and discusses the potential impacts that the construction & operation of the proposed expansion will have.

The objective of the assessment are:

1. Identify the hydrogeology of the core study area and its 10 km buffer area.

2. Identify the impacts of the proposed expansion on surface water and groundwater during construction and operational phases of the expansion.

7.3.1 SITE DESCRIPTION

The plant site is located in Villages – Debari and Bichhri, Tehsil- Girwa, District- Udaipur, Rajasthan by M/s Hindustan Zinc Limited. Location details are given in Chapter 2, para 2.3 of this EIA/EMP Report.

7.3.2 GEOMORPHOLOGY AND TOPOGRAPHY

The district is characterized by undulating topography. Majority of the area is plain with low lying mounds of stabilized sand. The general slope of the area is towards North. The lowest contour in the area is 552 mRL while highest contour is at 610 mRL. As such there is total elevation difference of 58 meters which clearly indicate that the area is undulating plain. Details are given in Chapter 3, para 3.5.1 of this EIA/EMP Report.

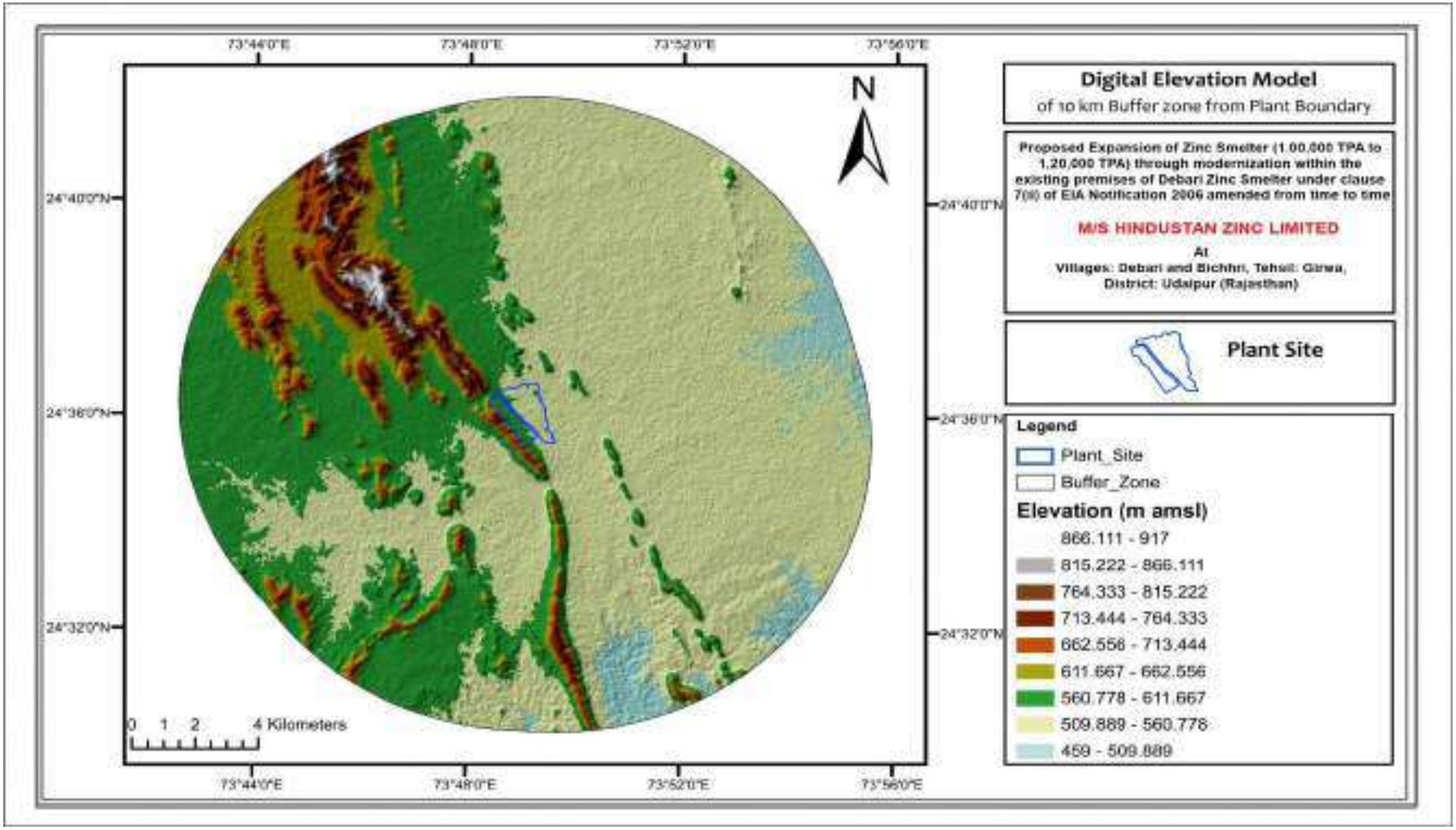


Figure 7.1: Map showing Digital Elevation Model 10 km study area (Source: Bhukosh)

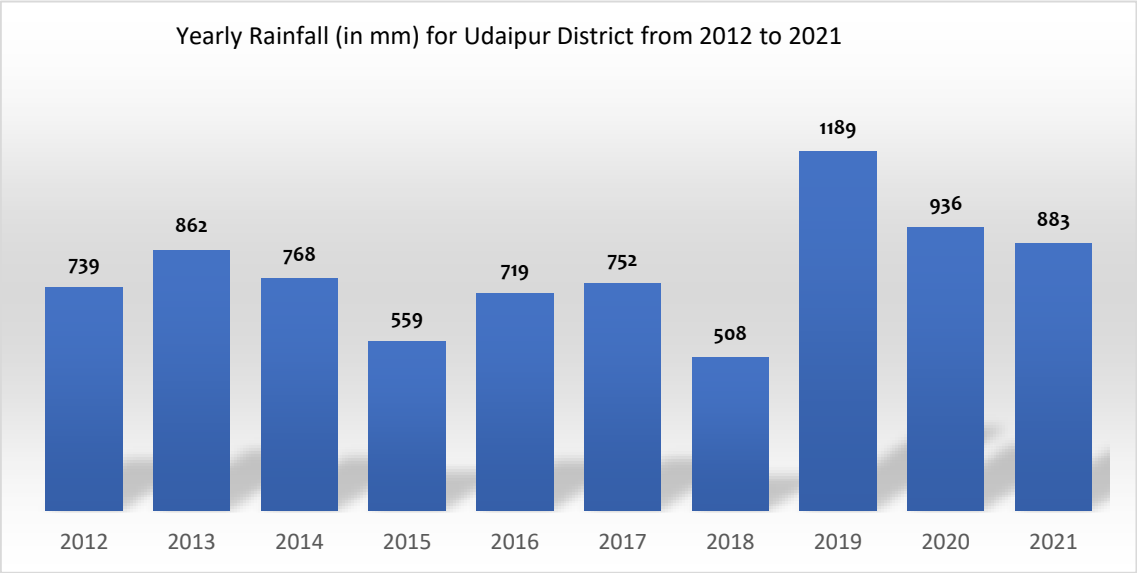
7.3.3 CLIMATE AND RAINFALL

Udaipur district has a sub-humid climate. There are three distinct seasons in a year. The winter season encompassing four months from November to February are mild and pleasant, with temperature ranging between 0ºC (Mount Abu) to 18ºC with little or no humidity. In Dec & Jan months occasional cold waves bring down the temperatures significantly. March is a pleasant transition month to summer. The summer months from April to June, record average daily temperatures of around 37ºC. May and June are the hottest months when temperature reaches up to 48ºC. Annually, most of the rainfall is received during the monsoon season which extends from June (end of June) to September. The Average Annual rainfall of the district is 681.80 mm (average of last 30 years rainfall data from 1991-2021) varying from minimum 288 mm in 1999 to maximum 1189 mm in 2019 as shown in chapter 3 of EIA. The average annual rainfall (2012 to 2021) of the district is 791.5 mm. Details are given in Chapter 3, para 3.5.2, of this EIA/EMP Report.

The rainfall pattern of the Udaipur district is shown in figure 7.2.

Total rainfall (mm)*	No. of rainy days*	Average annual rainfall (mm)**
883	153	791.5

** Year 2021*
*** Average of last 10 Years*



Source: WRIS/IMD Grid

Figure 7.2: Rainfall Pattern of Udaipur District

7.3.4 WATER REQUIREMENT AND ITS SOURCE FOR THE PROPOSED EXPANSION IN DEBARI ZINC SMELTER

Existing water requirement for the project is 8,000 KLD. After the expansion project, 3,800 KLD additional water will be required for the proposed expansion. After proposed expansion 11,800 KLD water will be required. Fresh water requirement for industrial and township usage will be met from Mansi Wakal Dam and STP Udaipur . No ground water abstraction is being done and will not be done for the proposed expansion project. Details of Permission obtained for supply of water for Debari Zinc Smelter are given in Chapter 2, para 2.5.3.1 of this EIA/EMP Report.

7.3.5 GEOLOGY OF THE STUDY AREA

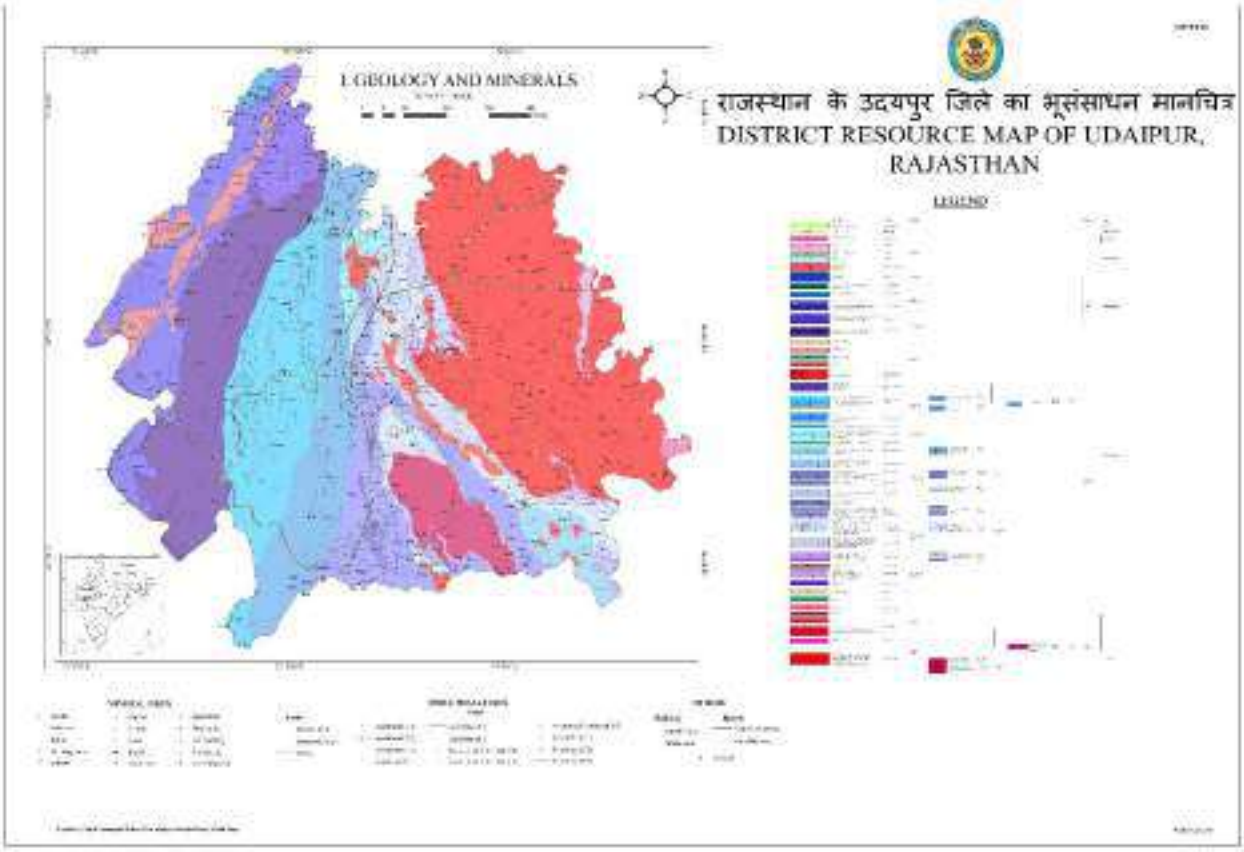
REGIONAL GEOLOGY

In Udaipur district the rock types ranging in age from Archean to upper Proterozoic are present in the area which holds significant position in metallogeny and tectonics of the western Indian craton. The Precambrian meta-sediments belong to 3 geological cycles designated as Bhilwara, Aravalli and Delhi Supergroups. The Bhilwara Supergroup is represented by the Hindoli Group and Mangalwar Complex of Archean age. The Mangalwar complex of Bhilwara Supergroup represents the oldest meta-supracrustals of Rajasthan grouped within Lasaria and Sarada and the overlying Mando–Ki–Pal and Potla Formations. The Hindoli group is represented by the Sujanpura Formation consisting of volcano–clastics with tuffs and meta-greywacke. The Bhilwara Orogeny experienced large scale magnetism that resulted in the emplacement of intrusive granitic plutons of the Untala and Gingla granites.

The Regional geological succession along with the geological map of the district is shown in table 7.1 and figure 7.3.

Table 7.1: General Regional geological succession

Super	Group	Formation
Delhi	Gogunda	Calc-schists, gneisses, mica-schists, garnetiferous biotite-schists quartzites & migmatites
	Rikhabdeo ultramafic suite	Serpentinite, talc-chlorite-schist, actinolite-tremolite schist & asbestos
	Jharol	Chlorite-mica schist, calc schist & quartzite
Aravalli	Bari lake	Meta volcanics, chlorite schists, amphibolite, quartzite & conglomerate
	Udaipur	Phyllite, mica schists, meta siltstone, quartzite, dolomite, gneisses & migmatites
	Debari	Meta arkose, quartzite, phyllite, dolomitic marble & dolomite
-------X--------X--------X--------X--------X---Unconformity---X--------X--------X--------X--------X-----		
Bhilwara	Mangalwar complex	Migmatites, gneisses, quartzite, felspathic garneti ferrous mica schists



Source: GSI.gov

Figure 7.3: Geological Map of Udaipur District

Table 7.2: Geomorphologic units, their description and distribution

Origin	Landfor	Description of Lithology
Denudational	Buried Pediment	Pediment covers essentially with relatively thicker alluvial, colluvial or weathered materials.
	Pediment	Broad gently sloping rock flooring, erosional surface of low relief between hill and plain, comprised of varied lithology, criss-crossed by fractures and faults.
	Intermontane valley	Depression between mountains, generally broad & linear, filled with colluvial deposits.
Fluvial	Valley fill	Formed by fluvial activity, usually at lower topographic locations, comprising of boulders, cobbles, pebbles, gravels, sand, silt and clay. The unit has consolidated
Hills	Structural Hills	Linear to arcuate hills showing definite trend-lines with varying lithology associated with folding, faulting etc.

Geology of the study area

The entire area comprises of amphibolite / hornblende schist, basic meta-volcanics, volcanic conglomerate, calcareous quartzite, carbonaceous phyllite, cherty quartzite, dolomite, dolomitic marble, feldspathic mica schist, feldspathic quartzite / meta-subgreywacke, ferruginous quartzite, granite / granite gneiss, migmatite, composite gneiss, manganiferous phyllite, dolomite, meta-conglomerate, mica schist / schist, pebbly meta-arkose, phyllite, meta-greywacke, meta-conglomerate, mica schist, quartz vein/reef, quartzite, quartzite with bands of phyllite, stromatolitic and

manganiferous dolomitic marble & stromatolitic and phosphatic cherty dolomite. The eastern side of the study area is entirely composed of granite gneiss, migmatite, composite gneiss of lasaria formation mangalwar group and bhilwara supergroup. These granite gneiss, migmatite, composite gneiss is of archaean age. the major part of the western region is composed of phyllite, meta-greywacke, meta-conglomerate of sabina formation and are of palaeoproterozoic age, pebbly meta-arkose of jaisamand formation of palaeoproterozoic age etc. The detail lithology of the study area is given in table 4 given below.

The tectonic activities in this area gave rise to different lineament structure such as fault, joint/fracture, ridge parallel, drainage parallel, overturned syncline fold, synform (f1) fold and antiform (f1) fold. The detailed geological map along with the lineament structure of the study area is given in figure 9

Table 7.3: Detail lithology of the study area

Super Group	Group	Formation	Lithology	Age
Aravalli	Udaipur	Sabina	Manganiferous Phyllite	Palaeo Proterozoic
			Phyllite, Meta-Greywacke, Meta-Conglomerate	
	Debari	Berwas	Calcareous Quartzite	
			Carbonaceous Phyllite	
			Dolomite	
			Phyllite	
		Dakankotra	Carbonaceous Phyllite	
			Manganiferous Phyllite, Dolomite	
			Quartzite	
			Stromatolitic And Phosphatic Cherty Dolomite	
		Delwara	Basic Meta-Volcanics, Volcanic Conglomerate	
			Feldspathic Mica Schist	
			Phyllite, Mica Schist	
		Gurali	Quartzite	
		Jaisamand	Feldspathic Quartzite / Meta-Subgreywacke	
			Ferruginous Quartzite	
			Meta-Conglomerate	
			Mica Schist / Schist	
			Pebbly Meta-Arkose	
			Quartzite With Bands Of Phyllite	
		Jhamarkotra	Cherty Quartzite	
			Stromatolitic And Manganiferous Dolomitic Marble	
-------X-------X-------X-------X-------X---Unconformity---X-------X-------X-------X-------X-----				
Bhilwara	Mangalwar Complex	Lasaria	Amphibolite / Hornblende Schist	Archaean
			Dolomitic Marble / Dolomite	
			Granite Gneiss, Migmatite, Composite Gneiss	
			Quartzite	

7.3.6 HYDROGEOLOGY OF THE AREA

The occurrence of ground water in the district is mainly controlled by the topographic and structural features present in the geological formations. The principal source of ground water in the district is

precipitation. Out of the total rainfall received, a major part of it is lost as runoff and by evapo-transpiration through soil and vegetation. Only as small part of rainfall infiltrates down to reach ground water body. Ground water occurs mainly under water table condition in all formations. The main water bearing formation occurring in the district are the gneisses, granite gneiss, phyllite and schist, calc schist, quartzite and limestone (Figure 7.4). The occurrence and movement of ground water is controlled through the foliation / bedding planner, fissures, joints, solution cavities and other structural weak planes. The weathered mantles of the hard rock yield good discharge of water. Depth to water level and yield of wells are generally controlled by physiographic location of well and percentage of secondary opening encountered in well sections.

Groundwater Level Monitoring

The depth to water level in the study area ranges from 4.67 m to 41.23 m bgl in pre monsoon season. The elevation of the monitoring locations ranges from 512 to 578 m amsl and the water table ranges from 490.20 to 541.97 m amsl. The maximum fluctuation within the study area is just 2 m, therefore the maximum and minimum depth of water level for post monsoon season was taken as 3.52 m bgl & 39.64m bgl respectively. The deep-water level is observed in calcareous quartzite of Berwas formation of Paleoproterozoic age. There is substantial ground water abstraction in the buffer zone due to large number of irrigation wells, which is the major source of ground water discharge. The Hydrogeological map along with the water table contour of 5m and general groundwater flow direction, Depth to water level (m bgl) map & depth to water table map is shown in figure 7.7, figure 7.8 and figure 7.9 respectively.

LONG TERM WATER LEVEL DATA ANALYSIS

The ground water levels observed over a period provides valuable information on the behavior of the ground water regime, which is constantly subjected to changes due to recharge and discharge phenomenon. When the recharge exceeds discharge, there will be a rise in the ground water storage and vice versa. The decline in water level may be due to increase in draft (for different purposes) or decrease in precipitation (less recharge to ground water). On the other hand, a rise in water level may be due to an increase in rainfall and/or due to changes in irrigation practices. From the pre monsoon and post monsoon depth to water level data collected during March and November respectively, water level fluctuation was computed.

HYDROGRAPH OF THE WATER LEVEL FOR 10 YEARS

A **hydrograph** is a graph showing overall rise and fall trend of water level & water level with respect to time. Water Level data of **Ramgiri (badagaon)** Station in Udaipur district for pre monsoon and post monsoon for last 10 years is taken from India WRIS and plotted in graphical representations. The details of groundwater monitoring station considered for hydrograph is given below in table 7.4 and the figure 7.5 and 7.6

Table 7.4: Depth to Water Level Data of Nearest CGWB Monitoring Station

India Water Resources Information System
Groundwater Report for Ramgiri (badagaon)
Phase: 2011 to 2020

Station Name		Ramgiri (badagaon)
Source		CGWB
Basin		GANGA
State		RAJASTHAN
Latitude, Longitude		24.6250° N 73.6833° E
Yearly Ground Water Level trends for Ramgiri (badagaon) Station from 2011 to 2020		
Year	**Pre monsoon (mbgl)**	**Post monsoon (mbgl)**
2011	4.600	1.820
2012	1.820	1.630
2013	7.60	0.840
2014	2.250	1.55
2015	5.15	3.610
2016	3.610	2.72
2017	2.770	5.850
2018	3.600	3.250
2019	7.400	1.300
2020	3.040	2.500
(Source: WRIS)		

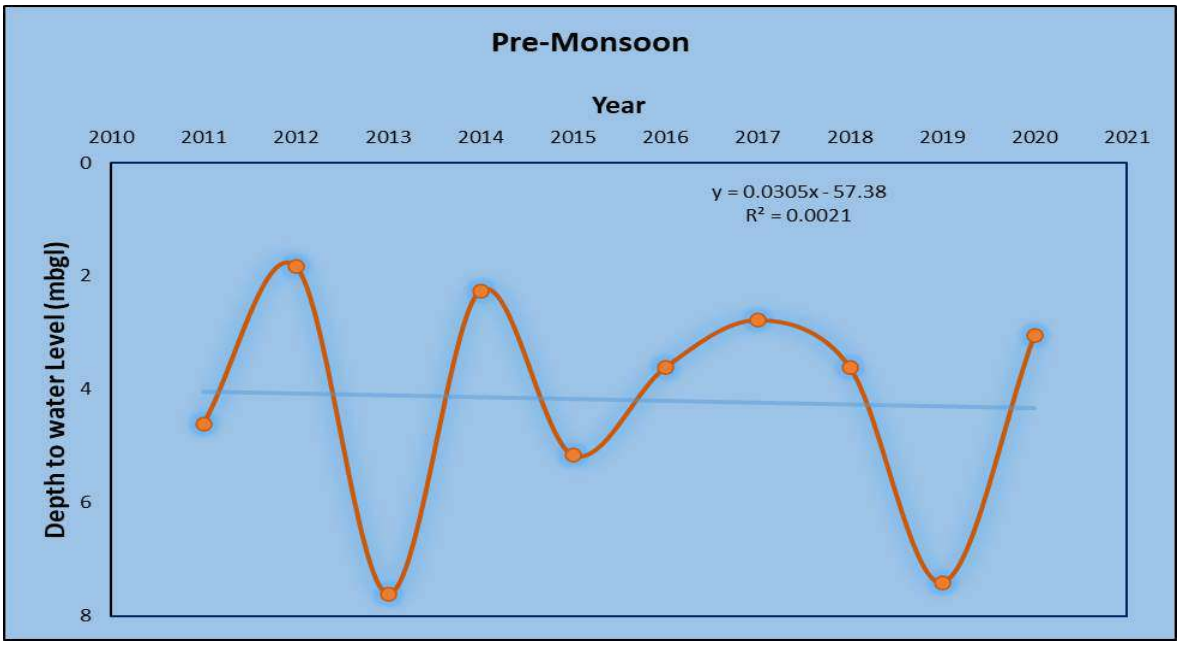


Figure 7.4: Hydrographs of Nearest CGWB monitoring station (Pre-Monsoon-10 Years)

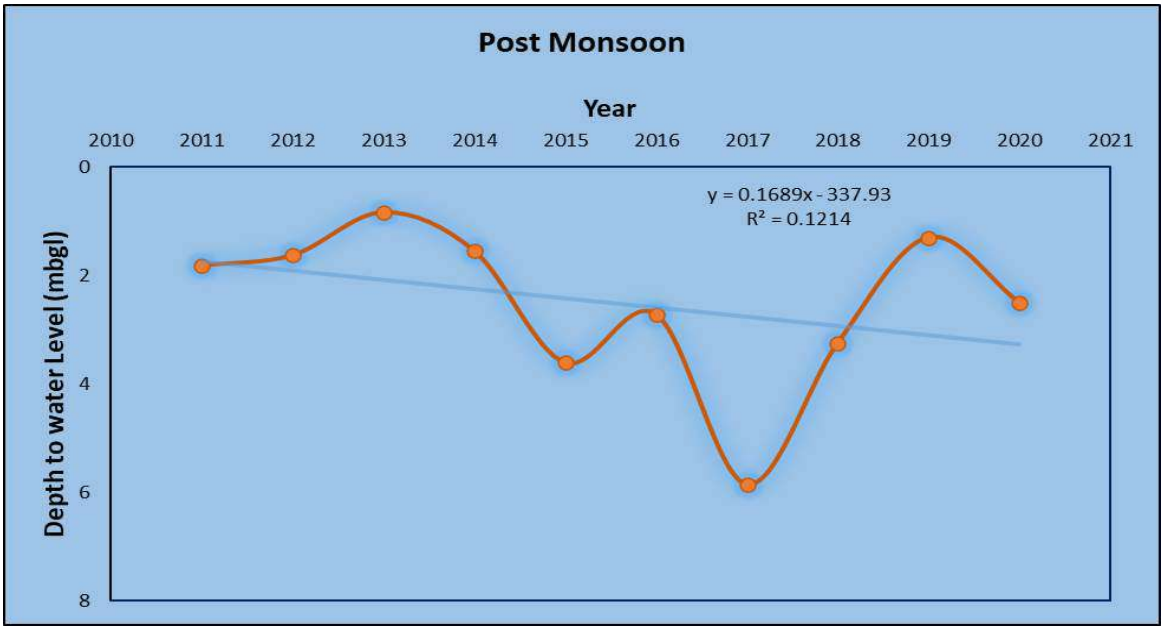


Figure 7.5: Hydrographs of Nearest CGWB monitoring station (Post Monsoon-10 Years)

GROUNDWATER LEVEL TREND

The groundwater level trend of the monitoring station can be predicted from the slope of the trend line. Since it is depth the water level and the axis are inverted, the interpretation of data reverses. A negative slope of trend line indicates rise in water level and a positive slope indicates fall in water level. Based on this the trend of the Groundwater monitoring station shows fall in the pre-monsoon and post monsoon season, therefore the overall trend i.e., annually, its showing fall as shown in table 7.5

Table 7.5: Trend of groundwater level in the nearest CGWB monitoring station

Site Name	Pre-monsoon		Post-Monsoon		Annual	
	Rise (m/year)	Fall (m/year)	Rise (m/year)	Fall (m/year)	Rise (m/year)	Fall (m/year)
Ramgiri (badagaon)	-	0.0305	-	0.1689	-	0.1994
(Source: WRIS)						

Groundwater Flow

From the analysis of the water table elevation map with water table contour of 2 m interval, the flow of ground water is in NE to Eastern directions. The ground water movement follows the natural topography and general slope of the study area.

Table 7.6: Range of water level within the buffer & 2km area from plant boundary

Monitoring Location	Range of Water Table Pre-monsoon Season (in m below ground level)		Range of Water Table Post-Monsoon Season (in m below ground level)	
	From (Pre-monsoon)	To (Pre-monsoon)	From (Post-monsoon)	To (Post-monsoon)
Buffer Zone	4.67	41.23	3.52	39.64
Within 2 km from plant Boundary	4.67	41.23	3.52	39.64

Table 7.7: Details of Groundwater Level Monitoring in and around 10 km Buffer Zone (Source: Field Survey)

S. No.	Location	Latitude (°N)	Longitude (°E)	Elevation (m amsl)	DTWL (m bgl)	DTWL (m amsl)	Type of Well	Depth of well (ft)
1.	Mandesar	24.614444	73.910000	512.00	7.23	504.77	Open Well	280
2.	Bichhri	24.602556	73.826667	536.00	4.67	531.33	Open Well	195
3.	Lakadwas	24.557500	73.806944	548.00	11.82	536.18	Open Well	180
4.	Debari	24.612778	73.824444	540.00	29.23	510.77	Borewell	210
5.	Udaipur	24.589722	73.746111	578.00	36.03	541.97	Borewell	240
6.	Dabok	24.621944	73.861389	524.00	33.8	490.20	Borewell	235
7.	Gowla	24.613611	73.818889	543.00	19.83	523.17	Open Well	170
8.	Sihora	24.594722	73.843611	529.00	22.09	506.91	Open Well	190
9.	Diggi	24.588333	73.835833	525.00	26.42	498.58	Open Well	195
10.	Near Panwari	24.598889	73.799722	562.00	41.23	520.77	Borewell	230

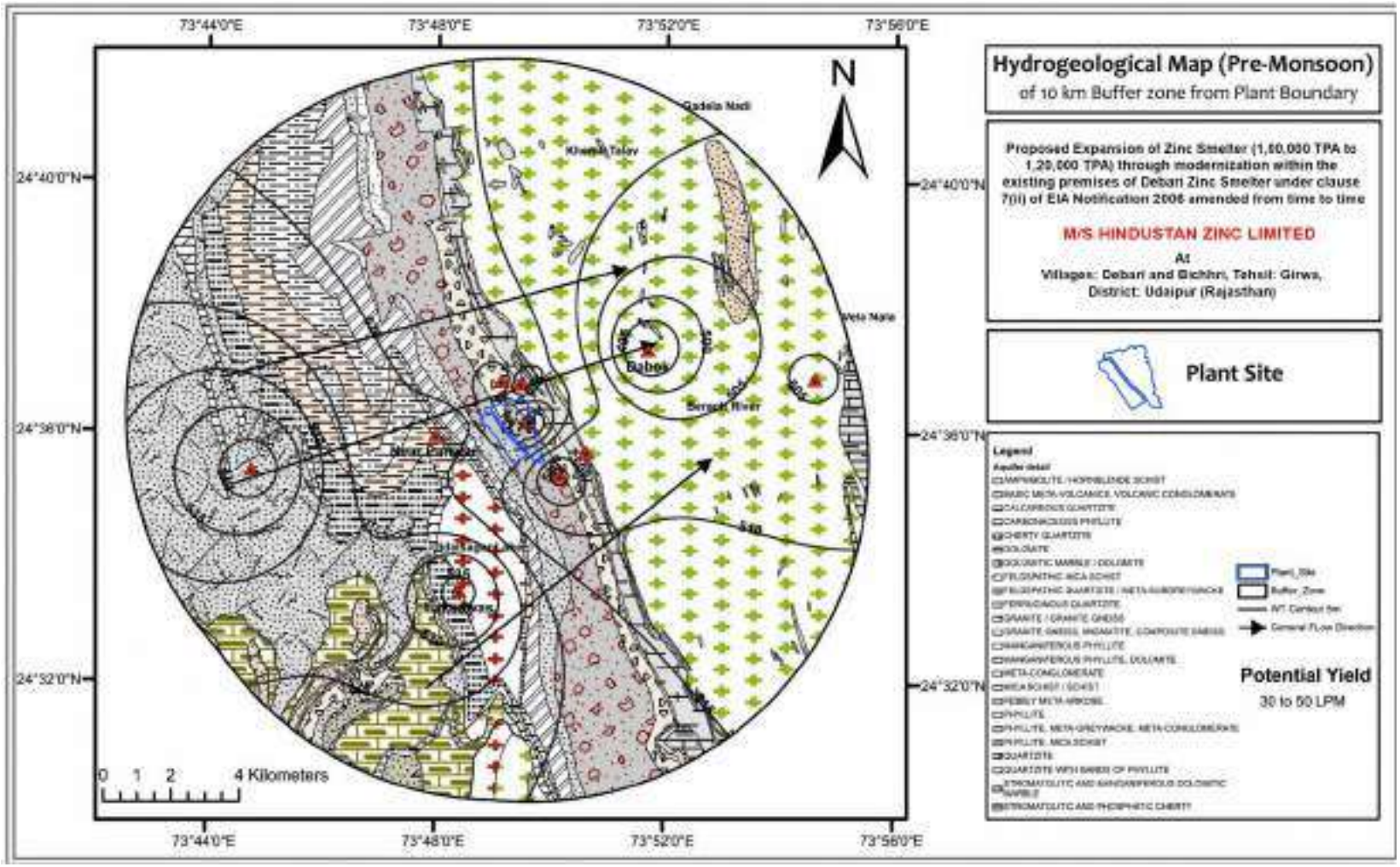


Figure 7.6: Hydrogeological Map of 10 km Buffer zone from Plant Boundary [Source: Bhukosh]

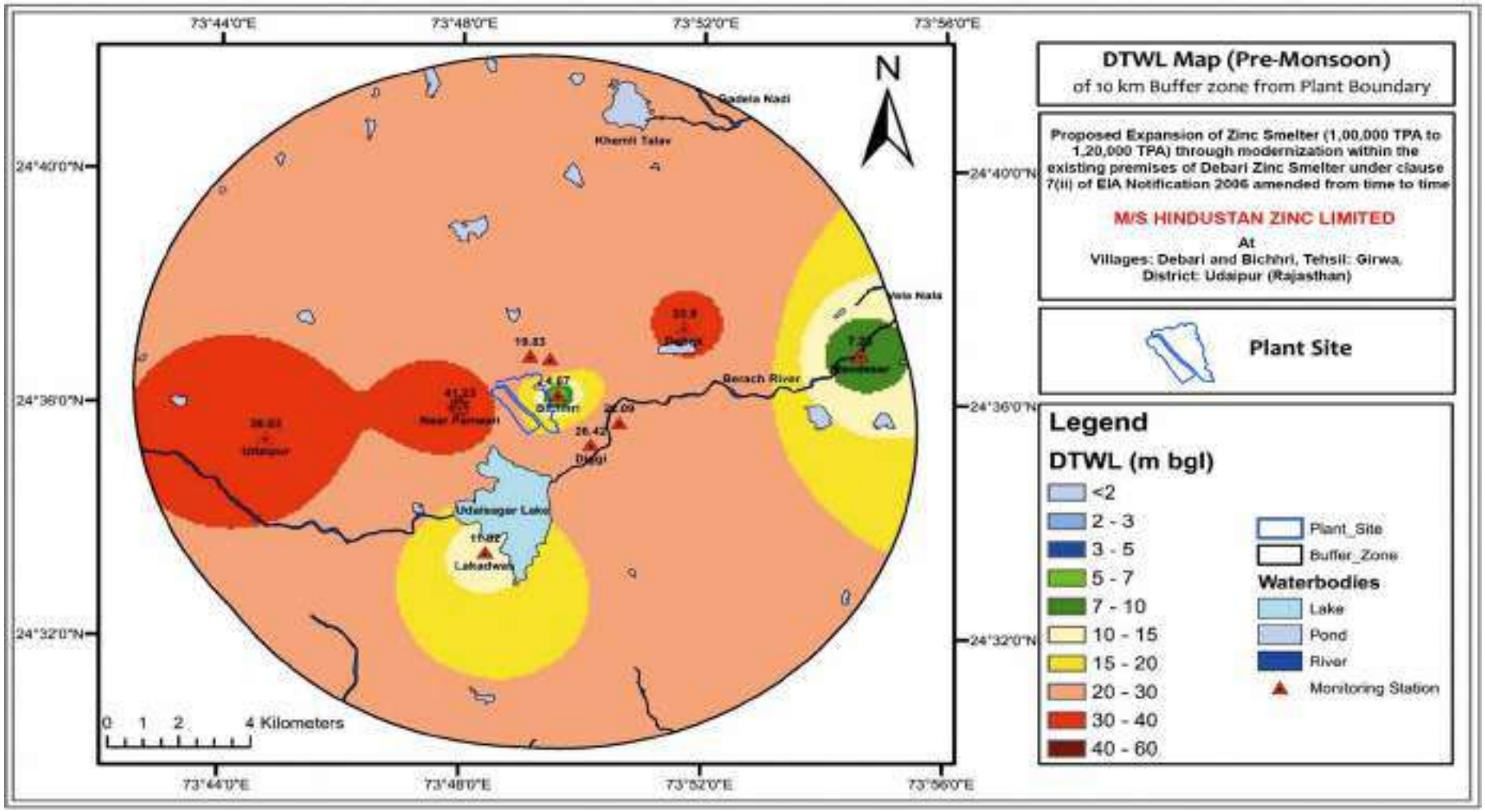


Figure 7.7: Depth to water level map of 10 km Buffer zone from Plant Boundary (pre monsoon)

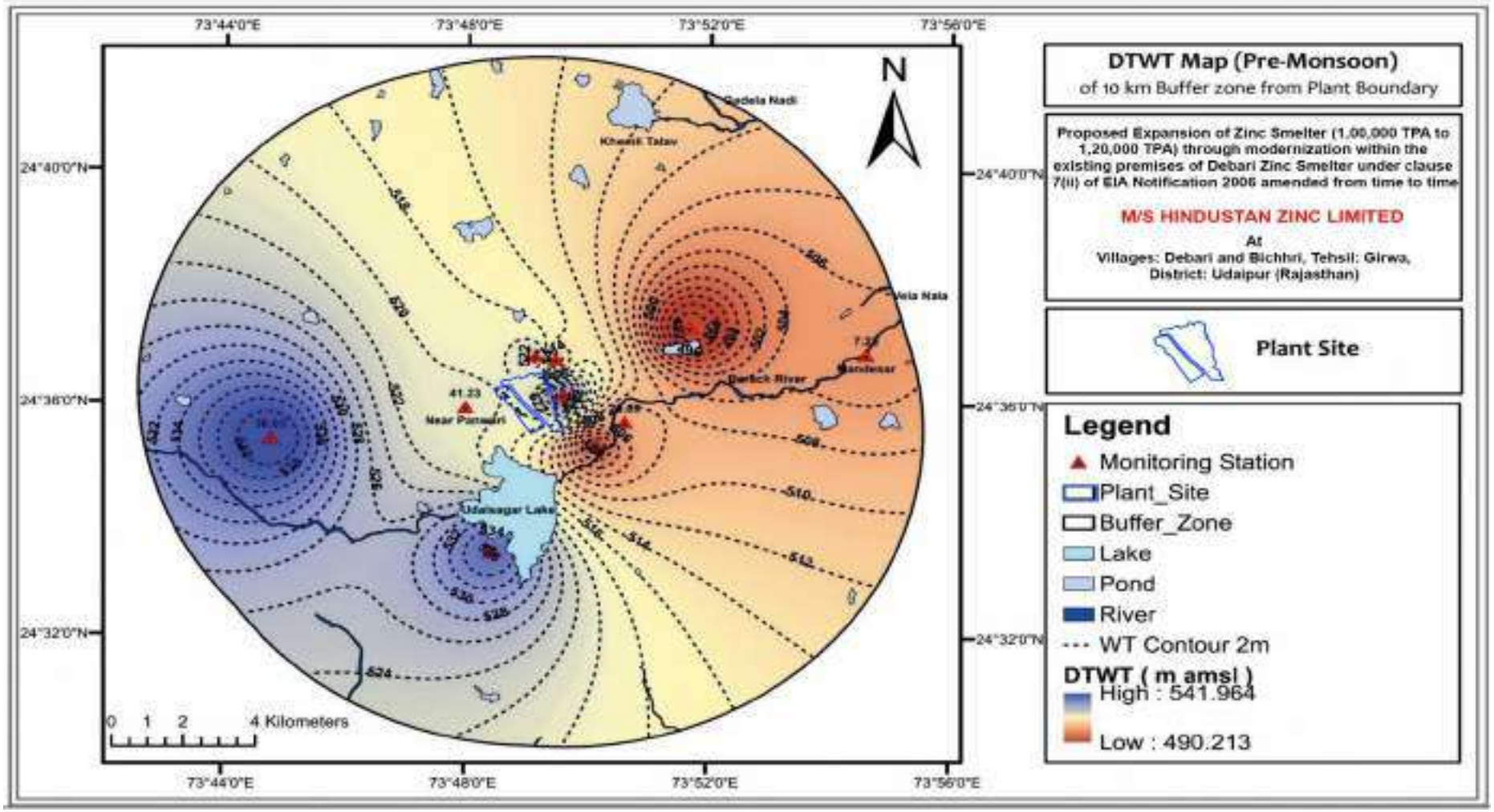


Figure 7.8: Depth to water table map of 10 km Buffer zone from Plant Boundary (pre monsoon)

7.3.7 WATER QUALITY

Surface and Ground water quality were analysed from the water samples in and around the project site. Details regarding the same are given in Chapter 3, section 3.5.7 of this EIA/EMP Report.

GROUND WATER RESOURCES

RECHARGE DUE TO RAINFALL

(a) BY GROUNDWATER TABLE FLUCTUATION METHOD

RECHARGE IN BUFFER ZONE BY WATER LEVEL FLUCTUATION METHOD	
Description of items	**Quantity**
1. Area (sq.km)	375.2458
2. Water Table Fluctuation (m)	2
3. Specific Yield for metamorphic	1.50%
4. Total Groundwater Storage [(1)*(2) *(3)](Mcum)	375.2458*2*0.015
5. Total (M cum)	11.26

(b) BY RAINFALL INFILTRATION FACTOR

RECHARGE IN BUFFER ZONE BY RAINFALL INFILTRATION FACTOR METHOD	
Description of items	**Quantity**
1. Area (sq.km)	375.2458
2. Average Annual Rainfall (m)	791.5
3. Rainfall infiltration factor	6%
4. Rainfall recharge in Buffer zone by Rainfall Infiltration Factor Method	375.2458*0.7915*0.06
Gross Rainfall Recharge (Mcum)	17.82

TOTAL RECHARGE OF BUFFER ZONE

As per the recommendations of Groundwater Estimation Committee (GEC), 2009, if the difference between the two, expressed as a percentage of rainfall infiltration method is greater than or equal to -20% or less than or equal to +20 %, then the recharge is taken as the value estimated by the water table fluctuation method. If it is less than -20%, then it is taken as 0.8 times the value estimated by rainfall infiltration factor method. If it is greater than +20%, then recharge is taken as equal to 1.2 times the value estimated by rainfall infiltration factor method.

RAINFALL RECHARGE IN BUFFER ZONE AFTER COMPARING RESULTS FROM WATER LEVEL FLUCTUATION METHOD AND RAINFALL INFILTRATION FACTOR METHOD	
Description of items	**Quantity**
1. Rainfall Recharge during monsoon season in Buffer Zone	
1a) By Water Level Fluctuation Method (Mcum)	11.26
1b) By Rainfall Infiltration Factor Method (Mcum)	17.82
2. Difference between (1a) and (1b) expressed as a percentage of (1b), 'PD' [{(1a) – (1b)/ (1b)}*100]	-37%
3.RainfallRechargein the Buffer Zone during monsoon season (Mcum) [=(1a) if 'PD' is between-20 and +20% =0.8*(1b) if 'PD' is less than -20% =1.20*(1b) if 'PD' is greater than +20%]	14.26

NET ANNUAL GROUNDWATER AVAILABILITY IN BUFFER ZONE

Description of items	(Mcum)
1. Recharge in Buffer Zone	14.26
2. Recharge from 'Other Sources'	
A. Return flow to Groundwater system (30%) through Irrigation (mcm/annum)	0.08
B Recharge through surface water bodies in the buffer zone (40% of water body spread):	2.97
Total Annual [(2a) + (2b)]	3.04
3. Gross Annual Groundwater Recharge	**17.30**
4. Annual Gross Groundwater Draft for all uses in Buffer Zone	16.95
5. Balance Available Annual Groundwater Recharge (Net Annual Groundwater Availability – Gross Annual Groundwater Draft)	0.35

Table 7.8: GROUNDWATER DRAFT OF BUFFER ZONE

GROUNDWATER DRAFT	Mcum
NET IRRIGATION USE	
For Combined	0.25
Return flow to Groundwater system (30%)	0.08
Net irrigation use	0.177
COMMUNITY USE	
For Domestic Population	15.47
For cattle population (5% of community use):	0.773
Industrial/Mine use (for all industries/mines falling in the buffer zone)	0.53
Total Community use	16.772
GROSS ANNUAL GROUNDWATER DRAFT FOR 'ALL USES' IN BUFFER ZONE	**16.95**

Table 7.9: SUMMARY OF BUFFER ZONE WATER BALANCE

DESCRIPTION OF ITEMS	BUFFER ZONE
1.Stageof Groundwater Development	
a. Net Groundwater Availability (Mcum)	17.30
b. Annual Gross Groundwater Draft (Mcum)	16.95
c. Balance Available Annual Groundwater Recharge	0.35
d. Stage of Groundwater Development [{(1b) /(1a)} *100]	97.98%
e. Category of Groundwater Development	**Critical**

Total recharge of the buffer zone is 17.30 mcm/annum while total groundwater draft is 16.95 mcm/annum. The groundwater development in the area is about 97.98% of total groundwater recharge. Therefore, buffer zone is coming under ***Critical*** category as per groundwater development status.

In spite of the above clarification the plant lies in ***Girwa Rural block and Udaipur District*** which comes under ***Critical*** Category as per CGWB Categorization 2020

http://cgwb.gov.in/GW-Assessment/Categorization%20of%20AU.pdf

However, there no ground water abstraction is being done for the existing plant and no ground water will be abstracted for the proposed expansion project. Therefore, in view of the above, the project will not affect the ground water resources within 10 km of the study area. Apart from that, the project

proponent has already installed groundwater recharge systems and undertakes other groundwater conservation measures. The same practice will continue for the proposed expansion project.

7.3.8 RAINWATER HARVESTING

Components of Rainwater Harvesting System:

A rainwater harvesting system comprises components of various stages - transporting rainwater through pipes or drains, filtration, and storage in tanks for reuse or recharge. The common components of a rainwater harvesting system involved in these stages are illustrated below:

Catchments:

The catchment of a water harvesting system is the surface that directly receives the rainfall and provides water to the system. It can be a paved area like a terrace or courtyard of a building or an unpaved area like a lawn or open ground. A roof made of reinforced cement concrete (RCC), galvanized iron or corrugated sheets can also be used for water harvesting.

Table 7.10: Run-off Coefficients for Various Catchment Surfaces

Type of Catchments	Run-off Coefficients
Roof Catchments • Tiles • Corrugated Metal sheets	 • 0.8-0.9 • 0.7-0.9
Ground surface coverings • Concrete • Brick pavements	 • 0.6-0.8 • 0.5-0.6
Untreated Ground Catchments • The soil on slopes with less than 10% • Rocky natural catchments	 • 0.0-0.3 • 0.2-0.5

Coarse mesh

On the roof to prevent the passage of debris including leaves and other plant vegetable matter etc.

Gutters:

Channels all around the edge of a sloping roof to collect and transport rainwater to the storage tank. Gutters can be semi-circular or rectangular and could be made using locally available materials such as plain galvanized iron sheets (20 to 22 gauges), folded to required shapes.

- Semi-circular gutters of PVC material can be readily prepared by cutting those pipes into two equal semi-circular channels.
- Bamboo or betel trunks are cut vertically in half.

The size of the gutter should be according to the flow during the highest intensity of rain. It is advisable to make them 10 to 15 percent oversize. Gutters need to be supported so they do not sag or fall off when loaded with water. How gutters are fixed depends on the construction of the house; it is possible to fix iron or timber brackets into the walls, but for houses having wider eaves, some method of attachment to the rafters is necessary.

Conduits:

Conduits are pipelines or drains that carry rainwater from the catchment or rooftop area to the harvesting system. Conduits can be of any material like polyvinyl chloride (PVC) or galvanized iron (GI),

commonly available materials.

Table 7.11: Sizing of Rainwater pipe for Roof Drainage

Diameter of Pipe (in mm)	Roof area (square meter)					
	50	75	100	125	150	200
	Average Rate of Rainfall in mm/ hour					
50	13.4	8.9	6.6	5.3	4.4	3.3
65	24.1	16.0	12.0	9.6	8.0	6.0
75	40.8	27.0	20.4	16.3	13.6	10.2
100	85.4	57.0	42.7	34.2	28.5	21.3
125			80.5	64.3	53.5	400
150					83.6	62.7

(Source: National Building Code)

First-flushing:

A first flush device is a valve that ensures that runoff from the first spell of rain is flushed out and does not enter the system. This needs to be done since the first spell of rain carries a relatively larger number of pollutants from the air and catchment surface.

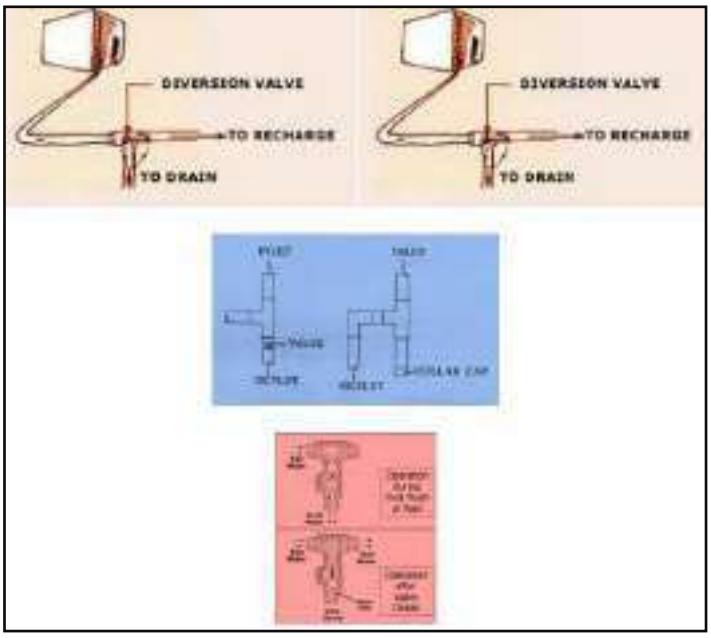


Figure 7.9: Diagrammatic representation of first Flushing device

Filter: The filter is used to remove suspended pollutants from rainwater collected over the roof. A filter unit is a chamber filled with filtering media such as fibre, coarse sand, and gravel layers to remove debris and dirt from the water before it enters the storage tank or recharge's structure. Storage Facility and Recharge Structures: Storage tanks may be constructed on the shape, size, and material of construction. Rainwater may be charged into the groundwater aquifers through any suitable structures like dug wells, bore wells, recharge trenches, and recharge pits.

These structures will conserve and store excess surface water for future requirements, since these requirements often change within a season or a period. They are also built to remove bacteriological and other impurities from sewage and waste water so that water is suitable for re-use.

FACTORS AFFECTING RUN-OFF POTENTIAL

- Climate and Rainfall Pattern

- Evaporation Losses
- Geological Formation and Catchment Characteristics

NET SUMMARY OF THE RAINWATER HARVESTING

Total water requirement for Proposed Expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) within the existing premises of Debari Zinc Smelter will be 9046 KLD which will be sourced from Mansi Wakal Dam and STP Udaipur through pipelines. No additional fresh water is required for proposed expansion as 1046 KLD of additional water will be sourced from Udaipur STP. The net Rainwater Harvesting Summarization withing the plant area is:

Table 7.12: Net Summarization of Rainwater Harvesting

Utilization	Area (in square meters)	Rainfall (in Meters)	Runoff Coefficient	Amount of Rainfall Runoff generated (Cum/annum)
Green belt	762800	0.681	0.15	77920.02
Open area	189600	0.681	0.20	25823.52
Roof Top/ Shed	858000	0.681	0.85	496653.3
Total	**1810400**	-		**600396.84**

*Rainwater harvesting calculation has been done excluding the ETP& RO-ZLD area of 3.16 ha (316000 m^2)

Table 7.13: Hourly Runoff generated

Land Particulars	Area (m2)	Runoff Coefficient	Average Peak Rainfall per hour (m/h)	Hourly Quantum of Runoff Available (m3)
1	2	3	4	5 (=2x3x4)
Rooftop	858000	0.85	0.074	53968.2
Open Area	189600	0.2	0.074	2806.08
Greenbelt	762800	0.15	0.074	8467.08
Total				**65241.36**

Table 7.14: Rain water/storm water harvesting structures within the plant site with storage capacity

S. No.	RWH Structures	Storage Capacity (cum)	Annul storage capacity (considering 3 fillings / annum)
1.	**Lagoon 1**	12000	36,000
2.	**Lagoon 2**	22500	67500
	Total	34500	103500

Table 7.15: Summarization of Rainwater Harvesting

S. No.	Particulars	Details
1.	Total Runoff Generated inside the Plant premises	600396.84 cum/annum
2.	Net Rainwater Harvesting capacity inside the Project Site	103500 cum/annum
3.	Percentage of generated runoff which will be harvested	17.24 %

Lagoon 1

Lagoon 2

Figure7.10: Photographs of Existing RWH Structure in DZS

The details of the major existing Rain water harvesting and recharge structures available within the plant site are given in the above table 7.14 and figure no. 7.11.

Figure 7.11: RWH Structure in DZS

Conclusion

Existing water requirement of the DZS Complex is 8000 KLD which is being sourced from Mansi Wakal Dam/ STP Udaipur. After the expansion project, 1046 KLD additional water will be required for the proposed expansion. The plant do not use any Ground water.

Total Run off available from the existing plant is 442017 cum/annum. Out of which 103500 cum/annum runoff is being harvested in plant with the existing facilities like Lagoon 1 & 2.

There are 5 RWH structures in Colony having catchment area of 1890 m^2 &rainwater harvesting potential of 982.8 m^3.

There are three seasonal nallahs passing through the plant site, which have run off water from the nearby hill in west direction during rains only:

1. 1st Nallah enters in to the colony from the nearby hill in the west direction and passes through the plant site along the Moore Cake Treatment plant towards east direction. This nallah has been concreated and stone pitched along the slopes. The run off from the nallah is collected, desilted and finally discharged outside the plant premises at its natural course.
2. 2nd Nallah passes through the plant site entering from the west direction in the colony towards east and has been diverted to merge with the 1st nallah almost at the center of the plant.
3. 3rd Nallah also transects the plant site from west to east between the solar plant and Jarosite Pond III. The nallah has been kept intact and the same will continue for the proposed expansion project. There will be no disturbance to these nallahs due to the proposed expansion project.

7.4 RISK ANALYSIS AND DISASTER MANAGEMENT PLAN

Definition

A major emergency in a work is one, which has the intensity to cause serious injury or loss of life. It may cause extensive damage to property and serious disruption both inside and outside the work. It would normally require the assistance of emergency services to handle it effectively.

Emergency may be caused by a number of different factors; it will normally manifest itself in two basic forms, viz fire, explosion or toxic release.

Scope of the Plan

An important element of mitigation is emergency planning i.e. recognizing that accidents are possible, assessing the consequences of such accidents and deciding on the emergency procedures, both on site and off site that would need to be implemented in the event of an emergency.

Emergency planning is just one aspect of safety and cannot be considered in isolation.

Objective

The overall objectives of the emergency plan are:

(a) To localize the emergency and, if possible eliminate it; and

(b) To minimize the effect of the accident on people and property.

Elimination requires well planned process/technology and its effective implementation, so that such situation should either not arises or if it comes, a pre warning is received for timely action in built or by preparedness for zeroing the effects.

Minimizing the effects may include prompt action, rescue, first aid, and evacuation, fire-fighting and also passing on information promptly to people living nearby.

7.4.1. Hazard Identification

Any accident may develop into a major emergency even with the best safety measures and programs in plant. Hence, an emergency preparedness plan has been planned properly and documented for ease of implementation at the time of need without losing time and avoiding delays.

Identification of Hazards at DZS, Udaipur is of primary significance in the analysis, quantification and effective control of accidents. A hazard is characteristic of a system/process that presents potential for an accident. All the components of a system/process need to be thoroughly examined to assess their potential for initiating an accident. Safety is relative and implies freedom from danger or injury. It calls for identification of hazards, risk and further suggestion on hazard mitigation measures.

Accident or hazardous situation may arise due to occurrence of any one of the following causes

7.4.2. Methodologies for Risk Analysis

The objective of risk analysis is to produce outputs that can be used to evaluate the nature and distribution of risk and to develop appropriate strategies to manage risk. Events or issues with more significant consequences and likelihood are identified as higher risk and are selected for higher priority mitigation actions to lower the likelihood of the event happening and reduce the consequences if the event were to occur. Qualitative methods use descriptive terms to identify and record consequences and likelihoods of the events and resultant risk. Quantitative methods identify likelihoods as frequencies or probabilities. They identify consequences in terms of relative scale (orders of magnitude) or in terms of specific values (for example estimate of cost, number of fatalities or number of individuals lost from a rare species). For both qualitative and quantitative methods, it is important to invest time in developing appropriate rating scales for likelihood, consequence and resultant risk. The full range of risk situations likely to be encountered within the scope of the exercise should be considered when developing rating scales.

7.4.3. Semi Quantitative Methods

Semi-quantitative approaches to risk assessment are currently widely used to overcome some of the shortcomings associated with qualitative approaches. Semi-quantitative risk assessments provide a more detailed prioritized ranking of risks than the outcomes of qualitative risk assessments. Semi-quantitative risk assessment takes the qualitative approach a step further by attributing values or multipliers to the likelihood and consequence groupings. Semi-quantitative risk assessment methods may involve multiplication of frequency levels with a numerical ranking of consequence. Several combinations of scale are possible.

		LIKELIHOOD				
SEVERITY		1	2	3	4	5
		Rare	Unlikely	Possible	Likely	Almost Certain
Catastrophic	5	5	10	15	20	25
Serious	4	4	8	12	16	20
Moderate	3	3	6	9	12	15
Minor	2	2	4	6	8	10
Negligible	1	1	2	4	4	5

Risk Factor 20 to 25 - Very High – A risk factor in this range would indicate an "unacceptable" level of risk. It would be appropriate to prohibit the activity until suitable improvements have been implemented to reduce the level of risk to an acceptable level;

Risk Factor 10 to 16 - High –". Hazards within this range should be proactively managed to reduce the risk to a level as low as reasonably practicable;

Risk Factor 5 to 9 - Medium – Risk factors within this range may be regarded as "tolerable" and identified hazards within this range should be actively managed; and

Risk Factor 1 to 4 - Low - Risk factors within this range would indicate that the level of risk is "acceptable" and therefore no further action would be necessary. However it would still be important to ensure that any existing controls are maintained.

7.4.4. Precautionary measures for Hazards

General Precautions

- Persons will be authorized for various skilled works;
- Every exposed part of any machinery used as, or forming part of, the equipment of a plant shall be adequately fenced by suitable guards to prevent danger;
- Only authorized and trained persons will be permitted to operate and maintain equipment's; and
- Danger signs will be displayed at appropriate locations.

7.4.5. Disaster Control and Management Plan

Emergency Scenario: Accidental release of H_2SO_4, SO_2, SO_3, Cl_2, Fire and/ or explosion.

Purpose of Plan: To minimise vulnerability to chemical hazards and consequent loss of lives, livelihood systems, property and damage to infrastructure and public utilities.

Causes: Accidental Fire and/or Explosion due to release/ leakage of LPG; leakage in Furnace Oil (HFO/HSD) storage; release/ leakage of gas (SO_2/SO_3), Chlorine from Cl_2 cylinders, Sulphuric acid.

Response Plan: An effective and prompt response to chemical hazards is very important for minimising the loss of lives and properties and providing immediate relief to the affected people. The role of communities and rescue team is vital in search, rescue and relief operations. Immediate medical assistance to the affected people and steps for prevention of outbreak of epidemics after the chemical hazards are essential components of response. The response functions to be carried out during emergency are as follows

- Emergency warning/notification by the site controller of DZS, if possible in consultation with respective SBU Heads.
- Emergency declaration by SEC in consultation with site controller
- Operational Directions and Coordination (mobilization of manpower, equipment and materials, firefighting, medical relief, etc.).
- Effective Operation of ECC
- Emergency Communication and alarms by fire personal after getting instruction from SIC through ECC.
- Firefighting and rescue of people for limiting casualties by Fire crew under the coordination of Fire & Safety Coordinator.
- Medical relief (treatment, transport of the injured, disposal of the dead etc.) & medical team should perform functions like providing first aid treatment, Victim transfer to Nalco Hospital if necessary, and assessment of future need for medical treatment.
- Accident investigation and Assessment by police and factory inspector should investigate the incident as per the act and rules and a team for investigation of incidents leading to on-site emergency situation should be constituted by SIC.

- Information to public and community residing within vulnerable area should be provided, if needed.
- Head Count of numbers of persons sheltered in emergency shelters and /or assembly points will be counted and informed to the SIC by facility coordinator as early as possible.

Evacuation Plan: In case of a major emergency, it would certainly be necessary to evacuate personnel from affected areas. As a precautionary measure, evacuation of non-essential workers in the first instance from the areas likely to be affected is required. The evacuation will be effected on getting necessary message from SIC. During the time of emergency, when evacuation order is declared, employees shall assemble at assembly points. The pregnant women and special needy people (who is recovering from injury and illness) shall be provided with support system to reach assembly points. The Performa of evacuation procedure should be such that it contains brief details of emergency and instructions to be followed. Announcement is to be made by the concerned official (say, Emergency officer) in Hindi and English. At the end, an all-clear signal is to be sounded from Emergency Control Centre after getting instruction from SIC.

7.4.6. Onsite Emergency Plan

Onsite emergency is the incident having potential to cause impacts with in the plant premises & Onsite emergency plan is vital to manage the associated emergencies with the storage and handling of hazardous chemicals (such as Chlorine, Sulphuric acid, Sulphur dioxide), any kind of stress and strain caused during operational processes which may lead to operational failures resulting into fire and explosion. Types of accidents/incidents which can cause emergency are as shown in the table given below.

Table 7.16: Type of incidents/accidents

S.No.	Source		Cause
1.	Chlorination plants (Mercury Removal plant)	Small or medium chlorine leakage (liquid) from cylinder	Valve or associated flange Leak, Pipe Leak, Tube Joint Leak, Impact failure of the pipe containing liquefied chlorine.
		Small or medium chlorine leakage (vapour) from cylinder	Valve or associated flange Leak, Pipe Leak, Tube Joint Leak, Impact failure of the pipe containing chlorine gas.
		Large vapour and/ or liquid release	Impact failure
2.	LPG Storage	Full bore rupture of the Main Pipe line, connecting pipes and hoses from LPG Storage to shed	Impact failure from the impact caused by the heavy machinery, vehicles, Sabotage or Material failure either due to stresses at the weak point of the pipelines or material failure due to high corrosion and/or erosion rates at the bends, weld joints, etc.
		Small size or medium size or large leaks can occur from Safety Relief Valve, Valves & other associated pipe fittings e.g. Flanges, Gaskets, etc., LPG	Valve or associated flange leaks, Pipe Leak, etc.
		Explosion (BLEVE)	Catastrophic failure of cylinders
		Explosion is also possible in the Combustion Chamber of the Furnace	Un-detected escapes of LPG and build-up of explosive mixtures of the gas in combustion chamber

3.	Sulphuric acid (Acid plant)	Bulk Storage of acid from tank	Failure or Rupture caused by corrosion in the tank/ Natural calamities
		Small or Medium or Large Leaks in Transfer Lines	Failure of Valves and associated joints or Impact failure or corrosion due to poor maintenance
4.	Furnace Oil/ HSD/LDO Storage	Pool Fires	Implosion due to failure of vent to take care of high discharge rate during evacuation of HSD tank and /or Explosion due to over pressure caused by the failure of Level indicator and/ or failure of vent to take care of high filling rates and /or Unusual occurrences e.g. Terrorist attacks, Lightning strike, Static electricity, etc. and/ or Stress in the weak point of weld joints and/ or high corrosion rates.
		Small or medium size leak from the tank and or pipe containment/ body shell	Failure due to stress in the weak point of weld joints and/ or high corrosion rates. Leakage from valves and associated flanges or any other pipe fittings.
5.	Sulphur Dioxide Handling (From GCP to Sulphuric Acid Plant)	Leakage from the transfer lines holding the SO_2	Impact or corrosion or heat or stress.
		Escape of SO_2 through stack	major process deviation at acid plant
6.	Bursting of Steam Pipes		Impact or corrosion or heat or stress.
7.	Boiler Explosion	Dry Fire Accidents	Boiler is allowed to operate without adequate water in the boiler
		Excessive Pressure Accidents	Boiler can no longer contain the excessive pressure allowed to build in the boiler. The operator control, high pressure limit, and the pressure relief valve need to fail before these accidents can occur
		Fuel Related Accidents	Occur in the combustion chambers when the operator fails to purge combustible gases from the fire box before ignition is attempted.
8.	Fire and Explosion at cadmium plant due to evolve of Hydrogen		Fire and explosion can takes place due to availability of ignition source i.e. due to hot work (welding/cutting/brazing/grinding work, electrical spark, smoking etc.)
9.	Food Poisoning		Bacterial infection, fermentation of food, food not prepared freshly, usage of unhygienic and infected water, fall of insects like lizard etc.
10.	Electrical fire (fire in electrical cables, transformer, electrical panels ,etc)		Short circuits, overloading, spark during hot work, smoking can lead to fire
11.	Collapse of Building/Structure		Aging, Poor maintenance, Overloading, Earthquake etc.
12.	Spillage / Leakage of molten Metal		Blast due to moisture, leakage of water through roof, foreign material, leakage of furnace, overflow of furnace, leakage of lounders, Complete Blackout, leakage of moulds, Splash of molten metal through rabbling gate while charging of bundles.

On the basis of MS&IHC Rules of 1989 as amended in 2000 (Schedule 1; Rules 2e (i), 4(1),

4(2), 17 and 18) of Environment (Protection) Act 1986:

- The Sulphuric Acid, LPG, Furnace Oil (FO), HSD, SO2/SO3, Chlorine, CO, etc. are the hazardous chemicals handled and/or stored at DZS.
- SO2/SO3, and Chlorine come under the category of toxic chemicals.
- LPG comes under the category of flammable gas. The lower and upper flammability limits (% vol. in air) of LPG are 2% and 9%.
- HSD fall in the category of highly flammable and flammable liquids respectively.
- The Carbon monoxide (CO) gas comes under the category of Chemical Asphyxiates.

Preventive measures are taken by DZS, Udaipur as a part of Onsite emergency plan such as regular inspection of the buildings and equipment, employee awareness and training programs, taking appropriate cautions, housekeeping and maintenance of flammable liquids properly, no circuit overloading, proper removal of combustible dust and other hazardous materials from areas that contain equipment and machineries.

Purpose: Factors that should be taken care during working in Plant to ensure Safety & Health risk to employees as well as assets in the related area is minimized by:

- Establishing procedures, methods and guidelines to promote and ensure a safe and healthy working practices and environment for DZS Complex.
- Identifying the equipment necessary for safe procedures and methods,
- Establishing a Plan of Action in the event of emergencies

Table 7.17: Role &Responsibility of Each Coordinator

Role of Coordinator	Overall responsibility
Site Emergency Controller (SEC)	• Final authority on all matters related to emergency and report to Corporate and civil authorities (officials of the Govt. like fire brigade, police, medical, pollution control board and the factory inspector)and provide advice to authorities on possible harmful effects to neighbouring population • Ensure that key personnel are called, direct the shutting down of plants and evacuation in consultation with the incident controller and key personnel, casualties are receiving adequate attention. • Contact the local meteorological office to receive early notification of impending changes in weather conditions if risk to outside areas from windblown. • Liaison with chief officers of the fire service, police dep't and health & safety executives. Provide advice on possible effects on areas outside the work premises. • Control traffic movement within the work premises, arrange relief personnel for site along with catering facilities, rehabilitation of affected persons on discontinuation of emergency. • Issue authorized statement to the news media and ensure that evidence is preserved for enquiry to be conducted by the Statutory Authorities. • Decide whether the employees are to be evacuated from the assembly points to identified shelter place based upon the severity of situation. • To inform CEO and whole-time director sitting at Udaipur about the details of the disaster and arrangements made by him to prevent loss of lives / property. • During Odd Shift hrs Shift incharge will act as Site Emergency Controller till arrival of emergency controller
Site Incident Controller	• Rush to the site of emergency after getting information from Shift In charge, assesses the situation and immediately inform to concerned Unit-Head

Role of Coordinator	Overall responsibility
	• Ensure that the persons working in the area are safe, isolate source of toxic release and assist Mgr. /Shift In charge in normalizing emergency. • Advice Manager (F&S) for providing water curtains to contain toxic release with in the plant battery. • Remain in touch with SEC & other concerned officers & Call Sr. Engineers & other shift in charges from colony if required. • Depending upon the severity of the incident, ensure that adequate emergency services like Medical / Laboratory / Mechanical / Electrical are summoned. • Evidence preservation without affecting the operation of emergency procedures to facilitate any subsequent inquiries. • Rescue & firefighting operations, until the arrival of the firefighting crew, search for casualties, evacuation of non-essential workers to assembly areas. • Control the traffic movement within the plant. • Setup communication points and establish continuous contact with ECC relating to failure of electric supply and there by public address system (PAS) and internal telephones, give advice and information as requested to the emergency services, brief to SEC and keep him informed • Direct instructions to shut down all operations within the affected area consideration and evacuation to safer areas.
Shut down Coordinator (Head Engineering Services)	• Contact Incident Controller/HOD at site • Decide about the plant to be shut down in the absence of Site Emergency Controller (SEC), ensure proper shut down of the plant • Inform about the status of plant and do work assigned by the site emergency controller.
Fire & Safety Coordinator	• Ensure the availability of all safety equipment and PPE, preservation of evidences for the investigation of the incident, on site operations are carried out safely. • Arrange for the search of missing persons, guide the rescue team • Investigate the accident to find out the causes, search of missing persons • Guide the fire officer/firefighting team to control the spread of fire and arrange for further equipment /assistance & containment /diversion of spills and chemicals, draining of effluent generation during firefighting • Do work assigned by site emergency controller
Facilities Coordinator (Head HR)	• Arrange transport for injured persons, to bring the key personnel, for shifting of necessary equipment and materials to the emergency location • Arrange additional transport, needed financial support for the emergency operations, rehabilitations of persons • Provide manpower count details available inside plant during emergency based on gate entry & actual head count present at safe Assembly point. • Any other work assigned by Site Emergency Controller
Medical Coordinators	• Inform the hospitals to be ready for receiving the injured persons, ensure proper first aid kit and safe transport of the injured persons to the hospital • Mobilize additional medical facilities if required and guide the medical team members and involve them in giving first aid to the injured persons • Any other work assigned by Site Emergency Controller.
Traffic & Security Coordinator	• Immediately send guards to the emergency site to restrict unauthorized entry by closing main gate by allowing in fire tenders, emergency coordinators, & ambulance • Prepare a report on number of labours and visitors admitted inside the company and send it to ECC within 15 minutes • Direct drivers from unloading area to reach safe assemble point /Emergency shelters and ensure the availability of vehicles to all causalities.

Role of Coordinator	Overall responsibility
communication Coordinator (In charge-CSR/PR)	• Rush to the ECC after getting information from the medical coordinator and inform facilities coordinator & assess "law and order" & the situation in consultation with Site Coordinator and incident controller and ensure that casualties get adequate transport / medical help. • Make arrangement to shift all persons to the safest place if called for & inform Press, TV / Radio, Local authorities about the severity of situation in close coordination with emergency controller. • Remain in touch with Site Emergency Controller (SEC) & Incident Controller (IC)- inform him about the situation
Public Relations Coordinator	• Relation maintenance with nearby industries/villages, Govt. agencies, large scale industries in the area and media • Ensure that the emergency in the plant does not get adverse publicity • Request help from police if necessary • Give report to press and public with the concurrence of the Site Emergency Controller and do work assigned by Site Emergency Controller
Power Coordinators (Head electrical)	• Ensure the availability of power for emergency operations • Arrange safe electrical circuits & emergency maintenance of electrical equipment, and do work assigned by Incident Controller/ Shut down Controller

Scope of the plan

- Assessment of the size and nature of events foreseen for causing Emergency and probability of their occurrence.
- Hazards identification and control safety precautions.
- Service utilities / facilities and their locations.
- Organization for emergency.
- Assignment of duties and responsibilities to key personnel for action on site.
- Assignment of specific responsibilities to all categories of personnel.

Organizational Structure for Handling Emergency

At ZSD due to storage and handling of Petroleum products of class 'B' (i.e. HSD) & class 'C' (i.e. FO, LSHS), Sulphuric Acid, Sulphur Dioxide (SO_2), Chlorine and LPG/Propane, etc. following three types of emergency situations may occur:

LEVEL 1: The level of incident which is controllable within the SBU/ Department and that incident can be purely managed by the emergency response teams of ZSD by using the resources and facilities available at ZSD. Incident may be due to:

a) Small spot of fire in the plant.

b) Toxic gas release for short duration.

c) Collapse of small equipment's.

LEVEL 2: The emergency which is confinable within the Factory premises and that incident can be purely managed by the emergency response teams of ZSD by using the resources and facilities available at ZSD. Emergency may be due to:

a) Big fire in factory premises

b) Medium scale explosion

c) Heavy leakage of toxic gas for short duration.

LEVEL 3: This indicates a situation of off-site emergency; whereby the consequences of incident may go beyond the plant boundaries. In this condition to deal with the emergency situation, emergency response teams at ZSD may require the support from the District Crisis Group and the Local Crisis Group (DLCG) in terms of both i.e. manpower and the resources. Likelihood of vapour cloud with formation of toxic / flammable gases drifting and affecting the general public (i.e. outside of plant premises). This type of emergency arises out of:

a) Explosion in high pressure vessel containing toxic / flammable material.

b) Heavy leakage of toxic material for a long duration from pipeline or storage tanks.

System elements or events that can lead to Accident:

System elements that can lead to major emergencies are as follows:

- HYDRO Plant DG Power Plant
- Storage and Handling of Chemicals
- Fire Hazard Areas
- Explosion Hazard Areas
- Areas susceptible to release of chemicals
- Hazardous locations due to bursting of pipe lines
- Hazardous locations susceptible to release of gases/dust

Hydro Plant

1. Raw material handling from RMH area to Roaster Furnace
2. Roaster for converting zinc sulphide to zinc oxide and sulphur dioxide in fluid bed furnace
3. Transformation of SO2 and gas cleaning system
4. Waste heat boiler
5. Leaching & purification (Hot & Cold leaching process)
6. Electrolysis process for the Zinc deposition on cathode sheets
7. Melting furnace for Zinc sheet melting
8. Finish goods (Zinc Ingots) handling
9. Acid tank of 02 x 5000 MT capacity at R3.

DG Power Plant

1. 132 KV Switch yard
2. Power transmission.

Fire Hazard Areas

1. FO/HSD storage tank and transfer lines of HSD/FO
2. Conveyor galleries including Transfer points
3. Cables in cable galleries/Cellars
4. Furnace Oil handling and oil tanks in Main plant
5. Transformer oil and lube oil storage facilities
6. Burners area in boilers

7. Control room
8. Turbine Hall
9. Turbine oil Tanks in Units
10. Power Transformers
11. Fire in dry bushes.

Explosion Hazard Areas

1. LPG storage and transportation
2. Transformer (oil cooled)
3. Boiler (oil Fired)
4. Explosion due to evolve of hydrogen at cadmium plant

Areas susceptible to release of chemicals

1. Acid storage tanks and associated distribution pipelines.
2. Furnace Oil tanks at Furnace Oil tank farm area

Hazardous locations due to bursting of pipe lines

1. Steam pipes due to high pressure/temperature
2. SO2 gas lines and acid lines
3. Acid tanks
4. LPG transportation Pipes
5. Compressed air header

Hazardous locations susceptible to release of gases/dust

1. Release of SO2/SO3 from generation points, transfer lines and acid plant
2. Ducts for flue gases

Hazard Identification

The following hazards are likely to be present at DZS, Udaipur:

Table 7.18: Hazards identification at DZS Udaipur

S. No.	Chemical	Location	Hazard
1.	LPG	LPG Storage shed& associated transfer lines and equipment	Fire: Pool Fire, Jet Fire, Flash Fire Explosion: Vapour Cloud Explosion (VCE), Boiling Liquid Expanding Vapour Explosion (BLEVE)
2.	Furnace Oil (FO)	FO Tank Farm	Fire: Confined or Running Pool Fires
3.	HSD	HSD Storage Yard	Fires: Confined or Running Pool Fires
4.	Sulphuric Acid	Acid Storage Yard	Acid Fumes arising from the Acid spills in large, medium or small quantities, Formation of hydrogen on reaction with metal.
5.	Sulphur Dioxide (SO_2)	Acid Plant and transfer lines from GCP to Acid Plant	Release of Toxic Gas caused by the sudden escape of SO_2 in large medium or small quantities
6.	Chlorine	Mercury & Water Treatment Plant	Release of Toxic Gas caused by the failure of cylinder/tonner.

Safety & Mitigation Measures:

Safety Relevant Components – The following safety relevant components are being used in DZS, Udaipur for the safe handling of the systems or elements that can minimize / control any accident/ major accident are shown in the table below:

Table 7.19: Details of safety relevant components

S.No.	Safety measure	Details
1.	LPG Storage shed	• The pipeline is painted to prevent the corrosion and a visual inspection at regular intervals • Pressure & Temperature Indicators, Safety Valves of adequate discharge capacity are provided. • Pressure regulators and the excess flow check valves provided at appropriate place and yearly checked to take care of pressure fluctuations and prevent infinite flow in case of bursting of the pipeline respectively. • LP gas detectors to identify the leakage from supply system. • Installation of Active and passive fire protection system (water sprinkler, hydrants & monitors) to deal with the possible fires in the LPG storage shed and permit system to perform any Hot and / Cold work in LPG storage shed and transfer lines, Integrity test (hydraulic test / thickness test) conducted on regular interval, bonding / earthling provided in transfer line to discharge static current
2.	Chlorination Plants	• Chlorine detectors to detect the leaks of 01 ppm & give alarms in the operation control room and also in the local area. • At Roaster-Acid plant chlorine tonner is provided with hood & connected to scrubber with interlocking of blower operation automatically based on detection by sensor. • The Chlorine Emergency Kit is provided at all the locations. • Neutralisation pits, alkali solution is provided in the chlorination rooms to put the cylinder in this pit in case of heavy leakage from the body. • The SCBA is available in safety dept. • Airline respirator system provided at both the locations. • Eye wash & Safety showers are provided at all locations of chlorine storage & trained operators are employed. • The other PPE's like Protective clothing, gloves, goggles and canister masks, cartridge type gas filters are also provided to the workers.
3.	High Speed Diesel Oil (HSD) and Furnace Oil (FO) Storage & Handling	• All storage vessels used for the storage of HSD and FO having facility of level indicators & controls. • Daily oil level checks performed on regular basis and a record is maintained. • The storage vessel and piping system used for the HSD and FO have grounded and provided with lighting arrestors. Earth connection and resistances are checked at regular intervals. • The tanks are provided with fencing / access control, dyke walls for leakage prevention, Active and Passive Fire Protections e.g. Foam pouring system, Hydrants & Monitors, etc., checked for their water content and drained at regular intervals to ensure entry of water in diesel fuel supply system & tank integrity tests e.g. Thickness test; are also performed at regular intervals. • Burner system provided with a UV flame detection system which will stop the oil pump and close the control valve in case of flame failure. • Oil unloading track line is with cement floor and provided with spillage collection trenches & Oil separation pits provided to reclaim the spillage oil and there is a provision for pumping back the collected oil to the tanks.

S.No.	Safety measure	Details
		• The entire plant premise is declared as "No Smoking Zone", proper housekeeping maintained. • For any welding and cutting works / jobs in the vicinity, hot work permit system is strictly followed.
4.	Electrical fire (Cable galleries /control rooms/Transformers)	• Adequate numbers of fire extinguishers at entrances of cable galleries, smoke detectors are provided at main electrical control rooms, adequate numbers of fire hydrant points are available nearby the cable galleries/transformers. • Work permit being followed for safely completion of jobs • Schedule inspection/preventive maintenance of electrical equipment's • Life Saving Rules and provision of access control at electrical control rooms & transformer yards
5.	Fire and Explosion at cadmium plant due to evolve of Hydrogen	• SOP is in place for to restrict hot work during plant operation. • Hydrogen vent duct provision for continuous venting of gas • Regular inspection of hydrogen duct for any chocking • Adequate firefighting equipment like fire hydrant line, fire extinguishers are provided, regular PMI of electrical equipment are being done, area restricted for unauthorized entry, HIRA has been done for hot work during plant shutdown
6.	Food Poisoning	• Stool test of food handler's other canteen staff done periodically, clean and hygiene portable water is being used for cooking and drinking, hygiene inspection done by doctors every month, fresh vegetables and food is served, Paste control and phenyl moping to prevent insects inside canteen
7.	Collapse of Building/ Structure	• Periodical maintenance of buildings and painting of structures, no overloading of structures and third party is engaged for monitoring/ auditing the building and structures. • Certification of stability from competent person
8.	Sulphuric Acid Storage	• Interlock of circulation pump with plant trip • Provision of level indicators (float & sensor type and level monitoring through DCS) & overflow line • Periodical cleaning and Thickness measurement of storage tanks • Dyke wall with sump & sump pump arrangements • Maintaining minimum level of acid in tanks (11 meters for 13-meter height tank), Acid neutralization arrangement
9.	Boiler Operation	• Periodical cleaning of boiler and inspection/testing by competent person & pressure relieve valves testing periodically. • Maintaining & ensuring water quality feeding in Boiler & other parameters. • Certified Boiler operators, timely replacements of Boiler bundles based on condition monitoring, engagement of IBR welder for welding
10.	Natural Calamities	• Structure stability through competent person, safe shelter for employees & trained and experience rescue team • No water stagnation due to geographical condition of plant • Provision of lightning arresters, availability of HEMM like Excavator, JCB, Pock lain, Forklifts, loader high pumping capacity sump pumps operated through DG
11.	Molten Metal	• SOP of charging of material into the furnace, Interlocks • Trained and experienced operators and rescue team, preventive maintenance of equipment's, Job specific PPE's • Provision of Emergency exits, safety showers and fire extinguishers, first aid box and trained first aiders.

Fire Fighting Activity:

The plant is protected against fire hazards and it is well equipped with fire protection systems. The details of the firefighting facilities available at DZS are as under-

Table 7.20: Fire Fighting Equipment

Fire System	Number
Fire hydrant single headed	61
Risers(at internal stairs)	01
Water monitors	12
Deluge valve Sprinkler system	01

Table 7.21: Classification of fire and type of fire extinguishers

S.No.	Fire Class	Application	Type of fire extinguishers
1	A	Organic Material's (Wood, Paper, Cloth, Plastic)	Water type
2	B	Flammable Liquides (Petrol, Paint, Solvent) etc.	Foam Type
3	C	Flammable Gases (LPG, Acetylene) & Fires Involving Elect.)	Dry Chemical Powder (D.C.P.)
4	D	Combustible Metals (Magnesium, Sodium, Potassium)	Carbon Dioxide (CO_2) special dry power

Table 7.22: Location of fire hydrants

S.No.	Hydrant No.	Location	Type of Hydrant
1	01	In front of Safety Engg. Department	Pillar Post
2	1-A	Near Canteen	
3	02	Near S.S.-5	
4	03	Near Water Clarifier	
5	04	Behind Store 'B' Section	
6	05	Near L.D.O. Tank in Zinc Dust.	
7	06	Behind Zinc Dust Plant	
8	07	Behind LDO Tank of Zinc Dust	
9	08	C.S. Store Yard	
10	09	Near Store Receipt Section	
11	10	Near old P.A.P. Plant	
12	11	Coke storage area	
13	12	Near Instrument Section	
14	13	Near Petrol Pump	
15	14	L.R.Mill	
16	15	Near Roaster Plant Office	
17	15-A	Near Cadmium Melting Plant	
18	16	Near Cake Storage Yard Stair	
19	16-A	Inside Acid Plant No.-I	
20	17	D.M. Plant	
21	18	Near Acid Plant No.-II Tank	
22-23	19 & 19 A	old Silver Recover Plant	
24	20	Old DG Power House HSD Tank	
25	21	Near Pump House No.II	
26	22	Behind 132 KV Switch Yard Corner	
27	23	Civil Office Corner	
28	24	Zinc Melting Plant Corner	
29	25	Slag Grinding Machine Corner	
30	26	Near RTP Transformer Room	
31	27	Near Settling Tank No.-05	

S.No.	Hydrant No.	Location	Type of Hydrant
32	27-A	Near Filter Cloth Washing Tank	
33-34	28 & 28 A	Near DG Set Fuel Tank	
35	29	Near Civil Maintenance Office	
36	30	Behind Extreme corner of DG Fuel Tank	
37	31	FO storage tank of Wartsila DG	
38	32	Near unloading point of FO at W.DG	
39	33	Near unloading point of FO at W.DG	
40	34	Near Wartsila DG	
41	35	Near Wartsila DG	
42	36	Near Boiler of Wartsila	
43	37	Near coke storage of MCTP	
44	38	Near old storage of MCTP	
45	39	Near kiln of MCTP	
46	40	Near chimney of MCTP	
47	ETP-1	ETP front road	
48	ETP-II	ETP back side	
49	ETP-III	ETPback side	
50	ETP -IV	Near tower no 2	
51	51	West of new cell house ZE	
52	52	Near acid plant -2 / TGT	
53	53	North east of new roaster control room	
54	54	East of calcine silos R-3, south of rmh shed	
55	55	East side of rmh area R-3	
56	56	North side of rmh area R-3	
57	57	East of new acid plant	
58	58	North east of new roaster acid storage tanks	
59	59	Near cooling tower R-3 for plant near acid tanks	
60	60	Near acid loading area R-3	
61	61	West of new roaster near compressor house	

Medical Arrangements

The DZS Udaipur stores and/or Handles FO, HSD, Chlorine, Acid etc. The handling of these chemicals has the risk of burn injuries, toxic exposures and physical injuries in case of blast. In this document we have detailed the infrastructure available with the DZS Udaipur for the effective management of Medical Emergency. The DZS Udaipur operates a Hospital in the DZS Colony and a dispensary at the plant premises. The details of facilities available at Hospital and the dispensary are detailed in table no. 14.1 and 14.2 respectively. DZS, Udaipur has one Hospital with more than 1 beds. The hospital is equipped with a team of qualified doctors, operation theatre and full range of emergency and normal treatment facilities.

Table 7.23: Facilities at DZS Hospital

S.No.	Particulars	Quantity in Nos.
1.	Bed Available	12
2.	Doctors Available	02
3.	Visiting Consultants	01
4.	Cardiac monitoring with Defibrillator	01
5.	General Ward	02
6.	X-ray Technician	01
7.	Pathology Technician	01
8.	Nursing Staff	05

S.No.	Particulars	Quantity in Nos.
9.	DRESSER	04
10.	Sweeper	02
11.	Oxygen Therapy Set	08
12.	ECG Machine	01
13.	Audiometric machine	-
14.	Physiotherapy Equipment room	01
15.	Spirometry	01
16.	300MA X-Ray machine	01
17.	Pathological Laboratory	01
18.	Operation Theater for Minor Cases (Minor OT)	01
19.	Ambulance	01
20.	Emergency Medicines and Trips	Full stock

Table:7.24: Facilities at nearby hospitals

Medical Facility	Distance from DZS (Km)	Telephone
GBH American Hospital Udaipur	13	0294 305 6000
Geetanjali Hospital Home	10	0294 250 0001
Mewar Hospital	10	0294 244 2006
Govt. General Hospital	12	02942528811
Maa Gayatri Hospital	06	0294 249 4700

Transport & Evacuation Arrangements:

Emergency preparedness is a shared responsibility. While disasters and emergencies affect everyone, their impact on people with disabilities/special needs is often compounded by factors such as reliance on electrical power, elevators, accessible transportation and accessible communication – all of which can be compromised in emergency situations but proper assistance will be provided to people present in the premises during any kind of emergency especially of persons with disabilities (hearing impairment) and pregnant women.

Communication during Emergency

Communication is the most important system for the effective management of an emergency situation. The process of declaration of emergency will involve passing of the information to the essential services and threatened areas. Besides, it also becomes essential to inform outside agencies, relatives, press, etc. In case of any incident, it will be informed by the person noticing first to the shift in-charge either through phone or Paging or through Walkie-Talkie sets or by any other means available at that time. In A, B & C shift, Shift In-charge will act as Site Emergency Controller till arrival of SEC.

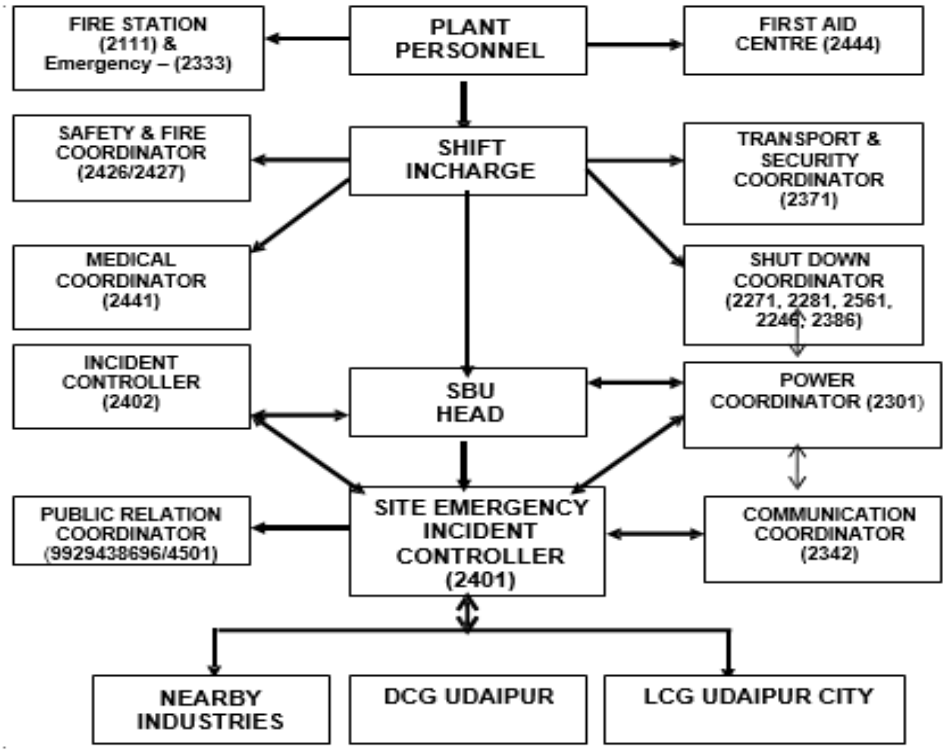


Figure 7.12: Communication network system at DZS, Udaipur

The details of the communication facilities are available in DZS are given below;

1. Public address system has been provided in the key plant locations.
2. Telephone and Intercom facilities are available at all required officially desks.
3. Emergency alarm is available at chlorine storage shed alerting the neighbouring plant areas in case of heavy leakage of chlorine.
4. Two P&T telephone connection are provided in Emergency Control Centre to contact nearby industries to seek for any external assistance.
5. In addition to this two-fax connection one Sat-com connection is also provided in Emergency Control Room.
6. Walky-Talky sets provided

Assembly Points

The location of the assembly points has been assessed keeping in the probable sites of emergency incidents, likely impact zones, vulnerable population and escape routes, etc. The locations of assembly points and emergency Safe shelter points with respect to the sources of major emergency scenarios in DZS are identified and are shown in Map. The following places can be declared as an Assembly Point and shelter points.

Assembly Point-I: Lawn near Safety Department

Assembly Point-II: Lawn near DG Power

Assembly Point-III: Lawn near ETP

Assembly Point-IV: MCTP

Safe Shelter: Executives club at Colony

Sports Complex at Colony

Plant Canteen

7.4.7. Off-site Emergency Plan

The off-site emergency plan is an integral part of any hazard control system. It is based on those incidents identified by the works management, which could affect people and the environment outside the works. Thus, the off-site plan follows logically from the analysis that took place to provide the basis for the on-site plan and the two plans therefore complement each other. The roles of the various parties that may be involved in the implementation of an off-site plan are described below. The responsibility for the off-site plan will be likely to rest either with the works management or with the local authority.

- Either way, the plan identifies an emergency coordinating officer who would take overall command of the off-site activities. Consideration of evacuation includes the following factors:
- In the case of a major fire but without explosion risk (e.g. an oil storage tank), only houses close to the fire are likely to need evacuation
- If fire is escalating very fast it is necessary to evacuate people nearby as soon as possible.
- In acute emergency people are advised to stay indoors and shield themselves from the fire.

Types of Accidents/ Incidents

Based upon the guidelines of MSIHC Rules and the findings of the PHA study (consequence analysis) the following plant wise, full ranges of scenarios were identified:

Chlorination Plants:

Causes-

- Valve or associated flange Leak, Pipe Leak, Tube Joint Leak, Impact failure of the pipe containing liquefied chlorine.
- External fire from neighbouring unit or Impact failure

LPG/ Propane Storage:

- Full bore rupture of the Main Pipe line, connecting pipes and hoses from LPG/Propane Storage to Plant
- Small size or medium size or large leaks can occur from Safety Relief Valve, Valves & other associated pipe fittings e.g. Flanges, Gaskets, etc., LPG/Propane Pump & Compressor
- Explosion (BLEVE) in LPG/Propane Storage due to catastrophic failure of shell of bullet
- Explosion is also possible in the Combustion Chamber of the Furnace.

Sulphuric Acid (Acid Plant):

- Leakage of acid from tank
- Small or Medium or Large Leaks in Transfer Lines

Coal Handling Plant:

- Fire or Dust Explosion in Coal Stockyard; Coal conveying system;

LDO / HSD Storage:

- Pool Fires
- Small or medium size leak from the tank and or pipe containment/ body shell.

Sulphur Dioxide Handling (From Roaster/ Sinter to Sulphuric Acid Plant):

- Leakage from the transfer lines holding the SO_2 caused by the impact or corrosion or heat or stress.
- Escape of SO_2 through stack during major process deviation at acid plant.

Bursting of Steam Pipes:

- Leakage and or bursting of pipelines and/or vessels carrying the steam caused by the impact or corrosion or heat or stress.

Organization

Organizational details of command structure, warning systems, implementation procedures, emergency control centres include name and appointments of incident controller, site main controller, their deputies and other key personnel involved during emergency.

Communications

Identification of personnel involved, communication centre, call signs, network, list of telephone numbers.

Specialized Knowledge

Details of specialist bodies, firms and people upon whom it may be necessary to call e.g. those with specialized knowledge

Voluntary organizations

Details of organization, telephone numbers, resources etc.

RESPONSIBILITY OF THE OUTSIDE AGENCIES AND/OR THE KEY PERSONNEL

To facilitate the emergency responders, it will be the responsibility of the emergency response team coordinators to assess the magnitude of consequences and scale of the impact of an incident. On the basis of their experience, when they think that the plant's emergency response is unable to control the emergency situation, they will ask the chief emergency controller to declare the off-site emergency i.e. Emergency Level-III. LEVEL-3 indicates a situation of off-site emergency; whereby the consequences of incident may go beyond the plant boundaries. In this condition to deal with the emergency situation, emergency response teams at DZS may require the support from the District Crisis Group and the Local Crisis Group (DLCG) in terms of both i.e. manpower and their sources. Likelihood of vapour cloud with formation of toxic / flammable gases drifting and affecting the general public (i.e. outside of plant premises). This type of emergency arises out of:

a) Explosion in high pressure vessel containing toxic / flammable material.
b) Heavy leakage of toxic material for a long duration from pipe line or storage tanks.

The possible composition of this crisis management group which can be called for the management of emergency situation of level-III has been described in 'The Chemical Accidents (Emergency Planning, Preparedness & Response) Rules 1996' (CAEPPR-1996) of Environment (Protection) Act, 1986. The CAEPPR-1996 seeks to achieve partnership among different stakeholders through the creation of

District and Local Level Crisis Groups (DLCG & LLCG). These crisis groups have been given the responsibility of management of chemical accidents in a given industrial area.

7.5 Conclusion

It has concluded that there will be no major risk involved due to proposed expansion project. Suitable Risk Control Measures with respect to Risk Assessment have been/will be implemented to minimize the risk to an acceptable level. Regular Training, Implementation of SOPs and compliance of relevant Personal Protective Equipment's (PPEs) shall help to minimize the health hazards and incidental casualties. So, it is safe to say that there will be no major risk involved due to the expansion project.

CHAPTER-8

PROJECT BENEFITS

8.1 INTRODUCTION

The development of industrial projects plays a key role in the economic growth of any country. M/s. Hindustan Zinc Limited is one of the top six global companies and is the only integrated lead and zinc manufacturer in India. HZL believes holistic socioeconomic development of the local community is the need of the hour. It truly believes that a company's prosperity is linked with that of its neighbouring communities.

It is anticipated that as a consequence of this expansion project there will be employment opportunity including skilled, semi-skilled, and unskilled wages. It has been assured alongside that the industry will bring improvement of physical infrastructure at local area like, building/strengthening of existing roads, providing drinking water, drainage system, transportation facility etc. with improved educational facilities and professional practices and by extending healthcare facilities it can be expected that the project will lead towards further development in literacy, economic status and standards of living. Thus, the basic requirement of the community needs will be strengthened by the expansion project either by providing or by improving the existing facilities in the area, which will help in uplifting the quality of life of the local communities. Additionally, support in the areas of sports, recreation and environmental sanitation can also be undertaken to facilitate socioeconomic opportunities.

This chapter focuses on those points which become beneficial to the surrounding area or community in terms of infrastructural development, social development, employment generation and other tangible benefits due to upcoming project activities. The company is active in overall socio-economic development of the area and will undertake socio-economic developmental activities for the benefit of the locals.

8.2 PROJECT BENEFITS

The proposed expansion project will provide various benefits across the nearby areas which are attributed below:

1. Environment
2. Employment
3. Economic
4. Social

The company is conscious of its obligations to society at large and will contribute in overall socio-economic development of the area in the coming years by increasing its efforts for overall development of the study area.

Benefits of the project clearly indicate environmental, social, economic, employment potential etc, are summarized below:

8.2.1 ENVIRONMENTAL BENEFITS

Out of the total plant area (184.2 ha), 40.0 ha (41.41 %) area has already been developed. The same will be maintained and densed by doing gap plantation to achieve the plantation density @ 2500/ha. The greenbelt & plantation around the plant results as a pollution sink with positive effective barrier between the plant and surroundings. Strengthening of greenbelt/plantation quality within the area is/will help in better harnessing of the run-off thereby helpful in potential recharging of the groundwater and also help in reducing the soil erosion. The development of greenbelt/ plantation in plant area is being helpful in capturing the fugitive emissions, attenuate the noise generated thereby maintaining the air quality and noise levels and will also improve the aesthetic beauty of the surrounding. The open space within the plan area, where tree plantation may not be possible is covered with shrubs and grass to prevent erosion of topsoil. Other open spaces within the plant area are converted to green areas in the form of lawns or flowering plants. Educational/Promotional activities is being/ will also be included as a part of CSR/CER activity to encourage the surrounding nearby/ local villagers towards the importance of trees, on their management/care.

Vegetation protects soil from erosion and reduces surface water runoff in many ways. Live plant foliage reduces the impact of rainfall and increase the absorptive capacity of the soil. Storm water is held onsite and released slowly. Groundcovers intercept and slow rainfall and their roots hold soil particles in place. Groundcovers reduce runoff velocity and filter out suspended soil particles during storms. Shrub and tree roots provide a restraining web that increases soil cohesion and stabilizes soil. Tree roots often penetrate deeply into soil blocks, increasing soil shear strength and resisting shallow mass soil movement. Roots also promote soil porosity and permeability. Evapotranspiration by plants reduces soil moisture and delays the onset of saturation and runoff.

Apart from the above, HZL has established Sewage Treatment Plant at Udaipur under PPP model to treat 60 MLD sewage and utilize treated water in its operations. Rainwater harvesting and recharge structures established by the company in and around the plant site will improve the water availability in the area.

8.2.2 EMPLOYMENT BENEFITS (DIRECT AND INDIRECT) DUE TO THE PROJECT

The expansion project will generate both direct & indirect employment. Existing manpower of the plant is 784 persons. Additional manpower of 65 persons will be required for the proposed expansion project. The operational workers are locals and commute daily from their residence for work therefore, no long-term housing will be required. Residential Colony has been provided for the non-local workers.

Apart from the above, various indirect employment opportunities are envisaged by way of transportation, workshops, petty contractors; shopkeepers, network of retailers throughout the state and in its marketing regions. Plant activities also result in ~400 indirect employment avenues for the people such as truck owners, drivers, repair shops, tea-stalls, lenders etc.

However, various Skill development activities and vocation training programs will be carried out in the area to develop different skill sets in the local youth and to make them employable at Debari Zinc Smelter Plant as well as other nearby industries. Total manpower for the project is estimated around 849 persons (310 permanent and 539 Contract labour).

Table 8.1: Employment generation

Employment Type	Existing	Additional		Total Additional	Total after Expansion	Remarks
		Phase I	Phase II			
Executive	295	15	0	15	310	Manpower will be sourced locally from nearby area as per eligibility criteria
Contract	489	50	0	50	539	

8.2.3 ECONOMIC BENEFITS

Total Exchequer to Government till 31st March, 2023 was Rs. 24892 Crores, Crore including dividend of 9,422 Crore including royalty and taxes. The expansion project will result in growth and development of the surrounding areas by increasing direct and indirect employment opportunities in the region which will not only improve the socio-economic condition but will also raise the living standard of the local population.

Special emphasis on financial and social benefits will be given to the local people. Development of social amenities will be in the form of medical facilities, education to underprivileged and creation of self-help groups. Business opportunities for the local people will be enhanced like transport of raw material in the market, maintenance & housekeeping contract work etc.

8.2.4 SOCIAL BENEFITS

The community has been a key stakeholder in business and environmental Concerns are a matter utmost priority for the company. The Management believes in being a catalyst in the transformation of the communities around its business operations through partnership with local communities, Government, NGO's and other stake holders. The company addressing developmental changes of health and sanitation, education, livelihood, rural infrastructure, women empowerment etc in nearby operational areas. The prime objective of our Corporate Social Responsibility Policy is to hasten social, economic and environmental progress. We remain focused on generating systematic and sustainable improvement for local communities surrounding our plants and project sites.

HZL has a Vision to enhance the quality of life and economic wellbeing of the communities around its operations, mainly SAKHI, MARYADA, KHUSHI campaigns, Shiksha Sambal Project, Jeevan Tarang Programme, Samadhan Programme reaching over 1.72 million plus beneficiaries and 237 villages across Rajasthan.

Hindustan Zinc Limited (HZL) has a dedicated CSR department which is led by qualified and experienced professionals. CSR is a fundamental part of HZL's targeted practices, broad objectives, and overall culture. The company has undertaken/will continue to undertake various community development activities for the social upliftment of community as under:

1. Education
2. Health, Drinking water, Sanitation& safety
3. Women empowerment
4. Sustainable Livelihoods
5. Sports & culture
6. Environment & safety
7. Skill Development
8. Community Infrastructure

8.3 PROMOTION OF SOCIO-ECONOMIC STATUS

The beneficial aspects of the projects on the socio-economic environment of the area are in the areas of employment, service, trade, commerce, public utility, literacy, social awareness, health care facilities, recreation etc.

HZL has contributed substantially to the overall economy and social development of the area.

Our Vision

"Lead in creating Prosperity and Happiness for all stakeholders through Innovation and Sustainable Practices"

As an organization, HZL spread happiness amongst everyone connected with their eco-system and create wealth for investors, employees, business associates and communities where HZL operate by experimenting and implementing new ideas for improving efficiencies and maximizing the ratio of output product to input resources.

Major areas undertaken by HZL have been shown below in Figure 8.1.

Figure 8.1: Focus areas for CSR activities

8.4 CSR ACTIVITIES CARRIED OUT BY HINDUSTAN ZINC LIMITED

HZL has contributed substantially to the overall economy and social development of the area through CSR activities. The same will be continued in future, in addition to the social developmental activities for proposed expansion project. The operation zone of the social developmental activities for the proposed expansion project will be extended to the nearby villages of plant site.

The CSR Projects have been carried out in the area to align with the Sustainable development goal covering each segment and domain of the society which includes broadly the area of Education, Women's empowerment, Health & Hygiene, Drinking water and sanitation, Sustainable Livelihood, Infrastructure Development, Environment Management & Miscellaneous development including community assets creation as below:

Table 8.2: Major Projects Carried Out/Continue So Far Under CSR

S. No.	Major Areas	CSR activities
1.	Health & Hygiene	Quality healthcare services at doorstep, Free medication and lab tests, health camps and awareness Referral services and linkages with government schemes benefitting community of 30 villages.
2.	Education	Aimed at providing education in Science, English and Maths (SEM), innovative learning techniques, including group learning, worksheets, learning camps, science fairs and so on in 15 schools and catering to 5500+ students. Support towards education initiatives-IIT coaching for students of HZL communities. Support to female students to pursue higher education at Vedanta PG Girls College. Under, anganwadis strengthening program, supporting preschool education, health of 0-6 kids/pregnant women, stakeholder engagements and developing Nand Ghars.
3.	Sustainable Livelihood	Farmers training, Micro Irrigation program, Improved Agriculture-Horticulture, orchard development, Rainwater harvesting, Artificial Insemination, Veterinary camps and mass vaccination programme. Provide training and employment opportunities to the local unemployed youth communities.
4.	Women Empowerment	Grassroot institutions like SHG and federations for saving and credits and income generation activities, linkage with banks and credits, new microenterprises for source of income, skill development centers, collective microenterprises- pickle, pulses grading, fabric stitching, spices etc. Overall 5000+ women associated with SHGs.
5.	Infrastructure Development	Need based infrastructure like Construction of village roads, culverts, school classrooms, kitchens, boundary wall and solar streetlights, drainage, Community Hall, Bus Station, Stadium etc.
6.	Drinking water and sanitation	Developing drinking water structures like OHT and pipeline, construction of toilets, water supply through tankers during summers and Water RO as well as ATM. Development of sanitization structures, wastewater management, toilets etc. in the villages.
7.	Skill Development	Mobilizing educated youths, training under different trades like food and beverage management, microfinance, customer relationship management etc., placement support.

Figure 8.2: Some Photographs of the CSR Activities Carried Out

8.4.1 Expenditures Incurred on CSR Activities By M/S. Hindustan Zinc Limited

The company has spent Rs. 1271.94 Lacs in last 5 years on CSR activities under various heads. Details are given as under:

Table 8.3: Expenditures Incurred on CSR Activities in last 5 years (In Lacs)

S. No.	Activity Heads	Year					Total (Lacs)
		1st Year (2017-2018)	2nd Year (2018-2019)	3rd Year (2019-2020)	4th Year (2020-2021)	5th Year (2021-2022)	
1.	Education	7.84	18.69	30.42	25.20	119.82	**201.97**
2.	Livelihoods (Skilling)	0.00	0.00	0.00	0.00	98.16	**98.16**
3.	Women Empowerment	10.89	4.24	0.00	0.00	4.47	**19.60**
4.	Health	2.94	58.96	116.39	87.94	112.15	**378.37**
5.	Drinking Water	104.41	95.87	83.18	54.96	59.99	**398.40**
6.	Sanitation	0.00	0.00	0.00	0.00	15.57	**15.57**
7.	Community Assets	0.00	11.19	43.13	1.48	8.29	**64.09**
8.	Sports & Culture	0.44	0.06	3.46	0.00	1.00	**4.97**
9.	Environment & Safety	0.00	0.00	0.40	0.00	3.13	**3.53**
10.	Program & Admin	10.34	17.56	18.02	13.62	27.74	**87.29**
	Total	**136.86**	**206.56**	**295.01**	**183.20**	**450.31**	**1271.94**

8.5 PROPOSED ACTION PLAN

The proposal is for obtaining Environmental Clearance for expansion project under para 7(ii)(a) of EIA Notification, 2006, amended from time to time and in line with the MOEFCC's OM dated 11.04.2022. Therefore, Public Consultation is not envisaged in this project.

However, in line with the Office Memorandums of MoEF&CC dated 30th Sept., 2020, & 20th Oct., 2020, Socio-Economic Developmental activities have been formulated, which will be addressed in Environment Management Plan (EMP) & will be implemented in a time bound manner with the commissioning of the project. An amount of Rs. 35.27 Crores has been earmarked for Socio-Economic development activities within the study area during 3 years.

The Socio-economic activities will be implemented based on the community priorities. The areas where the development is required will be identified through Socio-economic study and considered. This approach will strengthen the groups, empower the members and will develop a high sense of ownership. The funds allocated will be spent for various socio-economic development activities proposed to be undertaken in the study area with a priority to villages falling in the impact zone, which may be further extended to other villages depending upon the budget and requirement.

Table 8.4: Proposed social and Economic Status

Sector	Activity	1st Year	2nd Year	3rd Year	Total Amount (Rs. Lacs)
Community Infra	Construction of roads, community halls, school hall, School classrooms etc. based on need assessment and request from villages.	184	585	643.5	1412.5
Education	Support to schools through Siksha Sambal a program for providing education in Science,	217.2	260.8	274.88	752.88

Sector	Activity	1st Year	2nd Year	3rd Year	Total Amount (Rs. Lacs)
	English and Maths. Support towards education initiatives-IIT coaching for students of HZL communities. Support to female students to pursue higher education at Vedanta PG Girls College. Anganwadis strengthening program, supporting preschool education, health of 0-6 kids/pregnant women, stakeholder engagements and developing Nand Ghars.				
Water	Supply of drinking water through tankers and water RO and ATM	45	90	99	234
Sanitation	Sanitization drive and waste management system to be installed in villages	0	50	55	105
Women empowerment	Promoting activities like saving, credit linkage and income generation by forming SHG of women and strengthening them by supporting skill development. Currently 5000+ women are associated with our program.	71.63	110	121	302.63
Sustainable livelihood	Ensuring sustainable livelihoods through integrated farming system in operational area and promoting Sustainable community-based institutions to empower the rural community. Provide training and employment opportunities to the local unemployed youth communities.	159.62	200	220	579.62
Health	Providing primary health care facilities to nearby villages with the help of Mobile Health Van.	36	50	55	141
Total		**713.45**	**1345.8**	**1468.38**	**3527.63**

Note:

* The above action plan will be implemented during project implementation phases.

** The activities given in the above table are excluding the Pollution control and mitigation measures, which are included in EMP cost i.e., (Capital Cost: Rs. 600.628 Crores/- & Recurring Cost: Rs. 70 Crores/annum.

*** Village Development Committees will be formed to engage with the community; plan, monitor and coordinate the social developmental activities.

Table 8.5: Village Adoption Plan

S. No.	Nature of activity / Activity details	Tentative total Quantity	2024-25		2025-26		2026-27		Total (Rs. Lacs)
			Quantity	Budget	Quantity	Budget	Quantity	Budget	
A.	**Village Bichhri**								
1.	Drinking Water Facility - Pipeline & Tank, ATMs	Pipeline, Tank, Solar Pump and 1 ATM	1	4	-	30	-	35	69
2.	Road	1500 RM	-	0	500	25	1000	50	
3.	Over-Bridge	1 no.	-	1	-	0	1	75	76
4.	Street Lights	200 no. of LED lights	-	0	75	3	75	3	6
5.	Model Schools	2 no.	-	0	-	30	-	30	60
6.	Sub Center - Health	1 no.	-	0	-	10	-	15	25
7.	Nand Ghar / Model Anganwadi	2 no. of Nand Ghar Development	-	0	1	17.5	1	17.5	35
8.	Community Hall	2 no.	1	15	1	20	-	0	35
9.	Cremation shed	1 no.	1	20	-	0	-	0	20

S. No.	Nature of activity / Activity details	Tentative total Quantity	2024-25		2025-26		2026-27		Total (Rs. Lacs)
			Quantity	Budget	Quantity	Budget	Quantity	Budget	
10.	Women Washroom	2 no.	-	0	1	7	-	0	7
11.	Plantation Roadside	500 no. of Plants with Maintenance	100	2	200	4	200	4	10
12.	Sanitation Drive with System	1 no.	-	0	1	30	-	0	30
13.	Signage and boards - Road side	-	-	0	-	5	-	0	5
	Sub Total		**-**	**42**	**-**	**181.5**	**-**	**229.5**	**453**
A.	**Village Debari**								
1.	Drinking Water Facility - Pipeline & Tank	Pipeline, Tank, Solar Pump	-	0	-	30	-	30	60
2.	Street Lights & High Mast Light	50 no. of LED lights and Poles	-	0	25	7.5	25	7.5	15
3.	Model Schools (High Secondary School)	1 no.	-	30	-	25	-	25	80
4.	Sub Center - Health	1 no.	-	0	-	15	-	10	25
5.	Community Hall	1 no.	1	20	-	0	-	0	20
6.	Cremation shed	1 no.	-	0	1	10	-	0	10
7.	Women Washroom	2 no.	1	7	-	0	1	7	14
8.	Plantation Roadside	200 no.	50	1	50	1	100	2	4
9.	Sanitation Drive with System	1 no.	1	25	-	0	-	0	25
10.	Signage and boards - Road side	-	-	0	-	5	-	0	5
	Sub Total		**-**	**83**	**76**	**93.5**	**126**	**81.5**	**258**
	Grand total		**-**	**125**	**-**	**275**	**-**	**311**	**711**

8.6 CONCLUSION

Apart from providing direct employment opportunities the proposed expansion project is being/will generate a fair amount of direct and indirect employment in the study area in the form of contractor, shopkeepers, agents, stockists, transportation, workshop etc. and other casual employment. The local economy will receive a boost due to employee spending and services generated by the company. The overall effect will improve the buying power of employees and thus a higher standard of living viz. better education, improved health and sanitation facilities, housing etc. This is envisaged as a major positive benefit, which will ultimately lead to the sustainable development of the region.

CHAPTER - 9

ENVIRONMENTAL COST BENEFIT ANALYSIS

9.1 ENVIRONMENTAL COST BENEFIT ANALYSIS

M/s Hindustan Zinc Ltd. is one of the largest Lead-Zinc integrated producer & a Leading producer of silver with more than 60 years of experience in Mining & Smelting. Reserves & Resources of about Million Tones as on 31st March 2022 sufficient for more than 25 years of mine life. Clean Development Mechanism (CDM) projects on waste heat recovery & wind power have an annual Certified Emission Reduction potential of over 6.13 Lac TON of CO_2. As on March 31,2023, Gross contribution to exchequer 24,892 Crore including dividend of 9,422 Crore including royalty and taxes. HZL has established Sewage Treatment Plant at Udaipur under PPP model to treat 60 MLD sewage and utilize treated water in its operations. Vision to enhance the quality of life and economic wellbeing of the communities around its operations, mainly SAKHI, MARYADA, KHUSHI campaigns, Shiksha Sambal Project, Jeevan Tarang Program, Samadhan Program reaching over 1.72 million plus beneficiaries and 237 villages across Rajasthan.

Zinc Smelter Debari was commissioned in the year 1968 and has current production capacity of 1,00,000 tonnes per annum of zinc. Zinc Smelter Debari is a Hydrometallurgical zinc smelter situated at Debari, about 13 kms from Udaipur, in Rajasthan, India. The nearest railway station (Debari RS) is 1.5 Km from the plant and it is situated adjacent to National Highway. Plant is well connected by a metaled road from Udaipur, Chittorgarh and Rajsamand.

M/s. Hindustan Zinc Ltd. (HZL) is part of the Vedanta conglomerate, which is recognized as one of the most successful producers of various non-ferrous and ferrous metals in India. HZL is an India-based company, which is engaged in the mining and smelting of Zinc, Lead and Silver metal in India. The Company's segments are mining and smelting of Zinc, Lead and Silver and Wind energy. The Company's operations include five Zinc-Lead mines, over four Zinc Smelters, a Lead Smelter, a Zinc-Lead Smelter, a silver refinery plant and over six captive power plants in the state of Rajasthan. I addition, the Company also has a rock-phosphate mine in Maton near Udaipur in Rajasthan and Zinc, Lead, Silver processing and refining facilities in the State of Uttarakhand. The Company also has wind power plants in the States of Rajasthan, Gujarat, Karnataka, Tamil Nadu and Maharashtra. It has a metal production capacity of over one million tons per annum with its key Lead-Zinc mines in Rampura Agucha, Sindesar Khurd, Rajpura Dariba, Zawar and Kayad and smelting complexes in Debari, Chanderiya and Dariba, all in the state of Rajasthan while Silver Refinery and Lead Zinc Units at Pantnagar.

HZL has established Sewage Treatment Plant at Udaipur under PPP model to treat 60 MLD sewage and utilize treated water in its operations. Vision to enhance the quality of life and economic wellbeing of the communities around its operations, mainly SAKHI, MARYADA, KHUSHI campaigns, reaching over 5 lakh people spread over 184 villages across Rajasthan. The proposed expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) under clause 7(ii) of EIA notification will be carried out within the existing premises 184.2 ha which is already in possession of the company.

It is noteworthy that Zinc Smelter Debari was commissioned in the year 1968. As per revenue record, total Land is already under the possession of M/s. Hindustan Zinc Ltd. since year 1963.

On the other hand, the project proposal would not only generate a huge amount of government revenue but also a considerable number of direct/indirect employment opportunities followed by peripheral development. Therefore, Environmental Cost Benefit Analysis for the proposed project expansion shall consider all these parameters.

Environmental cost-benefit analysis (CBA) is the application of CBA to projects or policies that have the deliberate aim of environmental improvement or actions that somehow affect the natural environment as an indirect consequence.

Methodology

Different internationally famous research organisations have come with useful publications dealing with the problem of measuring social costs and social benefits. It may be noted, in this context, that the actual cost or revenues from the goods and/or services to the organization do not necessarily reflect the monetary measurement of the cost and or benefit to the society. This is because these figures are grossly distorted on account of restriction and controls imposed by the government. Hence a different yardstick has to be used for evaluating a particular in terms of cost and sacrifice on the part of the society. Such payments are easily valued at opportunity cost or shadow prices to judge their real impact in terms of cost to society for the purpose of social cost benefit evaluation. One of the most acceptable approaches is a five-stage methodology:

1. Calculation of financial profitability measured at market prices.
2. Obtaining the net benefit of the project measured in terms of economic prices.
3. Adjustment for the impact of the project on savings and investment.
4. Adjustment for the impact of the project on income distribution.
5. Adjustment for the impact of the project on merit goods and demerit goods

It is imperative to mention that Social Cost Benefit Analysis is a model based on the theory of welfare economics, according to which the welfare of a society depends on the aggregate individual utility levels of all members of that society.

The objective of cost-benefit analysis is, in its widest sense, to secure and achieve the value of money in economic life by simply evaluating the costs and benefits of alternative economic choices and selecting an alternative which offers the largest net benefit.

Therefore, it can be said that the main focus of Social Cost Benefit Analysis is to determine:

1. Economic benefits of the project in terms of a price (shadow price) that reflect social value;
2. The impact of the project on the level of savings and investments in the society;
3. The benefit of the project in the society;
4. The Cost of the project in the society.

9.1.1 Net present value & Benefit cost ratio

Net Present Value (NPV) equals the sum of the benefits in present value minus the sum of the costs in present value.

EVALUATION OF COST OF PRESENT VALUES		
S.N.	**Parameters**	**Value**
1.	Loss of value of timber, fuelwood and minor forest produce on an annual basis, including loss of manhours per annum of people who derived livelihood & wages from the harvest of these commodities	The proposed expansion will be carried out within the existing plant premises, which is in possession of the company since year 1963. The expansion will be achieved within a part of existing smelter plant area i.e. 184.2 ha which is a non-forest land Hence, no loss of man hours as no one depends for livelihood on this land.
2.	Loss of animal husbandry productivity, including loss of fodder	NIL There is no loss of animal husbandry productivity and loss of fodder.
3.	Cost of human resettlement	NIL There is no loss involved on account of human resettlement.
4.	Loss of public facilities and administrative infrastructure (Roads, buildings, schools, dispensaries, electric lines, railway etc) on forest land, or which would require forest land if these facilities were diverted due to the project	NIL No administrative infrastructures such as roads, buildings, schools, dispensaries, electric line, railway, etc are/shall be affected due to existing or from proposed expansion project under clause 7(ii) of EIA notification amended from time to time. There will be no loss involved on this account.
5.	Environmental losses: (Soil erosion, effect on hydrological cycle, wildlife habitat, microclimate upsetting of ecological balance).	NIL Impact assessment has been done in all aspects and incorporated in draft EIA report
6.	Suffering of oustees	NIL No land oustees
7.	Capital Investment	Rs. 2500 Crore
	TOTAL	**Rs. 2500 Crores (A)**

EVALUATION OF BENEFITS OF PRESENT VALUES		
S.N.	**Parameters**	**Value**
1.	Total Profit realization expected (in 10 years)	1800 Cr in 10 yrs
2.	Benefits of economy (govt. revenue/cess etc.) in 10 years	~1200 Cr/-
3.	Employment potential	No. of direct employment – 65 (Approx. 65*355*10 = 230750 man days in 10 years) Av. value @ Rs. 510 per man day = Rs. 11.77 Crores (approx.) Another Rs. 150 Crores (approx.) should be considered towards indirect employment. Hence Benefits due to employment (direct & indirect) = **Rs. 161.77 Crores.**
4.	Estimated Cost towards EMP	Rs. 600.628 crores (capital cost) Rs. 70 Crores per annum (recurring) So, recurring cost in 10 years (cumulative) Rs. 700 crores. Total Cost (capital investment + recurring) = **Rs. 1300.628 Crores.**

5.	10 MW Power generation through WHRB utilising waste heat from flue gases	84,00,00,00,00-million-unit power generation in 10 years. Considering Rs. 6.50/- per unit electricity, **Rs.5460 crores** will be saved through power generation in non-conventional energy source.
6.	Green Belt Development	10 crores
7.	CSR	138 crores
	TOTAL	**10070.398 crores**

Therefore, Net Present Value (NPV) equals to **B** minus (-) **A** = Rs. **10070.398** Crores – Rs. 2500 Crores = Rs. **7570.398 Crores.**

Therefore, Benefit Cost ratio = Rs. **10068.77** Crores/Rs. 2500 Crores= 4.028 Crores

9.1.2 Internal rate of return

The internal rate of return is the discount rate for which the NPV is zero. This is the rate that your money would have to earn in another investment for you to be indifferent to the investment. The term "IRR" is often used interchangeably with the term, "economic rate of return," or "ERR."

A ten-year time horizon has been considered here. Total capital outlay i.e., the project cost Rs. 2500 crores. Assuming the construction time, Cash flow of the first year is negative. Cash flow assumed positive second year onwards.

Year	Cash Flow (Rs. Crore)	Description
First year	245.76	Initial cost of the project
Second year		Net income in 1st year
Third year		Net income in 2nd year
Fourth year	163.84	Net income in 3rd year
Fifth year	163.84	Net income in 4th year
Sixth year	163.84	Net income in 5th year
Seventh year	163.84	Net income in 6th year
Eighth year	163.84	Net income in 7th year
Ninth year	163.84	Net income in 8th year
Tenth year	163.84	Net income in 9th year

9.1.3 Cost effectiveness analysis

Cost Effectiveness Analysis (CEA) is an alternative form of CBA. It assesses the net cost of a project or service relative to the outcomes (benefits) generated. CEA is used where the need for a project has already been established, but uncertainty remains over the best method for achieving it.

1. It does not require all costs and benefits to be put into monetary terms.
2. It acknowledges that a measure may not represent all of the benefit that is accrued.
3. It may be analysing intermediate goods (outcomes may not be clear).

As such it does not constrain the researcher into having to apply monetary values to certain variables. For example, the development of a new hospital would likely result in a number of saved lives in an area, but whereas standard forms of CBA would require a monetary value be placed on the value of a life saved, CEA does not require this.

CEA considers alternatives in reference to the ratio between the costs associated with each alternative and a single quantified, but not monetary, effectiveness measure. This represents a complication of CEA as costs are represented by monetary values, while effectiveness may be measured in terms of saved lives, time savings or other similar quantifiable measures.

For this reason, in CEA a ratio is calculated. Two forms of ratio can be expressed:

1. *Cost-Effectiveness Ratio:* dividing costs of an alternative by the measure of effectiveness.
2. *Effectiveness-Cost Ratio*: dividing effectiveness measured by costs of alternative.

In case of the expansion proposal of Expansion of existing plant, apart from the project cost, the other costs are negligible, as because:

- There will be no loss of value of timber, fuelwood and minor forest produce on an annual basis, including loss of man hours per annum of people who derived livelihood & wages from the harvest of these commodities
- There will be no loss of animal husbandry productivity, including loss of fodder.
- Cost of human resettlement is zero.
- No Loss of public facilities and administrative infrastructure (Roads, buildings, schools, dispensaries, electric lines, railway etc) on forest land, or which would require forest land if these facilities were diverted due to the project
- No Environmental losses due to soil erosion, effect on hydrological cycle, wildlife habitat, microclimate upsetting of ecological balance.
- There will be no suffering of oustees.

On the other hand, the project proposal would be effective in number of ways by generating a considerable number of direct/indirect employment opportunities and government revenues. On account of CSR of the company, peripheral development will also take place.

Therefore, it can be concluded that the proposed expansion under clause 7(ii) of EIA notification amended from time to time will certainly be favourable in terms of cost-effectiveness ratio.

CHAPTER -10

ENVIRONMENT MANAGEMENT PLAN

10.1 INTRODUCTION

The environmental management plan (EMP) is required to minimize adverse environmental impacts by implementing suggested mitigation measures with timelines and responsibilities during the project life cycle. An environmental management system (EMS) is a dynamic, continuous process initiated by management and involving communication between the client, its workers, and the local communities directly affected by the project. Drawing on the elements of the established business management process of "plan, implement, check and Act (Management review)" the system entails the thorough assessment of potential environmental, social impacts and risks from the projects. EMS provides order and consistency for mitigating and managing these on an ongoing basis.

EMP consists of a set of mitigation, management and institutional measures to be taken up during implementation and operation of a project to eliminate adverse environmental impacts or reduce them to an acceptable level. Chapter 4 dealt with environmental impacts of this project and proposed mitigative measures to minimize adverse impacts as well as to improve the existing environment quality.

This chapter mainly comprises of details of Environment Policy (EP) at Corporate Level [Group Level] and at Site level Environment, Environment Management Cell (EMC) at site and a well-developed mechanism of reporting of non-compliances up to Board of Directors levels which is regularly been reviewed, conduct root cause analysis of non-compliances and propose appropriate mitigation measures to ensure avoidance of adverse Penal action arising out of environment and other statutory regulation along with action plan and remediation actions in place.

10.2 ELEMENTS OF EMP

EMP includes four major elements:-

1. **Planning**: This includes identification of environmental impacts, legal requirement, commitments and policies, setting environmental objectives and environment, health, safety and social compliance requirements;
2. **Implementation**: This comprises of resources available for the project, accountability of employees , contractors and documentation of measures to be taken;
3. **Checking**: Measurement & Evaluation: This includes regular inspection, audits, monitoring corrective actions and record keeping ; and
4. **Management Review**: Actions are taken to continually improve the environment, health, safety, and social performance of the organization.

The following Policies & programs are already in place to ensure proper implementation of EMP for the proposed expansion project:

- Environment Policy (EP)
- Environment Management Cell (EMC)

- CREP Guidelines for Zinc Smelter
- Concept of Waste Minimization and Natural Resource Conservation including Rainwater Harvesting
- Greenbelt Development/plantation programme
- Occupational Health and Safety
- Budgeting of Environmental mitigation measures

10.3 CORPORATE ENVIRONMENT POLICY

HZL have Corporate integrated HSE Policy been formulated and adopted by the Board of Directors of Hindustan Zinc Ltd. to provide a framework to become an environmentally sustainable company and a site level Environment Policy duly signed by CEO Smelters and Location Head Debari Zinc Smelter.

Environment Policy represents company's general position on environmental issues, policies and practices for conducting business. Also conveys the company's commitment towards empowering the environment by adopting various measures.

Copy of Corporate Environment Policy and Site Environment Policy is given below as figure 10.1 and 10.2 respectively.

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Zinc & Silver of India

HINDUSTAN ZINC

Health Safety & Environment Policy (HSE Policy)

Health, Safety & Environment (HSE) Guiding Principles:

- Management shall demonstrate its strong commitment towards HSE at all times.
- All injuries, occupational illnesses, and adverse environmental incidents are preventable.
- Reporting and investigation of all incidents is an obligation.
- We are responsible and accountable for preventing injuries, occupational illnesses, and adverse environmental incidents.
- We are empowered and obligated to stop any job being carried out in an unsafe manner.
- HSE values shall never be compromised.
- Adherence to the HSE management system is a condition of employment.

Health, Safety & Environment (HSE) Policy

Hindustan Zinc is committed to achieve excellence in Occupational Health, Safety and Environment (HSE) management by implementing the following policy which applies to all employees and directors, business partners, suppliers, consultants, and external advisers who are required to comply with the Policy when they act on behalf of Hindustan Zinc.

Hindustan Zinc will:

- Comply with applicable national, regional, and local HSE regulations and statutory obligations. In the absence (or lack) of appropriate legislation, industry best practices and international standards (as applicable) will be used
- Develop, implement, and improve HSE management systems in line with our commitments and beliefs and maintain consistency with world-class standards
- Set targets and objectives to avoid, reduce and mitigate HSE-related impacts on people and the planet
- Incorporate appropriate HSE Criteria[i] for all business decisions for the selection of plant, technology, Business partners, and personnel
- Identify and evaluate HSE risks for all the activities[ii] by continuously monitoring performance to identify, prioritize, assess and take effective actions for mitigation of potential HSE risks
- Drive continuous HSE improvement through setting and reviewing targets using appropriate best available practices and providing all employees with appropriate training to understand the impacts of their work activities on the environment
- Promote a positive HSE culture through effective communication, proactive participation, and consultation with employees and business partners
- Communicate with all our stakeholders on the progress and performance of HSE and sustainability management to maintain the highest standards of transparency
- Prevent injury and occupational illness to employees and business partners by eliminating hazards and providing a safe and healthy work environment by minimizing the risks associated with occupational hazards
- Drive positive healthcare outcomes for our employees, business partners, and the local community
- Implement regular health surveillance and risk-based exposure monitoring of employees and ensure the participation and consultation of workers, and their representatives (when applicable) in the decision-making process for OH&S matters
- Conserve natural resources by implementing eco-friendly and energy-efficient technologies through process improvements
- Effective Waste Management from our operations and adopt the principles of waste avoidance, reuse, recycling, and beneficial utilization to minimize discharge and disposal to the environment
- Consistently assess our climate-related risk, manage our emissions, take appropriate mitigation and adaptation measures and communicate our climate strategy to our stakeholders in alignment with TCFD guidelines
- Ensure that all tailings storage facilities are designed, constructed, operated, and closed in compliance with all applicable laws and regulations and in alignment with accepted international practices
- Engage actively with employees and local community representatives to educate them on the nature of our impacts, how we manage them, our environmental obligations, and our performance
- Raise awareness by training employees, business partners, suppliers, and other stakeholders to adopt principles and practices in alignment with our policies

The Policy is part of the Vedanta Sustainability Framework and Hindustan Zinc shall implement this policy and its technical and performance standards. This policy is oversight by the HZL Board of Directors. Business leaders will be held accountable for HSE and sustainability performance and line managers are responsible for the full implementation of the related HSE and sustainability standards. We will measure and report performance on a periodic basis to ensure ongoing management of health, safety, and environment including the sharing of good practices throughout the organization. The content and implementation of this policy will be reviewed periodically.

i. These criteria are applicable to the product distribution and logistics (entire product life cycle from extraction to product distribution and logistics)
ii. The policy is not only applicable to our existing operational sites/new projects but also to all the due diligence, mergers and acquisitions, and non-managed operations / licensees (third party manufacturers / joint ventures / outsourcing partners)

Date: 05th July, 2022

Arun Misra
CEO & Whole Time Director, HZL

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Figure 10.1: Corporate HSE Policy

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HINDUSTAN ZINC

HINDUSTAN ZINC

INTEGRATED MANAGEMENT SYSTEM POLICY

We at Zinc Smelter Debari, a unit of Hindustan Zinc Ltd. engaged in production of world class quality of Zinc, Cadmium, Calcine, Raw Zinc Oxide and Sulphuric acid. We are committed to ensure customer satisfaction and to conduct all business activities in a responsible manner, which ensures the health, safety, environment and wellbeing of our stakeholders.

In order to do so we shall:

- Ensure Zero harm to personnel and environment.
- Demonstrate visible HSE leadership that Quality, Health, Safety, Social, Energy & Environment is our core value.
- Comply with all Health, Safety, Environment, Energy, Quality, Social & Sustainability rules, regulations, obligations & requirements and shall continually improve our Integrated Management system.
- Incorporate appropriate IMS criteria for all business decisions for selection of plant, technology and personnel.
- Identify and evaluate risks of all activities and take actions to eliminate/mitigate risks & hazards. Institutionalize the Philosophy of prevention/minimization of work place hazards and environmental aspects, at the first place, followed by effective operational controls and promotion of safe acts/behaviors.
- Conserve natural resources including provision of resources & information to eliminate waste through reduction, recycling & reuse methods which are environment friendly and energy efficient.
- ZSD shall strive to work towards achieving international bench marks in Environment, health, safety, quality, social, sustainability & productivity performance.
- Prevent injury, ill health and continual improvement in OH&S performance and wellbeing.
- Encouraging employees to seek work life balance and minimizing the stressful impact of work to achieve employee Wellbeing.
- Adopt and maintain global best practices on Energy management and minimizing energy consumption & thus reducing green-house gas emissions throughout our operations.
- Purchase safe, energy efficient and environment friendly products & services and design for performance improvement.
- Extend our approach to reporting carbon emissions by reporting our emissions in compliance with the internationally recognized protocols and working closely with others to reduce energy consumption and carbon intensity.
- Prevent defects rather than rectify the defects.
- Periodically review the suitability, adequacy and effectiveness of our Integrated management system and ensuring competitive excellence.
- Encourage, train, equip and empower personnel to adopt a healthy and safe working approach both on and off the job.
- Ensure stakeholder consultation, involvement, participation and motivation of all employees and contractor employees in implementation of our Integrated Management system through training, awareness & continual competence building.
- Maintain social and ethical codes of conduct in all our business processes.

Date:: 05th May, 2022

Manas Tyagi

www.hzinfo.com

Figure 10.2: Integrated Management System Policy DZS

10.3.1 FORMATION OF ENVIRONMENTAL MANAGEMENT CELL (EMC)

In order to maintain the environmental quality within the standards, regular inspections, audits & monitoring of various environmental components is necessary. M/s. Hindustan Zinc Limited has a full-fledged Environmental Management Cell (EMC) for environmental monitoring and control. The EMC team is responsible for pollution monitoring aspects and implementation of control measures as discussed in Chapter 2 & 4 of this EIA/EMP Report.

A group of qualified and efficient engineers with technicians have been deputed for maintenance, up keeping and monitoring the pollution control equipment, to keep them in working mode at the best of their efficiencies.

Debari Zinc Smelter has an efficient and operational Environmental Management Cell, which handles all environmental related issues at plant level and also at corporate level. Debari Zinc Smelter is an ISO 14001 and OHSAS 45001 certified unit and accordingly, all Environmental issues are addressed as per EMS-ISO 14001 system. Debari Zinc Smelter has a state of art Environmental Laboratory well equipped with basic and high-end equipment to carry day to day analysis for heavy metals and Toxic elements. The Laboratory team is having a pool of expertise in analytical aspects. The Environment Management Cell over sees the laboratory as well as day to day environmental requirement of the plant.

10.3.2 Structure of EMC

Structure of Environment Management Cell at Debari Zinc Smelter is given in Figure 10.3.

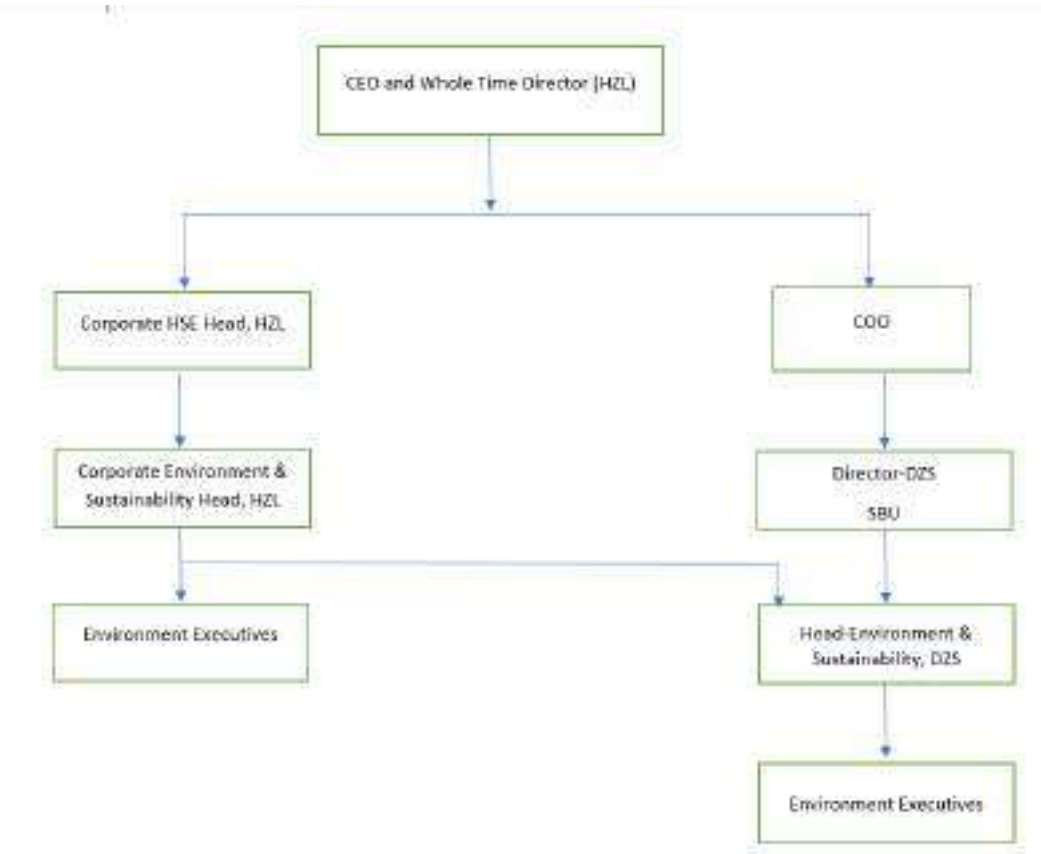

Figure 10.3: Organizational Structure of EMC at DZS

10.3.3 Responsibilities of EMC

The EMC looks after and implement the various functions to ensure that environmental status of the area remains within the statutory standard of MOEFCC and SPCB.

The responsibilities of the EMC include the following:

- Procurement and commissioning of Pollution Control/Monitoring Equipment
- Environmental monitoring of the core and buffer zone and evaluation of the results. Keeping of records to track the surrounding environment quality status.
- Specification and regulation of maintenance schedules for pollution control equipment.
- Ensuring that prescribed standards are maintained.
- Ensuring optimum water usage.
- Implementation of the mitigation measures suggested in EIA/EMP Report.
- Ensuring greenbelt development/plantation & its maintenance
- Compliance with guidelines and statutory requirements.
- Coordination with statutory bodies, functional groups of the unit, Corporate Project/Environment & Engineering department etc.
- Interaction with engineering & operation team for implementation of any modification programmes intended to improve the availability / efficiency of pollution control devices / systems.
- Carry out proactive environmental studies and observe all precautions necessary to avert disasters and emergencies in the mining observations as well as nearby areas.
- Regular environmental review and performance appraisal (Internal) and organizing Environmental / Energy and Water Audits by independent agencies/ 3rd party agencies.
- Coordination with the vendors dealing in waste supplies and disposal.
- Ensuring that the waste handling and disposal is carried out as per prescribed conditions.
- Implementation of the mitigation measures suggested in EIA/EMP Report.
- Conducting regular training programmes on various environmental requirements especially sustainable development, climate change, environmental monitoring etc.
- Reporting of compliances and non–compliances (if any) to the Board and other stakeholders.

10.4 Point wise compliance of CREP Guidelines for Zinc Industry

Point wise compliance of CREP Guidelines are given as under:

Table 10.1: Point wise compliance of CREP Guidelines

S. No.	Conditions	Compliance
1.	Melting SO_2 emission limit (2 Kg/ton of H_2SO_4 produced), 50 mg/Nm^3 of acid mist by Dec 2006. Action Plan to be submitted by July 2003.	Industry is complying with all the revised standards for emission as prescribed in respective ECs and CTOs. Details are given as under: • Additional Tail Gas Treatment (TGT) is proposed to minimize SO_2 emissions from 1.5 to 1.0 Kg /MT of Sulphuric Acid production in 2nd roaster and proposed roaster. • Regular monitoring is being done and emissions level are within stipulated norms and reports are being sent to RSPCB/ MoEFCC.
2.	SO_2 Emissions monitoring – Installation/ Proper	The Company has installed Continuous Emission Monitoring Systems (CEMS) with proper calibration system with process stacks and the

S. No.	Conditions	Compliance
	operation, maintenance and calibration of continuous SO_2 monitoring system by 30th September 2003.	same have been connected with the CPCB/SPCB server. Proper operation, maintenance and calibration is ensured by EMC.
3.	Solid and Hazardous Waste disposal: Construction of secured landfill for disposal of hazardous waste such a Jarosite cake, ETP cake and spent catalyst as per CPCB guidelines by 30th June 2003.	• ETP Cake (24789 TPA) will be sent to CTDF, Udaipur for further disposal. • Jarosite (123383 TPA) is being and will be sent to cement industries and Slag from Moore cake treatment plant (50,000 TPA) will be used for filling the low line area and road construction. • Municipal solid waste generated from the plant is being and will be segregated and disposed-off scientifically.
4.	Wastewater treatment and disposal: To achieve Zero discharge through 100% recycle/ reuse of treated wastewater by 31st December 2004.	• Total wastewater generated from the plant is 3494 KLD (3425 KLD from Zinc Smelter, 41 KLD from DG cooling tower & 28 KLD from MCTP) which is being treated in existing ETPs (5760 KLD) out of which 494 KLD of treated water is being used in process and remaining 3000 KLD of effluent is further treated in recently installed RO-ZLD/MVR unit. Additional 1700 KLD of effluent generation is envisaged from proposed projects and for which capacity of existing 3000 KLD RO-ZLD/MVR unit will be increased to 5000 KLD by expansion. • Effluent generated is treated in the Effluent treatment plant & Reverse osmosis plant. Treated water is completely recycled/ reused in the plant and zero discharge maintained. • Hence, no wastewater is being/will be discharged outside the plant.
5.	House Keeping: To reduce the generation of fugitive dust from vehicle movement and improve overall housekeeping – by 31st December 2003.	Proper housekeeping is being maintained to reduce the generation of fugitive dust from vehicle movement by regular water spraying and road sweepers deployment. The following actionable already in place; ✓ Concreted internal roads ✓ Vacuum road cleaning system ✓ Systematic stacking of materials ✓ Covered conveyor to transfer the material. ✓ Truck and tyre washing systems
6.	Green Belt: To develop canopy based green belt around the periphery of plant and township as per CPCB Guidelines	Canopy based greenbelt is already been developed around periphery of plant. 41.41 % green cover area is already been completed at project site. The same will be maintained and densed by doing gap plantation to achieve the plantation density @2500 trees/ ha.

10.5 AIR QUALITY MANAGEMENT

The major air pollutants in a Zinc Smelter Complex are PM, SO_2, Acid Mist, NO_x, NMHC & CO from various stacks. The following control measures are proposed to mitigate pollutant generated from the operational activities:

- Double Conversion Double Absorption (DCDA) Acid Plant to maintain SO_2 emission within the prescribed norms of 1.5 kg/T of acid production.
- Additional Tail Gas Treatment (TGT) is proposed to minimize SO_2 emissions from 1.5 to 1.0 Kg /MT of Sulphuric Acid production in 2nd roaster and proposed roaster
- Demister pad in acid plant is better designed to reduce the emission of acid mist.
- In process, material is being transferred in closed conveyors.

- Extensive dust extraction network consisting of Bag Filters are provided.
- Ventilation systems followed by bag filters, are provided in the melting and casting area to control work zone emissions.
- Concentrate shed, raw material handling area (RMH), concentrate unloading point area, Belt conveyors and other material transfer points etc. are provided with water sprinklers to arrest the dust and fugitive sources of dust.
- In order to minimize fugitive emissions Zn concentrate containing 8-10% moisture is being handled.
- Mobile vacuum dust sweeping system on industrial roads and vacuum dust cleaning system for plant area exist at smelter to control airborne dust due to the vehicles movement. Regular road washing is being done on internal roads.
- Vehicular emissions are maintained as per standard.
- 41.41 % of the area has already been covered with greenbelt/plantation at site. Avenue plantation is ensured along with internal roads to control dust emissions.
- 4 no's of CAAQMS (Continuous Ambient Air Quality Monitoring Stations) are installed with consultation of RSPCB.
- All existing Stacks are installed with OCEMS and connected to CPCB & RSPCB Server.

Table – 10.2: Air Pollution Control Measures

S. No.	Section	Name of the Pollutant	Control Systems
1.	Slag Grinding	PM	Bag Filters attached with stack are provided to trap Particulate matter to meet the stipulated limit of 50 mg/Nm^3. The existing system will be utilized.
2.	Sulphuric Acid plant II & III	SO2 Acid Mist	Double Conversion Double Absorption (DCDA), Demister, Absorption towers, ESP, Gas Conditioning Plant, Scrubbers has been already installed to capture SO2 and Acid Mist. Same practice will be continued after proposed expansion.
3.	Zinc melting and Casting furnaces	PM	These units are provided with Bag Filters stacks to trap Particulate matter to meet the stipulated limit of 50 mg/Nm^3. The existing system will be utilized.
4.	Roaster	PM	Ventilation system has been provided in the Roaster Calcine handling and storage section followed by bag filters to maintain stack emissions less than 30 mg/Nm^3 of PM
5.	Leaching Plant	-	Leaching operations are carried out at elevated temperatures and to ensure atmospheric pressure, steam is not widely distributed in the working area. All vessels are equipped with proper venting system.
6.	Moore Cake Treatment Plant	PM and Lead	Bag Filters provided in the section are adequate to handle the expected load. The ventilation air discharge from the bag filter stack will meet the stipulated limit of 50 Mg/Nm^3.
7.	Fugitive Emissions	PM	Concentrate shed, concentrate unloading area shall be provided with water sprinklers to arrest the fugitive dust emissions.

10.6 NOISE QUALITY MANAGEMENT

The company will take following measures for management of noise:

- High noise generating sources are insulated adequately by providing suitable enclosures.

- Design and layout of building to minimize transmission of noise, segregation of particular items of plant to avoid reverberant areas.
- Use of lagging with attenuation properties on plant components/installation of sound attenuation panels around the equipment.
- Equipment producing high noise are designed and procured with acoustic enclosures.
- Other than the regular maintenance of the various equipment, ear plugs/muffs are recommended for the personnel working close to the noise generating units.
- All the openings like covers and partitions are designed properly.
- Provision of Inlet and outlet mufflers; easy to design and construct.
- Noise control system designed to form an integral part of the plant.
- The existing greenbelt with rich canopy helps to attenuate the noise emitted by the various sources in the plant.

10.7 WATER QUALITY MANAGEMENT

The company will take following measures for water quality management:

- The existing total water requirement of the plant is 8000 KLD. Which included 6950 KLD industrial & 1050 KLD Domestic water.
- Total wastewater generated from the plant is 3494 KLD (3425 KLD from Zinc Smelter, 41 KLD from DG cooling tower & 28 KLD from MCTP) which is being treated in existing ETPs (5760 KLD) out of which 494 KLD of treated water is being used in process and remaining 3000 KLD of effluent is further treated in RO-ZLD/MVR unit. Additional 1700 KLD of effluent is envisaged from proposed projects and for which capacity of existing 3000 KLD RO-ZLD/MVR unit will be increased to 5000 KLD by expansion.
- Revamping of Existing ETP and Additional 2000 KLD capacity. RO-ZLD unit is proposed in expansion project.
- All trade effluent is being & will be treated in ETP followed by RO- ZLD with MVR unit and zero discharge is being & will be ensured.
- Domestic wastewater (150 KLD) generated from the Plant is being/will be treated in existing STP (200 KLD) and treated water is being /will be used in plantation purpose within the plant premises.
- No wastewater is being discharged outside the plant. The Plant will remain "Zero Liquid Discharge" Unit after the proposed expansion.

10.8 SOLID & HAZARDOUS WASTE GENERATION AND MANAGEMENT

The company will take following measures for management of solid and hazardous waste:

- Spent Catalysts (68 TPA), Empty barrels/containers/liners contaminated with hazardous chemicals/waste (15 TPA), Chemical Sludge from water (ETP Cake) (24789 TPA), Cooler Cake (1416 TPA) and Waste or residues containing oil (970 TPA) will be sent to CTDF Udaipur or registered recycler, or used for reprocessing/coprocessing.

- Process residue (2000 TPA), Purification Cake (2929 TPA), Used oil/spent oil (55 TPA), Resin from water purification (2 TPA) will be reused in the process or will be sold to the registered recyclers.
- Anode Mud (1902 TPA) will be used in Co processing in cement plant /Registered recycler/Reprocessing / CTDF Udaipur. Filters contaminated with oil (2 TPA) will be sent to CTDF Udaipur or will be Co-incinerated in the Cement Kiln.
- Additional hazardous waste generated due to the proposed expansion includes: Clarifier Cake/Calcium salts from RO-ZLD (7300 TPA), Insulation Waste/glass wool (100 TPA), Discarded Asbestos sheet (350 TPA), other solid waste like Slag generated from MCTP (50,000 TPA).
- Zinc ash skimming/dross (7505TPA) will be Reuse in process/sales to registered recyclers.
- Jarosite (123383 TPA) is being and will be sent to cement industries.
- Municipal solid waste generated from the plant is being and will be segregated and disposed off scientifically.

10.9 CONCEPT OF WASTE MINIMIZATION, 3R's (REUSE, RECYCLE and RECOVER TECHNIQUES)

10.9.1 Waste Minimization - 3R's

Reuse

- Chemical Sludge (MEE/MVR salt)/other residues generated from RO-ZLD process will be reused in the plant or will be disposed to TSDF/Co-incineration.
- Steam generated from roasting operation will be treated through WHRB to produce power.
- Waste generated from construction activity will be utilized in leveling of land.
- STP Sludge is being / will be used as manure for greenbelt development / plantation.

Recycle

- Total wastewater generated from plant is 3494 KLD out of which 3000 KLD is being treated in RO-ZLD unit and remaining 494 KLD is being used in process after treatment.
- Domestic Waste water (150 KLD) generated from the plant is being/will be treated in existing STP (200 KLD) and treated water is being /will be used in plantation purpose within the plant premises.
- Total effluent generation after expansion will 5194 KLD. For which, Debottlenecking to improve Efficiency of existing ETP is envisaged and additional capacity of 2000 KLD RO-ZLD unit will be installed to treat effluent.
- Hence, no wastewater is being/will be discharged outside the plant.
- PF Cake/Anode mud will be recycled through registered recycler.

Recovery

- Zinc Dross and other waste will be treated to recover Zn from the hazardous waste.
- It is proposed to recover 11.5 TPA Cobalt as cobalt oxide/compound from generated cobalt cake within existing plant premises.
- In the jarosite filtration section, the jarosite slurry is filtered and washed on horizontal vacuum belt filters to maximize water-soluble zinc recovery.

10.9.2 Sustainable Waste Management

- Increase in PF cake generation is envisaged due to increase in the concentration of elements like Cu:0.09 to 0.10 % and Cd: 0.17 to 0.18 %. The same will be sent to registered recyclers to further recovery of metal.
- Anode mud generated from the process will reduce from 1.6% to 1.4% of zinc metal production. The anode mud will be recycled in process to maintained required level Mn is electrolyte and Zinc. The remaining will be sent to registered recyclers for further recovery of metals.
- Generation of ETP cake will be reduced by circulating volume of process in system in proposed expansion which is now going to ETP for treatment. Filtrate generated from Jarosite filtration will be recycled in process, which will be either recycled in MCTP for recovery of zinc or sent to TSDF for sustainable disposal.
- Increase in Jarosite generation is envisaged due to increase in Fe: 8.3 to 8.8 %, Pb: 1.7 to 2.5 %, Silica: 1.8 to 3.0 % in raw material. 100 % Jarosite continued to be sent to cement industries as part of circular economy which will reduce environmental liability /concerns of leachate and PM emission due to handling and storage in the from Jarofix.

10.10 ENERGY & NATURAL RESOURCE CONSERVATION MEASURES

10.10.1. Energy Conservation

Energy management may broadly be said to have two aspects - energy conservation and energy efficiency. Energy conservation includes behavioural or process control measures which avoid wastage of resources, while offering provisions to harness or reuse waste energy. On the other hand, energy efficiency implies obtaining greater production output using the same energy input through application of technology. Debari Zinc Smelter has implemented numerous process control measures as well as energy efficient technologies which ensure proficient management of its energy resources.

Corporate and Site-Specific Committee has been formed to ensure the management of energy, waste and water (ESG Committee). A Copy of Energy and Climate Management Policy of HZL is given below as figure 10.4.

Improvement in Power rating

At present, existing cells are smaller and as per cell design the gap between anode and cathode is 37 mm is being maintained, where's as in proposed jumbo cells, the same gap will be of 45-48 mm. Hence, lower distance between anode to cathode is resulted in shorts and ultimately resulting of power loss. Such power loss will be reduced and current saved from the same will be utilized to produce metal.

At present the power rating varies from 6.46 to 7.04 MT/MW. FY 22-23 the power Rating was 7.04 MT/MW. After the revamping the estimated power rating in Phase-1 will be 7.15 by above changes in cell house. Further, power rating of 7.30 MT/MW will be achieved by operational excellence in Leaching & Purification section which is By optimizing impurity like Fe, Cu, Cd, Sb level electrolyte i.e, by improving process CpK.

The following measures have been adopted by Hindustan Zinc Limited for further reduction in specific energy consumption:

- Power consumption will be reduced by installing new jumbo cell house. Power rating will be improved.
- Dependency on fossil fuel for power generation will be reduced and power will be generated from renewable energy sources like solar power & waste heat recovery boiler (WHRB).
- 8 MW of energy is already generated through WHRB and a new waste heat recovery boiler will be installed which will generate 10 MW of energy.
- 20 MW power will be generated through Solar power plant (12.5 existing & 7.5 additional after expansion).
- Total contribution of renewable energy will be 34.5 % after proposed expansion project.
- Priority in Procurement of 5-star power rating equipment's.
- Energy Projects are taken on annual basis.
- Site is already ENMS certified for ISO 50001.
- Energy Audits are conducted at regular intervals
- Power saving by Optimizing the Start/Stop Timings and interlocking of Equipment
- High Energy Efficient equipment installed & maintained after proper planning at design phase.
- Installing low watt tube lights
- Minimizing idle running of vehicle, machines and electrical appliances
- Optimizing loads and periodic preventive maintenance and lubrication
- Installation of Solar based LED lights instead of conventional lighting in Plant site
- Switching off unnecessary lights by micro-based timer
- Energy conservation by stopping idle running hrs of equipment
- Internal & external training and awareness programs on energy conservation

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HINDUSTAN ZINC

Energy and Climate Change Management Policy

Hindustan Zinc acknowledges the global concern on climate change and recognizes that concerted and sustained global action is required to reduce the scale of the problem and to adapt to its impacts. Hindustan Zinc is committed to this effort through its own progressive Energy and Climate Change programme that forms an integral part of our vision for sustainable development and is consistent with our overall business vision and mission.

Hindustan Zinc will:

Reduce carbon footprint

- adopt and maintain global best practices on climate change and energy management and minimising greenhouse gas emissions throughout our operations. We will continue to measure our direct energy usage and carbon emissions and maintain our year-on-year efforts to reduce energy consumption across our operations.
- set emission reduction targets that maximise the benefits of process improvements and technological advances and reduce our operational greenhouse gas emissions in line with limiting global warming to 1.5°C
- invest in clean energy and maximise benefits from waste energy recovery.
- consider carbon emissions minimization for our project and R&D investments.
- integrate climate change considerations into our strategic approach, including the adaptation of carbon pricing or similar mechanisms into our investment decision-making.

Engage stakeholders

- communicate our approach and achievements actively to stakeholders and work closely with policy makers to encourage effective and equitable abatement policies within our sectors of operation.
- periodically measure, monitor and report to all relevant stakeholders on our greenhouse gas emissions in compliance with the internationally recognised protocols and working closely with other stakeholders to reduce energy consumption and carbon intensity.
- Foster research and innovatory techniques within our operations leading to optimal utilisation of resources with continuous focus on minimising specific energy consumption in all our operations. We will seek to use our leading position within the geographies that we operate to act as an advocate of effective energy and climate change management.
- Work with our staff, wider communities and other stakeholders to demonstrate our commitment to greenhouse gas emission reduction principles and practices.

Influencing Supply Chain

- Communicating our policies and creating awareness.
- Mandatory criteria in procurement procedures.

Adapting to Climate Change

- Screening and assessing risk of climate change on our activities.
- Provide adaption and future-proofing of our facilities.

This policy is part of the Vedanta Sustainability Framework and Hindustan Zinc shall implement this policy and its related technical and performance standards. Business leaders will be held accountable for energy and carbon performance and line managers are responsible for the full implementation of the related energy and carbon standards. We will measure and report performance on a periodic basis to ensure ongoing management of energy and carbon including the sharing of good practices throughout the Hindustan Zinc. The content and implementation of this policy will be reviewed periodically.

Arun Misra

Arun Misra
CEO & Whole Time Director, HZL

Date: 05th July, 2022

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Figure 10.4: Energy and Climate Management Policy

10.10.2. Natural Resource Conservation

- **Improvement in Zinc Recovery:**

  At present the existing Zinc recovery is 95.5% and Estimated Zinc recovery will be 96.8%. This will be achieved through following:

  Reduction of Zn loss in Jarosite:

  - Increased retention time in all the sections of Leaching. to prevent losses of Zn in Jarosite (from 4.0% to 2.8%).
  - Technological upgradation in leaching reactors design.
  - Installation of Hydrofoil agitator in all the leaching reactors.
  - Installation of calcine dosing weigh-feeders for online weighment tracking and pH analyzers.

  Reduction in losses through ETP cake (from 10.0 % to 8.1 %):

  - By introducing online cell cleaning, anode flattening, Magnesium removal circuit.
- Dross and other waste will be treated to recover Zn from the hazardous waste.
- Recycle and reuse of treated wastewater (Industrial & Domestic) to conserve the fresh water
- Rain Water Harvesting is being / will be carried out by the following methods:
  - Roof top rainwater harvesting
  - Surface rainwater runoff available from paved area, green area and open land is being / will be used for recharging through injection wells
  - Natural rainfall recharge to open land.
  - Rain water harvesting measures adopted to conserve water and to replenish ground water resources of the area for long term sustenance of the industry.

10.10.3. Rain Water Harvesting

The demand of water for industrial purposes, agricultural purposes, domestic purposes and other miscellaneous purposes is increasing considerably around plant premises. Deficiency of perennial surface water sources in the area makes it equally important and urgent to ensure the full proof supply of required quantity of water throughout the year without any disturbance to industrial activity as well as without causing any negative water scarcity impact on the neighboring villages. To achieve this target maximum quantity of Rain Water has to be harvested and reserved (charged) in the available sub-surface cavities or collected and infiltration must be facilitated through the management practice.

EXISTING RWH STRUCTURE WITHIN THE PLANT SITE

Being an existing plant, Debari Zinc Smelter has adequate Rain water harvesting as well as recharge structures within the premises. Major rain water harvesting structures within the plant have been shown in the photographs given below.

The details of the major two existing Rain water/storm water harvesting structures available within the plant premises are given below in table 10.2.

Table 10.3: Rain water/storm water harvesting structures with storage capacity

S. No.	RWH Structures	Storage Capacity (cum)	Annul storage capacity (considering 3 fillings / annum)

1.	**Lagoon 1**	12000	36,000
2.	**Lagoon 2**	22500	67500
	Total	34500	103500

Lagoon 1

Lagoon 2

Figure 10.5: Photographs of Existing RWH Structure in DZS

Figure 10.6: Existing RWH Structure in DZS

Being an existing complex, DZS has rain water harvesting as well as recharge structures within the premises which have been shown in the figure no. 10.5 & 10.6 given. The details regarding the same have been given in section no. 7.2.7 of Chapter 7 of this EIA/EMP Report.

10.11 GREENBELT DEVELOPMENT & PLANTATION PROGRAMME

10.11.1 Objective

Greenbelt is a set of rows of trees planted such a way that they form an effective barrier between the plant and the surroundings. The main purpose of green belt development is to contribute to the following factors:

- To attenuate noise levels generated from the plant;
- To improve the aesthetics of the plant area;
- To trap the vehicular emissions and fugitive dust emissions;
- To maintain and improve biodiversity;
- To prevent soil erosion and to protect the natural vegetation; and

Provision of wide greenbelt around the plant has been foreseen to reduce any adverse impacts on the surrounding population due to emissions from the proposed expansion activity. Plantation of grass, flowers, bushes and trees is/will be taken-up to reduce generation of dust from bare earth and to enhance the aesthetic/scenic value.

10.11.2 Guidelines for Greenbelt Development

Following guidelines is/will be followed for the greenbelt development in the plant area.

- All the barren areas are/will be vegetated.
- Trees growing to a height of 5 m or more are/will be planted.
- Plantation of trees is/will be undertaken in and around the area in alternating rows to prevent horizontal pollution dispersion.
- Trees are/will be planted along roadsides, to arrest auto-exhaust and noise pollution, and in such a way that there is no direct line of sight to the installation when viewed from a point outside the foliage perimeter.
- Since tree trunks are normally devoid of foliage (upto 3 m), it is appropriate to have shrubbery in form of such trees to give coverage to this portion.
- Fast growing trees with thick perennial foliage are/will be grown, as it takes many years for trees to grow to their full height.
- In order to facilitate the proper growth of vegetation, limited measures involving preparation of seedbed with suitable amount of fertilizers and treatment with mulches are/will be taken.

10.11.3 Benefits of Greenbelt Plantation

Vegetation covers in and around the plant workings generally helps in:

- Stabilizing erodible slopes to minimize pollution
- Control of dust
- Enhancement of aesthetic value
- Minimizing evapo-transpiration loss which helps to recharge ground water in the area
- Reducing noise.

10.11.4 Selection Criteria

Out of the total plant area i.e., 184.2 ha., 76.28 ha (41.41 %) area has already been developed under greenbelt/plantation. Greenbelt development has been developed all along the road & plant boundary to attenuate noise level, arrest dust & to increase aesthetic beauty of the area. Plantation

has been done in appropriate alternate rows around the site to prevent lateral pollution dispersion. The trees help in maintaining regional ecological balance and conform to soil and hydrological conditions.

Miyawaki plantation has been done in one acre by planting 8000 plant saplings in one acre area.

Native plant species have been planted in consultation with local horticulturist such as Shisam, Neem, Arjuna, Jamun, Casiasamea, Peltophorum, Alstonia etc.

The company has social obligation to recreate the environmental status by providing thick canopy cover to suppress fugitive emission and provide aesthetic beauty. Trees form important part of the biosphere in the Eco-system. The ecological belt maintains the natural balance of the area.

Greenbelts of tree plantation around the plant site help arrest the particulate matter in the area and hence attenuate the pollution to a great extent.

The following characteristics have been taken into consideration while selecting plant species for green belt development and tree plantation.

I. They should be fast growing and tall trees.
II. They should be perennial and evergreen.
III. They should have thick canopy cover.
IV. The planting should be in appropriate alternate rows around the site to prevent lateral pollution dispersion.
V. The trees should maintain regional ecological balance and conform to soil and hydrological conditions. Indigenous species should be preferred.

10.11.5 Greenbelt Plantation at Plant Site

Due care is/will be taken to ensure that a greenbelt is developed around the plant area. Areas having low density vegetation will be systematically and scientifically afforested. The plantation scheme broadly covers the following areas:

- Green belt formation around the plant site
- Afforestation of barren and non-industrial areas.

Apart from the greenbelt and aesthetic plantations for fugitive emissions and noise control, all other massive plantation efforts will be executed with the assistance and co-operation of the local community.

10.11.6 Plantation Programme

A. Within the Plant Premises

The plant was built in 1968. At that time the green belt has been developed wherever it is feasible which is 94.8% of total boundary length of 6454 meter. The Green belt is not available in some places of west side of plant boundary (338 meter, 5.2% of total boundary length). However, the colony which is adjacent to the plant in west side is lush green and same is acting as green belt to minimize the impact of plant activities. Other sides of boundary are already covered with green belt. This green belt plantation is ensured towards receptors/locality. Greenbelt in another 130-meter length will be proposed after demolishing old building planned after stabilizing proposed project in future.

The Company has already developed 76.28 ha (41.41 %) of the total plant area (184.2 ha) for proposed expansion under greenbelt / plantation. At present, 150000 number of plants has already been planted in the plant site with a density of 1967 trees/ha. Further 40700 plants will be planted by doing gap plantation to increase the density @2500 trees/ha. A budget of 1.628 crore capital cost & 1 crores/annum recurring cost has been allocated for further development of greenbelt.

Miyawaki plantation has been done in one acre by planting 8000 plant saplings in one acre area.

Details regarding the existing and proposed plantation have been incorporated in below Table:

Table 10.4: Details regarding existing and proposed Greenbelt Plantation

Description	Existing	Proposed (Gap Plantation)			Total
		2024-25	2025-26	2026-27	
Total Area of Green Belt (ha)	76.28	NIL	NIL	NIL	76.28
No. of Plants	150000	15000	15000	10700	190700
Plant Species	Shisam, Neem, Arjuna, Jamun, Casiasamea, Peltophorum, Alstonia, Karanj, Peepal, paras peepal, Badam, Gulmohar, Casurina, palash etc.				

Photographs showing Existing Green Belt Development

Miyawaki Plantation

Plantation Within Complex

Avenue Plantation along the Boundary Site

10.12 OCCUPATIONAL HEALTH AND SAFETY MEASURES

To control and minimize the risks at workplace, Debari Zinc Smelter by M/s. Hindustan Zinc Limited has implemented Health, Safety and Environment Policy with the following objectives:

- Healthy & Safe working environment for employees is the prime concern of the company.
- Hindustan Zinc Limited is committed to maintain safe & healthy work environment for employees, against hazards & risks through:
  - Continuously developing & maintaining safe work practices.
  - Focus on operational & occupational hazards & risks.
  - Creating awareness about preventive health & safety measures.
  - Providing safety Equipment to all employees.
  - A well-equipped first aid health center established at plant site.
  - Carrying out risk assessment associated with its operation and taking the remedial measures.

The company, therefore, has adopted the policy set below for the purpose of creating and maintaining safe and healthy environment.

10.12.1 Health and Safety Policy

- Health, Safety and Environmental Protection (HSE) is a part of the company's vision, which encompasses commitment to conduct the activities in harmony with society and nature. The company expects all its employees to implement the HSE Policy.
- Integration process of H&S must start at the inception of a project since HSE consideration must be addressed at the design stage, which also helps in optimizing the support process.
- Hindustan Zinc Limited has integrated Health, Safety and Environment Protection into the business strategies to add value to the enterprise, to manage risk and to enhance the reputation.
- The health and safety of the employees, neighbors, customers and consumers, and the protection of the environment are company's priorities consistently pursued throughout.
- Each employee will be made to comply with the HSE guidelines and the laws applicable to her or his area of operational responsibility.

10.12.2 Life Saving Rules

Hindustan Zinc Limited is committed towards following organizational vision of zero harm by way of training people, conducting safety interactions and bringing out behavioral changes.

Hindustan Zinc Limited has defined certain Life Saving Rules (LSR) which always needs to be followed by employees and stakeholders alike to prevent serious injuries. Following Life Saving Rules have been laid out which shall be followed unconditionally:

- LSR 1: Do not override & interfere with any Safety features /devices
- LSR 2: Follow permit to work system
- LSR 3: Immediately report all incidents
- LSR 4: Always fasten seat belt while travelling in vehicles and always wear crash helmets while riding two-wheelers including pillion riders

- LSR 5: No person shall enter the plant under the influence of alcohol or drugs of abuse.
- LSR 6: Mandatory and Job specific PPE's must be used.

Table 10.5: LSR Details

LSR Details	Violation Type	Consequence, if LSR not followed		
		1st instance	2nd instance	3rd instance
Do not override & interfere with any Safety features /devices.	Any of the violation of LSR by individual which is visible. Viz – 1. By passing guards, limit switches, safety interlocks etc. 2. Risk assessment not carried out before issuing permit to work etc. 3. Leakage of undesirable gas from stack not reported on time, not informing area in-charge of any safety violation incident etc. 4. Not fastening seat belt, etc. 5. Use of alcohol, drugs, etc. while entering plant premises or carrying such items inside plant etc. 6. Not wearing mandatory PPE's like Helmet, Safety Shoes or as specified by the Plant/Unit and not wearing specified job /additional specific safety PPEs etc.	Advisory note & record in personal file	Warning letter & record in personal file	7 days suspension & record in personal file
Follow permit to work system.		Enquiry (find out RCA) 1st instance of personal negligence - one month suspension	Enquiry (find out RCA) - Exit after following applicable rules.	
Immediately report all incidents.		Advisory note & record in personal file	Warning letter & record in personal file	7 days suspension & record in personal file
Always fasten seat belt while travelling		Advisory note & record in personal file	Warning letter & record in personal file	7 days suspension & record in personal file
No person shall enter the plant under the influence of alcohol or drugs of abuse.		Enquiry (find out RCA) 1st instance of personal negligence – one month suspension	Enquiry (find out RCA) - Exit after following applicable rules.	
Mandatory and Job specific PPE's must be used.		Advisory note & record in personal file	Warning letter & record in personal file	7 days suspension & record in personal file

10.12.3 Vedanta Safety Standard (VSS):

Business partner must comply with the requirement of Vedanta Safety Standard. Following are Vedanta Safety Performance:

1. Work at Height
2. Confined Space
3. General Electrical Safety
4. Isolation/LOTO
5. Vehicle & Driving Safety
6. Crane & Lifting Safety
7. Machine Guarding & Conveyor Safety
8. Molten Metal Handling

9. Excavation Safety
10. Rail Safety
11. Molten Metal Handling
12. PPE
13. Scaffolding
14. EOT Safety
15. Stockpile and Dump Management
16. Chemical Handling Safety
17. Hot Work

10.12.4 Personal Protective Equipment (PPE)

10.12.4.1 Definition:

Personal protective equipment (PPE) refers to protective clothing, helmets, goggles, or other garments or equipment designed to protect the wearer's body from injury or infection. The hazards addressed by protective equipment include physical, electrical, heat, chemicals, bio-hazards, and airborne particulate matter. They are considered as the last line of defence in hierarchy of controls.

10.12.4.2 Typical PPEs include:

- Foot Protection
- Hand Protection
- Eye Protection
- Head Protection
- Chemical suit
- Respiratory Protection
- Thermal Protective Clothing
- Job Specific PPEs

10.12.4.3 General Requirements for PPE

PPE is defined as equipment designed to be worn by personnel to protect themselves against work related hazards which may endanger their Health or Safety. PPE shall not be a substitute for effective engineering controls, safe working conditions or sound work practices. PPE will only protect from injury not prevent incidents; it is the last resort. Line Managers shall ensure that adequate PPE is selected in as per hazards identified at work places or in his job.

Reference:

a. American Standards.
b. European Standards.
c. IS Standards

All Contractual Business partners shall, at its own expense, supply required Hindustan Zinc Limited approved PPE among his Personnel, where required, in connection with the safe performance of the Services, with adequate protective clothing and other protective equipment including first aid which

shall be maintained in good condition or replaced, and shall be worn at all times where required to manage potential injury hazards associated with a work activity under this Contract.

All Contractual Business partner will ensure that his personnel have been trained in the correct use and application of PPE. All such training shall be documented and available to company on request.

10.12.5 Roles & Responsibility

10.12.5.1 HZL Line manager shall:

- Ensure that employees including Business partner's employees use the appropriate types of PPE as per hazards identified at work places or in his job.
- Ensure that PPE fits and correctly used by employees.
- Display of applicable PPEs at the entrance of each shop floor
- Explore other hierarchy of controls for mitigation of risk related to that hazard considering PPE as last line of defence.
- Shall ensure that a system of feedback and reporting about quality of PPE has been established and reviewed regularly.
- Technically evaluate each PPE and recommend vendor panel based on trial.
- Escalate defects to procurement dept. and ensure corrective action.

10.12.5.2 Business partners shall:

- Provide and ensure that, their employees use PPE which is specified by ESL and certified by IS/EN/ANSI standard. List of specified PPE is available with safety department.
- Ensure that PPE fits and correctly used by employees.
- Ensure that all PPE shall be ergonomically designed and adequate strength for the work to be performed conforming to EN/ANSI/IS standards.
- Testing of certain PPEs must comply with the Company's PPE procedures.

10.12.5.3 Training:

The line manager & responsible person of Business partners shall provide training to each employee who is required to use PPE, as per the following:

- When PPE is necessary
- What type of PPE is necessary
- How to properly don, doff, adjust, and wear PPE
- The limitations of the PPE
- The proper care, maintenance, useful life and disposal of the PPE.

Each affected employee shall demonstrate an understanding of the training and ability to use PPE properly, before being allowed to perform work requiring the use of PPE. Circumstances where retraining of employee is required include, but are not limited to, situations where:

- Changes in the workplace render previous training obsolete.
- Changes in the types of PPE to be used render previous training obsolete.

10.12.6 Safety Work Permit

The Business partners shall obtain necessary safety work permit(s) from the Company's Authorized Representative/ Engineer, before starting the work. All such safety permits once issued to the Business partner shall be available at the work site for inspection, as and when required. Format for safety work permit is available with the Company's Authorized Representative

10.12.7 Safety Requirements

- The Business Partners shall ensure that all work undertaken by them conforms to the requirements of all existing statutory laws and regulations in matters of health, safety and environmental protection
- The Contractor Business partners shall carry out regular safety inspection of all the equipment, tools and temporary works used by him at Site as well as of the work site and satisfy himself that all safety measures are being properly maintained. He shall also arrange to carry out load tests on erection equipment and tools from time to time through authorized agencies and maintain records of the test results.
- The Business partners shall promptly notify the Company's concerned Authorised Representative of any accident, which occurs at the Site, major or minor, whether or not affecting person & property; which resulted or could have resulted in an injury or damage to the property, and shall actively assist the Company in resulting investigations, if any
- The Business partners shall intimate to the Company's Authorised Representative before commencing work, the name of a 'key person' from his organization who shall:
  - Be fully responsible for safety of persons and
  - Ensure safe practices during the execution of the Contract.
- The Contractor Business partners shall ensure that at least one of his HSE representatives is always present at the work site during execution of works. This Safety person will take full responsibility for safe work practices including good housekeeping. In case of any violation of safety procedures or any unsafe acts are performed by their personnel, Company reserves right to penalise the Business partners and also demand replacement of his Safety representatives.
- Business partners shall follow the available Permit to Work (PTW) system for carrying out any activities that includes following (but not limited to) activities. The Business partners shall not perform any of such activities without first obtaining and displaying the applicable work permit(Presently applicable permit) at the project site:
  - Hot work
  - Confined space entry
  - Working at height
  - Electrical/Lockout / Tag out / isolation etc.
  - Any Job based permit/protocol/work instructions etc.
  - Any government related permit/ required statutory

10.12.8 HSE Performance Assessment:

Business Partners performance shall be assessed based on their HSE performance on monthly basis. There will be reward and reprimand scheme for partner as per the Contractor Safety Management Guidelines

10.12.9 Occupational Health Surveillance

In the Debari Zinc Smelter, the occupational health surveillance of the employee is being / will be done on a regular basis and records of the same are being / will be maintained as per the Factories Act. The occupational health surveillance program has been / will include lung function; sputum analysis and audiometric analysis on regular basis to observe any contraction due to exposure to dust and noise and corrective measures are/ will be taken accordingly.

Vocational training programmes are/will be conducted related to all safety and health aspects pertaining to their vocation and thereafter every quarter special training courses/ Awareness programme for Malaria eradication, HIV and health effects on exposure to dust, heat, noise, chemicals are/will be organized for employed person.

Periodical medical camps with specialized doctors of various disciplines are/will be organized to provide the specialized medical assistance to employees as well as neighbouring communities.

Annual sample report of health status of worker with special reference to Occupational Health and Safety has been enclosed as ***Annexure – 10*** along with this EIA/EMP Report.

A. List of Equipment for Occupational Health Monitoring

- ECG
- Analytical Pan Balance
- Dust Sampling devices
- Spectrophotometer
- Noise Monitoring device (dosimeter)
- Spiro meter
- Audiometric device
- Vision screener
- Tele Medicine Facility

B. Pre-Placement and Periodical Health Status

Pre / Post-employment checkup is being / will be carried out and following test is being / will be conducted:

- BMI (Body Mass Index)
- Chest x ray PA view
- Vision testing (Far & Near vision, colour vision and any other ocular defect)
- ECG
- Haemogram (examination of the blood)
- Blood Pressure & Blood Sugar Fasting
- Serum Cholesterol
- Renal Function Test (Blood Urea, Serum Creatinine)

- Liver Function Test (S. Bilirubin, Alk. Phosphatase, SGOT and SGPT)
- Urine (Routine and Microscopic)
- Complete physical examination
- Post-employment occupational health check-up such as lung function, audiometry, CBC, Blood Sugar, Lipid Profile etc.
- Medical records of each employee will be maintained separately and will be updated as per finding during monitoring.
- Medical records of the employee at the end of his / her term will be updated.

C. Frequency of Medical Examination

As per Factory Act, Frequency of Medical Examination

a. Pre-Placement Medical examination: Prior to joining
b. Periodical Medical examination: After every 1 year

D. Personal Protective Devices and Measures

- Industrial Safety helmets, Crash helmets
- Face shield
- Zero power Safety goggles and Gas Cutting Goggles
- Welders equipment for eye and face protection i.e. welding shield
- Ear muffs and Ear Plugs
- Full body Safety harness
- Leather hand gloves, Asbestos hand gloves, Electrical hand gloves, Heat Resistive hand gloves, Chemical hand gloves and Cut resistance hand gloves
- Safety net, Barricading net
- Industrial safety shoes with steel toe
- Electrical safety shoes without steel toe and Gum boots
- Retractable and fall arrestors
- Leather apron
- Reflective Jackets
- Protective clothing, Dangari etc.
- Safety belt / line man's safety belt
- Rope grab fall arrestor.

10.12.10 Implementation of OHS standards as per OSHAS/USEPA

The overall objective of the company is to provide a system that is capable of delivering healthy and safe workplace. Following measures have been / will be adopted for implementation of OHS standards.

- Site is already certified for IMS [ISO 9001, ISO 14001 and ISO 45001]
- Well-equipped Occupational Health Centre with adequate paramedical staff
- Routine and special investigation related to occupational health
- Health surveillance and maintenance of health record

- Rules and procedure for effective implementation of Safety Health and Environment policy and made to know all employees
- Round the clock Ambulance facility
- Sufficient number of First aid boxes
- Implementation of OHSAS 45001 for Occupational Health and Safety Management System
- Implementation of ISO 14001 for Environment Management System
- Formulation of OHS implementation team/ cell
- Risk assessment of each and every activity
- Implementation of OHS management program
- Displaying the safety and health policy and instructions at various locations
- Display of safe operating procedure (SOP) at various locations
- Job safety analysis
- Carry out daily plant safety inspection by internal safety department
- Investigation of fatal, serious accidents and near miss accident
- Investigation of reports of occupational diseases
- Monthly safety meeting of all employees & workers to discuss last month accident if any, reason and corrective measures taken.
- Organize campaigns, competitions, contests etc. to promote safety
- Organize safety training, seminars for safe working and safe vehicle and traffic movement within the plant premises and regular training for safe driving outside the plant premises
- Prepare annual reports of accidents and occupational diseases. Preparation and updating of Onsite Emergency Plan and Liaison with external agencies and authorities
- Ensure use of PPEs according to the job like helmet, safety shoes, goggle, dust mask, ear plug and hand gloves etc.
- Establishment of Occupational Health Centre for pre and periodic medical examination of workers and staff to detect any onset of occupational disease and corrective manures
- Display Material Safety Data Sheets (MSDS) for use of every hazardous substance
- Periodic Safety Audits both internal and external, review and implementation of recommendations.

10.12.11 Safety Committee

A safety committee exists and is manned by equal participation from management and workers with the following functions:

a) Accident prevention and control including ensuring the use of safety appliances.
b) Publicity, propaganda, education and training.
c) Assisting and cooperating with the management in achieving the aims and objectives outlined in the "Health and Safety Policy" of the occupier.
d) Carrying out health and safety surveys for identifying unsafe working condition/practices, which causes accident.

10.12.12 Medical Facilities

The plant is provided with a health centre with full-fledged facilities including hospital and dispensary at the plant premises with capacity of 16 beds available at Debari Hospital. 2 qualified doctors keep observation for 24 Hrs. Emergency Services is there at site to render the medical assistance. First aid box is available at many prompt locations in unit with required medicines. For medical treatment, the injured person shall be sent to dispensary and if required shifted to nearby associated hospital.

Apart from these, specialists will visit Debari Zinc Smelter Plant to render consultation. Camps for immunization, family planning, blood donation and free medical checkup programs will be organized on regular basis for employees as well as neighboring communities.

10.12.13 Investigation Facility

Full-fledged pathological laboratory, X-ray machine with routine and specialized investigation facilities has been made available at the plant.

- The Laboratory at Hospital is well equipped with Biochemistry Analyser, 03 part Cell Counter, Urine Analyser, and Incubator.
- Facilities for testing Diabetic Profile, Renal Profile, Liver Function Test, and Lipid Profile & Cardiac Profile are present.
- X-Ray Machine with Computerized Radiography
- Audiometer
- Spirometer
- Pathological Laboratory
- Oxygen Therapy Set

10.12.14 Ambulance Services

The hospital provides an ambulance to bring the patients to hospital in case of emergency. Health Centre has Ambulances for transportation of non-ambulatory & critical cases. Types:

a. Critical Care Ambulance- 1 Ambulance at Plant dispensary

10.12.15 First Aid Boxes

First aid boxes are/will be provided at prominent places with following items:

- Diphoterine Kit (6) (Rinsing solution for splashes of chemical products)
- Small, medium and large size sterilized dressing
- Burnol Ointment
- Packets of sterilized cotton wool
- Bottle (120 ml) of cetramide solution (1%) of suitable antiseptic solution
- Mercurochrome solution (in 2% water)
- Scissors
- Adhesive plaster (2 cm x 1 m)
- Sterilized eye pads in separate sealed packets
- Aspirin tablets
- Potassium Permanganate crystals

First aid boxes are/will be kept in every department for emergency. First aid training is/will be organized for the employees. These Boxes are checked, replenished & recorded by paramedics on 5th and 20th of every month. They confer to Class II of Factories Act and OHSAS 18001.

10.12.16 Occupational Health Facility

a) Monitoring health of all Regular and Contractual workers,
b) Initial Medical Examination or Pre employment Medical examination is done mandatorily before issuance of Gate pass,
c) Periodic Medical Examination is done in a scheduled plan with focus on hazard specific areas on the guidelines of DG- Factories and DG – Mines Safety. For hazardous jobs, specific tests are monitored half yearly.
d) Anthropometry, Lung Function Test – Spirometry, Hearing Test – Audiometry in a sound proof chamber, Blood Tests like Complete Blood Count, Lipid Profile, Sugar levels, Urea, Creatinine, Liver Function Test, Urine Routine & Chest X ray. For Mining workers, Chest X Rays are compared with ILO standard set of X Rays to diagnose Pneumoconiosis & silicosis. Stool tests are done for Food Handlers and Stemming workers.
e) All food handlers are vaccinated against Typhoid vaccination,
f) Regular employees with Metabolic Syndrome and increased BMI are regularly followed up at Health Centre.
g) All data relating to Occupational Health and Patient history are entered in Hospital Management Software. They are also stored in Hard copy in a systematic manner.

10.12.17 Plan & Fund allocation for Occupational & Safety Hazards

Plan and fund allocation to ensure the occupational health & safety of all contracts and sub-contract workers is given in Table - 10.5.

Table 10.6: Fund allocation for Occupational Health and Safety Hazards

Health Expenses (Rs. In Lacs)								Details
Year	Capex		Total Additional	Revenue		Total Additional	Grand Total	Periodic Medical Examination 24 X 7 medical facilities Ambulance Maintenance
	Phase I	Phase II		Phase I	Phase II			
1st Year	20	0	20	180	**40**	220	**240**	
2nd Year	10	20	30	100	**150**	250	**280**	
3rd Year	10	40	50	100	**180**	280	**330**	
Total	**40**	**60**	**100**	**380**	**370**	**750**	**850**	
Safety Expenses (Rs. In Lacs)								**Details**
Year	Capex		Total Additional	Revenue		Total Additional	Grand Total	Structural Replacement/Strengthening PPE's Fire Prevention Network Maintenance and Improvement Monitoring and Testing Training and development
	Phase I	Phase II		Phase I	Phase II			
1st Year	**2000**	**0**	2000	**100**	**0**	100	**2100**	
2nd Year	**100**	**500**	600	**50**	**50**	100	**700**	
3rd Year	0	600	600	**0**	**100**	100	**700**	

Total			**3200**			**300**	**3500**	

10.13 BUDGETORY PROVISION FOR ENVIRONMENT MANAGEMENT

The budget proposed for expansion of the project and that for the environmental protection measures is given as below:

- **Capital Cost for project:** Rs. 2500 crores. (Rs. 2200 Cr in Phase I & Rs. 300 Cr. In Phase II)
- **Cost for Environmental Protection Measures:**
  - ✓ Capital Cost: Rs. 600.628 Crores /-
  - ✓ Recurring Cost: Rs. 70 Crores /annum.

EMP Cost Break-up is given in Table - 10.6 below:

Table 10.7: Cost Break up of EMP (Rs. in Crores)

S. No.	Project activity	Environment Improvement measures	Capital Cost			Annual Recurring Cost		
			Phase I	Phase II	Total	Phase I	Phase II	Total
1.	Bag Filters for silos (Roaster)	For dust emission control	1	0	1	0.1	0	0.1
2.	Hot ESP (Roaster)	For separation dust from gas	30	0	30	1	0	1
3.	Wet ESP(Roaster)	For suppression of dust in gas	20	0	20	1	0	1
4.	Tail Gas Treatment Plant (Roaster)	To reduce the SO_2 content from Stack discharge	40	0	40	2	0	2
5.	SO_2 Blower (Roaster)	To carry and discharge Gas through stack	15	0	15	1	0	1
6.	Steam Turbine Generator (Roaster)	Power generation from steam	50	0	50	4	0	4
7.	ETP(Roaster)	Treatment of Effluent to clean water and remove any toxic and non-toxic materials, so that water can be reused	40	0	40	7	0	7
8.	RO-ZLD(Roaster)	To ensure zero discharge as well maximize water recovery and its recycling in process	20	0	20	10	0	10
9.	Acid Plant (Roaster)	To reduce So2 emissions	130	0	130	3	0	3
10.	Acid Plant Converter/Catalyst (v205)	To minimise So2 emissions	-	-	-	6	0	6
11.	Acid pumps (Roaster)	To reduce So2 emissions	5	0	5	1	0	1
12.	Cooling towers (Roaster)	Supporting Equipment	5	0	5	1	0	1
13.	WTP(Roaster)	Supporting Equipment	10	0	10	2	0	2

S. No.	Project activity	Environment Improvement measures	Capital Cost			Annual Recurring Cost		
			Phase I	Phase II	Total	Phase I	Phase II	Total
14.	Firefighting system (Roaster)	Preventive Equipment	1	0	1	0.1	0	0.1
15.	Cooling towers (Leaching-Cell House)	Supporting Equipment	108	0	108	1	0	1
16.	ETP-RO-ZLD (Leaching-Cell House)	To ensure zero discharge as well maximize water recovery and its recycling in process	108	0	108	8.2	0	8.2
17.	Bag Filters (Leaching-Cell House)	For dust emission control	16	0	16	0.1	0	0.1
18.	Green Belt development & Maintenance	To enhance environmental quality and aesthetic value	1.628	-	-	1	0	1
19.	Post project Monitoring	To keep check on the environmental status of the plant site area	-	-	-	0.25	0	0.25
20.	Hazardous waste disposal cost & Jarosite Recycling in cement industries	Disposal of Hazardous and Other waste in Environmentally friendly manner	-	-	-	20	0	20
21.	Training, Development, and Awareness sessions.	Enhance awareness and skill development	-	-	-	0.25	0	0.25
	Total		**600.628**	**0**	**600.628**	**70**	**0**	**70**

Note: The implementation of the EMP is responsibility of the EMC. Reporting of compliances and non–compliances (if any) to the Board and other stakeholders is also the responsibility of the EMC. Details are given in Section 10.3.1 of this Chapter.

An amount of Rs. 35.27 Crores has been earmarked for Socio-Economic development activities within the study area during 3 years and Rs. 7.11 Crores for adoption of two villages i.e., Debari and Bichhri for model village development. Details are given in section 8.5 of chapter 8 of this EIA/EMP Report.

10.14 CONCLUSION

As discussed, it is safe to say that the proposed expansion project under clause 7(ii) will not be likely to cause any significant impact on the ecology of the area, as adequate preventive measures will be adopted to contain various pollutants within the permissible limits. Greenbelt development is being /would also be taken up as an effective pollution mitigative technique, as well as to control the pollutants released from the premises of Debari Zinc Smelter, Udaipur (Rajasthan).

CHAPTER - 11

SUMMARY & CONCLUSION

11.1 INTRODUCTION

M/s Hindustan Zinc Ltd (HZL) is part of the Vedanta conglomerate, which is recognized as one of the most successful producers of various non-ferrous metals in India. HZL is an India-based company, which is engaged in the mining and smelting of Zinc, Lead and Silver metal and Wind energy in India. The Company's operations include five Zinc-Lead mines, over four Zinc Smelters, a Lead Smelter, a Zinc-Lead Smelter, a silver refinery plant and over six captive power plants in the state of Rajasthan. In addition, the Company also has a rock-phosphate mine in Maton near Udaipur in Rajasthan and Zinc, Lead, Silver processing and refining facilities in the State of Uttarakhand. The Company has wind power plants in the States of Rajasthan, Gujarat, Karnataka, Tamil Nadu and Maharashtra. It has a metal production capacity of over one million tons per annum with its key Lead-Zinc mines in Rampura Agucha, Kayad and Sindesar Khurd, and smelting complexes in Chanderiya, Debari and Dariba, all in the state of Rajasthan.

M/s Hindustan Zinc Ltd. is one of the largest Lead-Zinc integrated producer & a Leading producer of silver with more than 60 years of experience in Mining & Smelting. Reserves & Resources of about Million Tones as on 31st March 2022 sufficient for more than 25 years of mine life. Clean Development Mechanism (CDM) projects on waste heat recovery & wind power have an annual Certified Emission Reduction potential of over 6.13 Lac TON of CO_2. Total Exchequer to Government till 31st March, 2023 was Rs. 24892 Crores, Crore including dividend of 9,422 Crore including royalty and taxes. HZL has established Sewage Treatment Plant at Udaipur under PPP model to treat 60 MLD sewage and utilize treated water in its operations. Vision to enhance the quality of life and economic wellbeing of the communities around its operations, mainly SAKHI, MARYADA, KHUSHI campaigns, Shiksha Sambal Project, Jeevan Tarang Programme, Samadhan Programme reaching over 1.4 million plus beneficiaries and 234 villages across Rajasthan.

HZL is now proposing expansion for its existing Debari Zinc Smelter unit established in 1968 at Debari, Udaipur, Rajasthan, within the existing plant premises. This report has been prepared in reference to the Ministry's O.M. dated 11th April, 2022 regarding grant of EC under para 7(ii) of EIA Notification, 2006, amended from time to time for which EIA/EMP Report has been prepared as per Standard TOR Points for carrying out the Environmental Impact Assessment (EIA) study for "Proposed Expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) through modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time at Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan)by M/s. Hindustan Zinc Limited".

This expansion will be carried out in 2 phases, in 1st phase the capacity expansion will be done up to 1,20,000TPA (20%) along with Roaster installation and in the 2nd Phase, capacity will be further increased up to 1,40,000TPA (40%) by Modernization of process by installation of new state of art

with latest technology equipment's to improve efficiency. Recovery, reduction in power consumption & GHG emission as well as elimination of manual activities.

Details of the existing Clearances & Consents are given in Chapter 1, table 1.1 of this EIA/EMP Report. As per EIA Notification dated 14thSept., 2006, as amended from time to time; the project falls under S. No. 3 (Material Production), Category "A", Project or Activity 3 (a)- Metallurgical Industries (ferrous & non–ferrous).

Following activities are planned in Debari Smelter Unit:

1. Increasing existing capacity from 1,00,000 MTPA to 1,20,000 MTPA in Phase-I and then 1,20,000 MTPA to 1,40,000 MTPA in Phase II by:
    - Expansion in melting capacity section of existing melting of 10.5 TPH by adding 1 induction furnace and 1 slab casting line (24TPH).
    - Installation of New Jumbo Cellhouse equipped with Crane for improvement in Current efficiency from existing 84% to 87% and then to 92% there by reduction of power consumption
    - Installation of Automatic cathode stripping machine.
    - Installation of Anode flattening Machine.
    - Installation of New Leaching and Purification equipped with Automatic filter press.
    - Present small cells (576 Nos') will be replaced by Jumbo cells (80 Nos')
    - Replacement of existing rectifiers from 58 MVA to 80 MVA capacity,
    - Installation of Cooling tower for Rectifier heat exchanger
2. Installation of new Acid Leaching section having higher capacity reactors of 200 m3 and thickeners having diameter of 21 meter.
3. Installation of new Roaster of capacity 3,00,000TPA calcine is proposed to be installed along with Sulphuric acid plant capacity of 2,89,000 TPA to treat the SO_2 laden off gases from proposed roaster.
4. Installation of additional 5 nos. of reactor and 2 thickeners in leaching section equipped with calcine dosing system and bag filter to control fugitive dust emission
5. Installation of tail gas treatment plant.
6. For Environment expects separate Ventilation system Bag filters are provided for furnace and work zone and stack has been provided.
7. Provision of dust control system/ bag filters has been provided at material transfer points
8. Installation of additional RO-ZLD of 2000KLD capacity.

11.2 JUSTIFICATION FOR THE PROJECT

Proposed expansion will be done within the existing plant premises. The site for the existing plant was finalized considering the ideal location for the industries. Following factors were considered while selecting the site:

- The site has ample flat land for accommodating plant and related facilities within the existing DZS premises.
- Availability of reliable power & water supply.
- Nearness to NH-27 & NH-48 makes it easier to transport raw materials & final product at market.
- Availability of suitable source of raw material
- There is no National Park, Wildlife Sanctuary and Biosphere Reserve within 10 km radius area of plant site.
- Availability of manpower in the nearby area.
- Already established industrial environment and necessary infrastructure.
- Using the Eco-friendly Clean Technology.
- Economies of scale will result in lower operating cost.

11.3 DETAILS ABOUT THE PROJECT

11.3.1 Brief Description of the Project

Hindustan Zinc Limited has an existing Debari Zinc Smelter established in year 1968 at Village: Debari, Tehsil: Girwa, District: Udaipur (Rajasthan). The existing plant comprises of Zinc Smelter Plant [1,00,000 TPA Zinc metal 4,19,000 TPA Sulphuric Acid, 4,45,000 TPA Calcine, 320 TPA Cadmium metal / Sponge (equivalent metal), 2,000 TPA Sodium Chloride, 16,500 TPA Sodium Sulphate]. The plant has Solar Power Plant of 12.50 MW, WHRB 8 MW and has Emergency DG sets with total capacity of 14.80 MW (2*7.4 MW).

The chronology of events of the said project is as below:

- Initially, the Honorable Governor of the State of Rajasthan granted lease of 427 Acres (172.79 Ha) in 1962 for 99 years under the provisions of the Rajasthan Industrial Areas Allotment Rules, 1959, framed under Section 100 of the Rajasthan Land Revenue Act, 1956, which includes 98.74 hectares (244.01 Acres) vide lease dated 29.01.1962, 13.02 hectares (32.18 Acres) vide lease dated 26.03.1962 and 61.03 hectares (150.81 Acres) vide lease deed dated 26.03.1962 respectively. HZL commissioned the referred Zinc Smelter unit in 1968. Hindustan Zinc Limited, whilst being an erstwhile public sector undertaking, acquired additional land from nearby villages in and around the 1990s, for the purpose of its operations.
- Hindustan Zinc Limited (HZL) has filed a suit [Case Title: HZL vs Nandram & Ors. (Case No. 117/204)] before SDO/SDM Court, Girwa, Udaipur against Nandram & 23 others under Rajasthan Tenancy Act, 1955 for mutation and correction of revenue records.
- Plant and colony was established in 1968, and being used for non-forest purpose before the Forest (Conservation) Act, 1980, came into effect, therefore Forest Clearance was not applicable for Zinc Smelter Debari.
- As per Hon'ble Supreme Court orders (State Of Bihar vs Banshi Ram Modi & Ors, 7.05.1985), "forest area which is broken up or cleared before the commencement of the Act, prior approval of the Central Government in terms of Section 2 of the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 is not required and it would be required, when lease granted before the

commencement of the said Act, is renewed after its coming into force. During the continuance of the lease period, the approval of the Central Government under Section 2 of the said Act is not required.

- In this case also, prior approval under Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980, will only be required during renewal of Zinc Smelter Debari's lease i.e. 2061. At present, the lease of the unit is valid and in continuance.
- Environment Clearance (EC) for expansion of Zinc Smelter (80,000 TPA to 1,00,000 TPA) at Village: Debari, Tehsil: Girwa, District: Udaipur (Rajasthan) was granted by MOEFCC, New Delhi vide F.No.J-11011/479/2006-IA.II(I) 19.03.2008 for total land area of 190.05 ha. CTE for the same was obtained from RSPCB vide F.No. 12(30-86) RPCB/Gr II/49 dated 5.04.2008 followed by CTO vide Letter F: 12(30-86) RPCB/Gr II/2702 dated 17.09.2008. The plant is in operation as per renewed CTO obtained from RSPCB vide Order no. 2022-2023/HDF/9282 dated 17.03.2023 (Valid upto 31.03.2027).
- Subsequent to the above, M/s. Hindustan Zinc Limited proposed for the Expansion of Zinc Smelter (1,00,000 TPA to 1,40,000 TPA) through Modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time At Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan). While submitting the online application along with kml file of the Plant area on the Parivesh portal vide Proposal No. IA/RJ/IND1/457836/2024 dated 06.01.2024 withdrawn on 19.07.2024, it was found that:
- some part of land covering, security colony, substation, some plantation etc. is showing under forest land. Upon observing this discrepancy, for further verification of the referred land, we consulted DCF-Udaipur (North Region) and found a reflection of the same in the Decision Support System. This is contrary to the revenue records as are in place, since in the same, this land parcel as which is part of the lease deed awarded to HZL in 1962, for 99 years, is recorded in HZL's name.
- After further enquiry with the revenue and forest departments it was found that the total area of Zinc Smelter Debari complex (Plant and Colony) comes out to be 184.2 ha (instead of 190.05 Ha mentioned in the EC letter). Remaining 5.85 Ha area falls outside the physical boundary Plant area (129 Ha) & Residential colony area (55.2 Ha). Hence, 184.2 Ha area is considered as projects area for this proposal.
- Out of this 129 ha of plant area, as per the information available with Forest department, 1.77 ha of Khasara No. 4522 and 5.20 ha of Khasra No. 4523 falls under Kantiya Forest (total area – 292 ha), which was notified as reserve forest by Mewar Government on 27.12.1947.
- Similarly, out of 55.2 ha. of colony area, 11.60 ha of Kasara No. 4509, 2.40 Ha. of Khasara No. 4510 and 2.46 Ha of Khasara No. 4511 falls under Panwadi Forest (total area 225 ha), which was notified as reserve forest by Mewar Government on 21.02.1943.

- Whereas, old revenue records of sanwat 2051 (year 1994) are showing above khasra No. 4522, 4523,4509, 4510, 4511 as factory area.
- In this regard, DCF-Udaipur (North Region) vide Letter No. F()Survey/Uvas-Uttar/2023-24/6317 dated 22.09.2023 confirmed that there is no presence of forest land in the 121 Hectares of land as within Hindustan Zinc Limited's Zinc Smelter Debari, Udaipur, and that this does not fall within any forest area.
- It is to be noted that Hindustan Zinc Limited will maintain status quo as far as the claimed forest is concerned, and no activities are proposed to or will be carried out in this area without obtaining requisite clarity on the discrepancy or necessary approvals for the same.

Now M/s. Hindustan Zinc Limited is submitting an application for "Proposed Expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) through Modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time At Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan)". Meanwhile, the EIA/EMP Report has been prepared for both phases of the expansion.

Brief description about the proposed Project is given in Table - 11.1.

Table 11.1: Salient features of the Project

S. No.	Particulars	Details
A.	**Nature of the Project**	Expansion Project
B.	**Size of the Project**	M/s. Hindustan Zinc Limited is proposing the expansion of existing plant from 1,00,000 TPA to 1,40,000 TPA. This expansion will be carried out in 2 phases, in 1st phase the capacity expansion will be achieved upto 1,20,000 TPA (20%) through modernization with installation of state of art jumbo cell house, higher capacity reactors & thickeners in L&P section and Roaster. In the 2nd Phase, capacity will be further increased upto 1,40,000TPA (40%) by debottlenecking, improvement in current, melting efficiency & metal recovery. This will result into improvement in metal recovery, recovery of minor metals and reduction in specific power, fresh water, GHG emissions. M/s. Hindustan Zinc Limited is hereby proposing for "Proposed Expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) through modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time At Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan)" .
C.	**Category of the Project**	Category "A", Project or Activity 3(a)- Metallurgical Industries (ferrous & non–ferrous).
D.	**Location Details**	
1.	Plot No./Khasra No.	Land documents are enclosed as ***Annexure 8***
2.	Villages	Debari and Bichhri
3.	Tehsil	Girwa
4.	District	Udaipur
5.	State	Rajasthan
6.	Latitude& Longitude	A: 24°36'28.25"N 73°48'51.06"E B: 24°36'7.67"N 73°49'26.92"E C: 24°35'30.90"N 73°49'37.68"E D: 24°36'11.89"N 73°48'32.26"E
7.	Toposheet No.	Core Zone: 45H/14(G43T14)

S. No.	Particulars	Details
		Buffer Zone: 45H/10(G43T10), 45H/11(G43T11), & 45H/14(G43T14) & 45H/15(G43T15)
E.	**Area Details**	
1.	Total Plant Area	Total Plant Area: - 184.2 ha (129 ha plant area + 55.2 ha colony area)
2.	Greenbelt/ Plantation Area	Out of the total plant area (184.2 ha), 76.28 ha (41.41 %) area has already been developed. The same will be maintained and enhanced by doing gap plantation to achieve the plantation density @ 2500/ha.
F.	**Environmental Setting Details *(with approximate aerial distance and direction from the plant site)***	
1.	Nearest Town/City	• Udaipur (~5.6 km in WSW direction from plant site)
2.	Nearest Railway Station	• Debari RS (~1.5 km in NNW direction from plant site) • Rana Pratapnagar RS (~7.0 km in WSW direction from plant site) • Khemli RS (~9.5 in NNE direction from plant site)
3.	National Highway	• NH-27 (Near to Plant Boundary in North direction from plant site) • NH-48 (~2.5 km in West direction from plant site) • SH-9 (~5.0 km in NE direction from plant site) • MDR- 36A (~0.3 in North direction from plant site)
4.	Nearest Airport	Maharana Pratap Airport – Udaipur (~5.8 km in East direction from plant site)
5.	National Park, Wildlife Sanctuary, Biosphere Reserve, Tiger Reserve, Wildlife Corridors, Reserved / Protected Forest (PF)etc. within 10 km radius	• Panwari RF (Khasara No. 4509, 4510 and 4511 of plant area falls under Panwari Forest) • RF (~1.0 km in ENE direction from plant site) • Kantia RF (Khasara No. 4522 and 4523 of plant area falls under Kantia Forest) • Kamlodia RF (~2.0 km in SW direction from plant site) • RF (~2.0 km in South direction from Plant site) • Bara Magra RF (~1.0 km in NNW direction from plant site) • Bhainsra RF (~3.5 km in NNW direction from plant site) • Segria RF (~3.5km in West direction from plant site) • Hinglashia RF (~3.5 km in SW direction from plant site) • Bordi RF (~3.5 km in WSW direction from plant site) • Dhenkli RF (~4.5 km in NW direction from plant site) • Gugla RF (~5.5 km in West direction from plant site) • Umra RF (~6.5 km in SW direction from plant site) • Bagdara RF (~8.0 km in SSW direction from plant site) • Santu RF (~6.5 km in SSE direction from plant site) • Nahar Magra RF (~6.5 km in NE direction from plant site) • Amberi PF (~8.5 km in NW direction from plant site) • Amarbir RF (~7.0 km in SSE direction from plant site) • Nauva RF (~8.0 km in NNW direction from plant site) • Hora RF (~8.5 km in SW direction from Plant site) • Kheradi RF (~8.5 km in NNW direction from plant site) • Chirwa Ka Ghata (~9.0 Km in NNW direction from plant site)
6.	Water Body within 10 km radius	• Udaisagar Lake (~1.0 km in SSW direction from Plant site) • Berach River (~1.5 km in SE direction from Plant site) • Udai Sagar Left Canal (~5.5 km in NE direction from Plant site) • Udai Sagar Right Canal (~1.5 km in ESE direction from Plant site) • Udai Sagar Middle Canal (~0.5 km in East direction from Plant site) • Karget Canal (~2.5 km in SSE direction from Plant site) • Dabok Pond (~3.0 km in ENE direction from Plant site) • Ahar Nadi (~3.5 km in SW direction from Plant site) • Vela Nala (~6.5 km in ENE direction from Plant site) • Khemlitalav (~8.0 km in NNE direction from Plant site) • Bagdara Talav (~8.0 km in SSW direction from Plant site) • Ganeshpura pond (~8.5 km in West direction from Plant site) • Gadela Nadi (~9.0 km in NNE direction from Plant site)

S. No.	Particulars	Details			
		There are three seasonal nallahas passing through the plant site, which have run off water from the nearby hill in west direction during rains only Apart from the above, study area is having many seasonal ponds, nallahs, water channels which are active during rainy season.			
7.	Wetlands within the study area as per State Wetland Authority	No Wetland site notified under Ramsar Convention, is falling within 10 km radius study area. However, Udai Sagar lake (~1.0 km in SSW direction from Plant site) has been listed as Wetland by State Wetland Authority, Rajasthan. (source:https://environment.rajasthan.gov.in/content/environment/en/state-wetland-authority/list-of-identified-wetlands.html) As per the ADS raised on 23.10.2024 Point no. 7 the application for obtaining NOC regarding the proximity of the Udai Sagar Lake (~1.0 km, SSW) from the Project site has been submitted to the Rajasthan State Wetland Authority (RSWA) on 24.10.2024. The matter is under process with the authority.			
8.	Seismic Zone	Zone - II [as per IS 1893 (Part-I): 2002] i.e., Low Damage Risk Zone			
G.	**Basic Requirements of the Project**	**Existing**	**Additional for proposed expansion**		**Total after proposed expansion**
			Phase I	**Phase II**	
	Water Requirement (KLD)	8000	1046**	0	9046
		** Total water requirement for industrial and Domestic usage will be met from Mansi Wakal Dam and STP Udaipur.* *** - No additional fresh water is required for proposed project. Treated sewage from Udaipur STP will be used as additional water for proposed expansion.*			
	Power Requirement (MW)	*Existing – 90 MW* *Total after Expansion – 110 MW* *Source:* WHRB & Solar Power plant at site; CPPs from sister units at Zawar, Dariba & Chanderiya & AVVNL. DG Sets for power back up. *Additional power required for proposed expansion shall be sourced from WHRB or renewable energy*			
	Steam Requirement (TPH)	Existing - 24 Additional - 8 Total after expansion - 32			
	Manpower Requirement (Number)	784	65	0	849
		**Additional manpower will be sourced locally from nearby area. In addition to above 400 nos of manpower is being used for projects and other improvement projects.*			
H.	**Cost Details**				
	Total Cost for the Project	Rs. 2500 crores (Phase I Rs. 2200 Cr. & Phase II Rs. 300 Cr.)			
	Cost for Environmental Protection Measures	Capital Cost: Rs. 600.628 Crores/- Recurring Cost: Rs. 70 Crore /annum			

Source: Pre-feasibility Report

11.3.2 Major Requirements for proposed expansion project

11.3.2.1 Raw Material Requirement

Major raw material required for Zinc Smelter is Zinc concentrate, Calcine, High silver Lead and various additives Fuel etc. Details regarding quantity of raw materials, their source along with distance and mode of transportation are given in Table – 11.2

Table 11.2: Raw Material Requirement & Additives Requirement

S. No.	Particular	UNIT	Quantity					Probable transportation	
			Existing	Additional		Total Additional	Total After expansion	Source	Distance and mode
				Phase I	Phase II				
1.	Zinc concentrate/Calcine	TPA	491000	107919	88094	196013	687013	HZL Mines	50 km to 310 Kms
2.	Zinc Secondaries - Zinc Dross/ Ash/ Zinc bearing waste	TPA	5250	1183	1072	2255	7505	HZL Smelter	Within same premises
3.	High Silver Lead (HSL)	TPA	0	1500	0	1500	1500	HZL Smelter	By covered truck DSC- 80 Km CLZS- 110 km
4.	Zinc dust	TPA	0	4800	700	5500	5500	HZL Smelter	By covered truck DSC- 80 Km CLZS- 110 km
5.	Zinc Sulphate	TPA	-	9283	1111	10394	10394	Ancillary	By covered truck DSC- 80 Km CLZS- 110 km
6.	Pyro metallurgical Slag	TPA	Nil	60,000	0	60,000	60,000	HZL Smelter	By covered truck DSC- 80 Km CLZS- 110 km
7.	Moore Cake	TPA	Nil	50,000	0	50,000	50,000	HZL Smelter	Stock of HZL & By covered truck DSC- 80 Km CLZS- 110 km
8.	Coke fines	TPA	Nil	25,200	0	25200	25200	Indigenous /imported	Approx. 1500kms Through Trucks
9.	LGLC (low grade silver crust/cake)	TPA	Nil	0	30,000	30000	30000	HZLs DSC & CLZS Smelter	By covered truck DSC- 80 Km CLZS- 110 km

Source: Pre-feasibility Report

11.3.2.2 Fuel Requirement

Details regarding quantity of fuel required, their source along with distance & mode of transportation for expansion project are given in Table – 11.3.

Table 11.3: Fuel Requirement

S. No.	Particular	Unit	Quantity Total After expansion	Probable transportation	
				Source	Distance and mode
1.	Fuel HSD/LDO/LPG/ CNG/PNG	KLA	1450	IOCL / Reliance, Gujarat Based Refinery/Oil Depot	Approx. 1000 km
2.	Fuel LPG at Melting	MTA	87	Indane Depot	Approx 5 Km

S. No.	Particular	Unit	Quantity Total After expansion	Probable transportation	
				Source	Distance and mode
					to 50 Km
3.	Fuel HSD/LDO at MCTP	KLA	960	IOCL / Reliance, Gujarat Based Refinery/Oil Depot	Approx. 1000 km

Source: Pre-feasibility Report

11.4 PROCESS DESCRIPTION

The process description of the Zinc Smelter Complex includes the following units:

A. Zinc Smelter
   a. Roasting Plant
   b. Gas Cleaning
   c. Sulphuric Acid Plant
   d. Tail Gas Treatment Plant
   e. Leaching Plant
   f. Purification Plant
   g. Cell House
   h. Melting and Casting Plant

B. Power Generation
   a. WHRB
   b. Solar Power Plant
   c. DG Set

C. Other associate Facilities
   a. ETP
   b. STP
   c. RO-ZLD with MVR
   d. MCTP

Detailed Process Description are given in chapter 2, Section 2.7 of EIA/EMP Report

11.5 DESCRIPTION OF ENVIRONMENT

11.5.1 Presentation of Results (Air, Noise, Water & Soil)

Ambient air quality monitoring has been carried out at 8 monitoring locations within the 10 km radius of the study area on 24 hourly bases.

- The concentration of PM2.5 and PM10 for all the 8 AAQM stations were in range of 26.5 to 51.3 µg/m3 and 58.9 to 88.1 µg/m3 respectively, SO2 and NO2 were found to be in range of 6.6 to 16.6 µg/m3 and 12.2 to 28.2 µg/m3 respectively. CO was found to be in range of BDL to 1.12 mg/m3. The concentration Zinc (Zn) ranges between BDL (DL: 1 µg/m3) to 3.02 µg/m3, the concentrations of Total Hydrocarbon was BDL (DL: 1.0 mg/m^3) to 2.2 mg/m3 and the concentrations of lead was BDL (DL: 0.02 µg/m3) to 0.39 µg/m3.

- Ambient noise levels were monitored at 8 locations around the plant site Noise level varies from 51.5 to 66.4 Leq dB (A) during day time and from 41.7 to 56.4 Leq dB (A) during night time.
- Surface water quality analysis for 4 sampling locations shows that pH varies 7.44 to 7.7, Total dissolved solids varies from 996.0 to 1136.0 mg/l, Total hardness 341.59 to 584.14 mg/l and conductivity (1626.0 to 1823.0 µS/cm). The COD (24 to 63.3 mg/l) and BOD (7.6 to 18 mg/l). The nutrients were also found low viz. sulphate (92.80 to 121.60 mg/l), nitrate (4.82 to 8.54 mg/l), calcium (63.35 to 120.75 mg/l), magnesium (44.60 to 68.74 mg/l). The Dissolved oxygen (66.1 to 7.2 mg/l) indicated that the water bodies are safe for aquatic biodiversity.
- Ground water quality analysis for 8 sampling locations shows that pH varies from 7.42 to 7.85, Total dissolved solids varies from 636 to 1498 mg/l, Total hardness from 301.9 to 792.0 mg/l and conductivity (972 to 2412 µS/cm). The nutrients were also found low viz. sulphate (92.07 to 201.3 mg/l), nitrate (15.04 to 33.06 mg/l), calcium (87.13 to 188.12 mg/l), magnesium (20.55 to 78.40 mg/l). indicated that all the samples comply to the drinking water standard (IS: 10500-2012) except 2 locations (Village Debari and Village Lakadwas) where Total Hardness values are out of the prescribed limit.
- Soil monitoring was carried out at 8 locations and the analysis results showed that soil colour is Reddish, Light and dark brown & the textures of the soil samples majorly were Sandy Clay to Sandy Clay loam. The samples have rich content of organic matter comprising of 0.78 % to 1.11 for the plant growth, nitrogen (160.25 to 333 kg/ha) better to sufficient, phosphorus (42.6 to 98.64 kg/ha) medium to more than sufficient and potassium (513.26 to 1491.02 kg/ha) more than sufficient, Magnesium (315 to 614.5 mg/kg), and Calcium (1943 to 3062 mg/kg).

Above baseline study results shows that the emission levels & water quality parameters are within the prescribed norms, however the HZL is being/will adopt adequate Environmental pollution control measures in order to minimize the environment pollution due to the proposed expansion project activities. Details are given in Chapter 4 & 10 of this EIA/EMP report.

11.5.2. Biological Environment

As per the field survey and List of Flora by ENVIS, MoEF&CC; no endemic, endangered and rare species of flora have been observed in the study area. Total 216 species were reported out of which 57 trees, 39 shrubs, 91 herbs, 20 species of grass and 09 species of climbers have been recorded in the study area based on primary observation as well as based on information collected from the secondary data. Out of all the floral species found in the study area 37 are agricultural crops.

Among fauna 16 species of mammals, 5 species of reptiles, 9 amphibians and were recorded from the study area. Among avifauna 70 species were recorded in the study area. No National Park, Sanctuary, Biosphere Reserve, Migratory Corridor of wild animals exists within 10 km radius of study area. Among aquatic fauna 10 species were recorded in the study area.

As per the authenticated list, total 9 Schedule 1 species i.e., *Panthera pardus* (Leopard), *Vulpes bengalensis* (Indian Fox), *Canis aureus* (Golden Jackal), *Felis chaus* (Jungle Cat), *Herpestes smithii*

(Ruddy Mongoose), *Hyaena hyaena* (Striped Hyena), *Hystrix indica* (Indian Crested Porcupine), *Daboia russelii* (Russell's Viper), *Pavo cristatus* (Indian Peafowl) found within the study area during survey. Wildlife conservation plan for the above species has been prepared and submitted to DCF, Udiapur for authentication from CWW, Udaipur vide letter dated 30.03.2023. The receipt of the same is enclosed herewith with this EIA/EMP report as ***Annexure 7C(i).*** Receipt for approval of revised Wildlife conservation plan submitted to DCF, Udaipur for authentication from CWW, Udaipur on 19.12.2023 is enclosed herewith with this EIA/EMP report as ***Annexure 7C(ii).*** Final Report for WLCP for HZL Debari issued vide document no. ZSD/ENV/22-23/BD/WCP has been attached as ***Annexure 7d*** with this EIA/EMP report.

11.5.3. Socio-Economic Environment

The population of the study area as per 2011 Census records is 577495 (for 10 km radius). Total no. of households is 120209. Scheduled Caste fraction of the population of the study area is 58458 (10.12%) and Scheduled Tribe 56783 (9.83%). Literacy rate of the area is 85.62%. Total working population and non-working population is 35.36% and 64.64%, respectively in the study area.

There are mainly 10 educational institutions, 9 places of worship, 1 post office are present within 01 Km of the study area. Apart from these 3 seasonal nallahs are also passing through the plant site. Mitigation Measures for Environmental Sensitive Areas within 01 Km Radius of the Plant Site is given in Chapter 4, section 4.12.1 of this EIA/EMP report.

11.6 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Anticipated environmental impacts due to operation of the proposed expansion project along with mitigation measures are given in Chapter 4 of this EIA/EMP Report.

11.7 ENVIRONMENTAL MONITORING PROGRAMME

Details of the environmental monitoring schedule / frequency, which will be undertaken for various environmental components, as per conditions of EC / CTE / CTO are given in Table - 11.4.

Table 11.4: Post Project Monitoring

S. No.	Aspect	Monitoring parameters	Location	Schedule and frequency of monitoring	Responsibility
CONSTRUCTION PHASE					
1.	Ambient Air Quality Monitoring	PM_{10}, $PM_{2.5}$, SO_2, NO_2	Work Zone-Construction site	Quarterly	HZL/ NABL Accredited Laboratory
2.	Noise Level Monitoring	Noise Level	Work zone-construction site	Quarterly	HZL/ NABL Accredited Laboratory
3.	Ground water monitoring	As per IS : 10500-2012	Construction site	Pre-Monsoon & Post Monsoon	NABL Accredited Laboratory
	OPERATIONAL PHASE				
4.	Meteorological data	Dry bulb temp, wet bulb temp, relative humidity, wind speed, wind	Permanent station in plant premises. The wind sensor is preferably at 10 m height above the	1 No. Online metrological station.	HZL

S. No.	Aspect	Monitoring parameters	Location	Schedule and frequency of monitoring	Responsibility
		direction and rainfall	ground without any surrounding hindrances that may affect the free flow of wind		
5.	Ambient Air Quality	PM_{10}, $PM_{2.5}$, SO_2, NO_2 CO (As per NAAQS 2009)	Plant premises and in nearby villages	4 Nos. continuous ambient air quality monitoring stations (CAAQMS) have already been installed after getting site approval from SPCB (PM_{10}, $PM_{2.5}$, SO_2, NO_2, CO at an angle of 120° each). Manual ambient air quality monitoring will be conducted at 4 different locations around the plant area by NABL Accredited Laboratory- Quarterly	HZL / NABL Accredited Laboratory
6.	Stack Emission Monitoring	PM, SO_2, NO_X, Acid Mist, Pb	At all major combustion-based stacks.	Online continuous monitoring system will be there for proposed unit as per CPCB directions. In absence of online system, manual monitoring as per CTO condition. Quarterly	Online continuous monitoring system/ NABL accredited lab
7.	Performance Evaluation of pollution control equipment		All pollution control devices	Annually	HZL
8.	Fugitive Emission		Locations across Raw Material Handling area, storage area, Silos, near control rooms, workshop, yards, junction houses, etc.	Quarterly	HZL
9.	Noise Level Monitoring		Inside the plant boundary	Quarterly	HZL
10.	Water Quality/effluents	Water quality of surface and ground as per IS: 10500-2012 except radioactivity	Ground water & Surface water	Six monthly	HZL/ NABL accredited lab
		Effluent- pH, TSS, TDS, BOD, COD	ETP/STP - Outlet	ETP/STP- daily effluent quality monitoring by own lab (pH, COD & TSS- Daily basis TDS & BOD – Weekly).	HZL

S. No.	Aspect	Monitoring parameters	Location	Schedule and frequency of monitoring	Responsibility
				Online water flow meter and web camera as per CPCB guideline will be installed.	
11.	Soil quality for fertility	N, P, K, organic matter, water holding capacity, density, texture, etc.	One location inside the plant area	Yearly	NABL accredited lab
12.	Inventory of hazardous waste		Within plant	Yearly or as directed by SPCB	HZL
13.	Medical check-up of employees		Nearby hospitals/ Health Centre/On-site Occupational health Centre	Half Yearly	HZL
14.	Water Consumption		At all consumer points through water meter	Continuous through water meter	HZL

11.8 ADDITIONAL STUDIES

As per EIA Notification dated 14th Sept. 2006, and its subsequent amendments; in reference to the Ministry's O.M. dated 11th April, 2022 regarding grant of EC under para 7(ii) of EIA Notification, 2006, amended from time to time for which EIA/EMP Report has been prepared as per standard TOR Points for carrying out the Environmental Impact Assessment (EIA) study, the Following Additional studies are required to be carried out for the expansion project:

1. Hydro-geological Study and Rainwater Harvesting Plan
2. Risk Assessment and Disaster Management Plan

The detail information regarding additional studies is given in chapter 7 of this EIA/EMP report.

11.9 PROJECT BENEFITS

The proposed expansion project will help in combating the growing demand of Zinc in the market & hence will help in the economic growth of the country. The company will result in growth of the surrounding areas by increasing direct and indirect employment opportunities in the region including ancillary development and supporting infrastructure. Development of social amenities will be in the form of medical facilities, education to underprivileged and creation of self-help groups. The state will get revenues in terms of taxes and local people will get direct & indirect employment. Business opportunities for local community will be available. No adverse effect on environment is envisaged as proper mitigation measures will be taken up for the same. An amount of Rs. 35.27 Crores has been earmarked for Socio-Economic development activities within the study area during 3 years and Rs. 7.11 Crores for adoption of two villages i.e., Debari and Bichhri for model village development. Details are given in section 8.5 of chapter 8 of this EIA/EMP Report.

11.10 ENVIRONMENT MANAGEMENT PLAN

This is a proposal for Expansion within the existing Premises of Debari Zinc Smelter. The anticipated environmental impacts of the Plant will be mainly due to the constructional and operational activities. Therefore, following components has been considered for Impact Assessment:

1. Air Quality
2. Noise Level
3. Water Quality
4. Soil Environment
5. Occupation Health & Safety

Various mitigation measures have been proposed to take care of the environment in respect of air, water, noise, soil and the green cover of the plant site and nearby villages.

Table 11.5: Environment Management

S. No.	Particular	Description
1.	Air Quality Management	• Emissions generated from production process as well as the prescribed limits from CPCB & MOEFCC are as PM (3 Zinc melting furnaces: 50 mg/Nm3, 2 oil fired Boilers: 600 mg/Nm^3, Slag grinding Plant: 50 mg/Nm3 and DG Sets: 75 mg/Nm^3), SO_2 (Sulphuric acid Plant II and III: 950 mg/Nm^3, 1.5 kg/ton of acid production and oil fired boiler: 600 mg/Nm^3), Acid Mist (Sulphuric acid Plant II and III: 50 mg/Nm^3), NO_x (2 oil fired boilers: 450 mg/Nm^3, DG Sets: 710 mg/Nm^3), NMHC (DG Sets: 100mg/Nm^3) & CO (DG Sets: 150mg/Nm^3). • Double Conversion Double Absorption (DCDA) Acid Plant to maintain SO_2 emission within the prescribed norms of 1.5 Kg/MT production. • Additional Tail Gas Treatment (TGT) is proposed to minimize SO_2 emissions from 1.5 to 1.0 Kg/MT of Sulphuric Acid production in 2nd roaster and proposed roaster. • Demister pad in acid plant is better designed to reduce the emission of acid mist. • In process, material is being transferred in closed conveyors. • Extensive dust extraction network consisting of Venturi Scrubbers and Bag Filters are provided. • Ventilation systems followed by bag filters, are provided in the metal tapping area to control work zone emissions • State-of-The-Art DCDA Acid Plants & Tail Gas Treatment Plant in roaster. • Concentrate shed, raw material storage yard, concentrate unloading point area, Belt conveyors and other material transfer points etc. are provided with water sprinklers to arrest the dust and fugitive sources of dust. • In order to minimize fugitive emissions Zn concentrate containing 8-10% moisture is being handled. • All existing Stacks are installed with online analyzers and connected to CPCB & RSPCB Server. • Mobile vacuum dust sweeping system on industrial roads and vacuum dust cleaning system for plant area are exist at smelter to control airborne dust due to the vehicles movement. Regular road washing is being done on internal roads. • Vehicular emissions are maintained as per standard. • Avenue plantation is ensured along with internal roads to control dust emissions. • 4 no's of CAAQMS (Continuous Ambient Air Quality Monitoring Stations are installed with consultation of RSPCB. • 41.41 % of the area has already been covered with greenbelt / plantation at site. • DG sets are installed to provide power back up during emergency.

S. No.	Particular	Description
		• Emissions from DG set are /will be dispersed through the stack. Adequate stack height has been maintained for the existing DG set as per CPCB guideline.
2.	Wastewater Management	• The existing total water requirement of the plant is 8000 KLD. Which included 6950 KLD industrial & 1050 KLD Domestic water. • Total wastewater generated from the plant is 3494 KLD (3425 KLD from Zinc Smelter, 41 KLD from DG cooling tower & 28 KLD from MCTP) which is being treated in existing ETPs (5760 KLD) out of which 494 KLD of treated water is being used in process and remaining 3000 KLD of effluent is further treated in recently installed RO-ZLD/MVR unit. The additional wastewater generation after proposed expansion project will be 1700 KLD capacity of existing 3000 KLD RO-ZLD/MVR unit will be increased to 5000 KLD by expansion. • No expansion is proposed in ETP. Debottlenecking /Replacement of existing equipment is planned to improve efficiency. • All trade effluent is being & will be treated in ETP followed by RO- ZLD with MVR unit and zero discharge is being & will be ensured. • Domestic wastewater (150 KLD) generated from the Plant is being/will be treated in existing STP (200 KLD) and treated water is being /will be used in plantation purpose within the plant premises. • Domestic sewage generated from Colony is treated in 600 KLD STP. Treated water is being used in plantation and horticulture purpose. • No wastewater is being discharged outside the plant. The Plant will remain "Zero Liquid Discharge" Unit after the proposed expansion.
3.	Noise Management	• All the design/installation precautions as specified by the manufacturers with respect to noise control will be strictly adhered to for the expansion project too. • High noise generating sources are insulated adequately by providing suitable enclosures. • Design and layout of building to minimize transmission of noise, segregation of particular items of plant and to avoid reverberant areas. • Use of lagging with attenuation properties on plant components/ installation of sound attenuation panels around the equipment. • Equipment producing high noise are designed and procured with acoustic enclosures. • Other than the regular maintenance of the various equipment, ear plugs/muffs are recommended for the personnel working close to the noise generating units. • All the openings like covers and partitions are designed properly. • Provision of Inlet and outlet mufflers; easy to design and construct. • Noise control system designed to form an integral part of the plant. • The existing greenbelt with rich canopy helps to attenuate the noise emitted by the various sources in the plant.
4.	Solid & Hazardous Waste Management	• The total hazardous waste generated from the proposed expansion project will include: - Spent Catalysts (68 TPA), Empty barrels/containers/liners contaminated with hazardous chemicals/waste (15 TPA), Chemical Sludge from water (ETP Cake) (24789 TPA), Cooler Cake (1416 TPA) and Waste or residues containing oil (970 TPA) will be sent to CTDF Udaipur or registered recycler, or used for reprocessing/coprocessing. Process residue (2000 TPA), Purification Cake (2929 TPA), Used oil/spent oil (55 TPA), Resin from water purification (2 TPA) will be reused in the process or will be sold to the registered recyclers. Anode Mud (1902 TPA) will be Co processing in cement plant /Registered recycler/Reprocessing / CTDF Udaipur. Filters contaminated with oil (2 TPA) will be sent to CTDF Udaipur or will be Co-incinerated in the Cement Kiln. • Additional hazardous waste generated due to the proposed expansion includes: Clarifier Cake/Calcium salts from RO-ZLD (7300 TPA), Insulation Waste/glass

S. No.	Particular	Description
		wool (100 TPA), Discarded Asbestos sheet (350 TPA), other solid waste like Slag generated from MCTP (50,000 TPA). • Zinc ash skimming/dross (7505TPA) will be Reuse in process/sales to registered recyclers. • Jarosite (123383 TPA) is being and will be sent to cement industries. • Municipal solid waste generated from the plant is being and will be segregated and disposed-off scientifically.
5.	Greenbelt Development & Plantation	• Out of the total plant area (184.2 ha), 76.28 ha (41.41 %) area has already been developed. The same will be maintained and enhanced by doing gap plantation to achieve the plantation density @ 2500/ha. • Miyawaki plantation has been done in one acre by planting 8000 plant saplings in one acre area. • The Species planted are Shisam, Neem, Arjuna, Jamun, Casiasamea, Peltophorum, Alstonia etc. • The same will be maintained and enhanced by doing gap plantation.

Source: Pre-feasibility Report

11.11 OCCUPATIONAL HEALTH AND SAFETY

To control and minimize the risks at workplace, Debari Zinc Smelter by M/s. Hindustan Zinc Limited has implemented Health, Safety and Environment Policy with the following objectives:

- Healthy & Safe working environment for employees is the prime concern of the company.
- Hindustan Zinc Limited is committed to maintain safe & healthy work environment for employees, against hazards & risks through:
  - Continuously developing & maintaining safe work practices.
  - Focus on operational & occupational hazards & risks.
  - Creating awareness about preventive health & safety measures.
  - Providing safety Equipment to all employees.
  - A well-equipped first aid health center established at plant site.
  - Carrying out risk assessment associated with its operation and taking the remedial measures.

11.12 CONCLUSION

It is appropriate to say that the proposed expansion project is an environmentally friendly project which will not cause any significant negative impact in the area, as adequate pollution control measures and preventive measures are being/will be adopted to maintain the range of various pollutants within the permissible limits. Regular monitoring of all the components of environment is being/will be done. Increased social welfare measures are being/will be taken by the company that will bring development and progress in the near-by villages. Maintenance of Greenbelt around the area has been/will be also taken up as an effective pollution mitigation technique as well as to control the pollutants released from the plant premises towards the near-by area.

Therefore, proposed expansion within the existing Debari Zinc Smelter will not degrade the environmental quality of surrounding environment. It would contribute towards the improvement of the socio-economic conditions and aesthetics of the surrounding areas.

CHAPTER - 12

DISCLOSURE OF THE CONSULTANT ENGAGED

12.1 DISCLOSURE OF THE CONSULTANT ENGAGED

J.M. EnviroNet Pvt. Ltd. (JMEPL) has prepared this EIA / EMP Report along with preparation of Land Use / Land Cover Maps of the core and buffer zone and Hydrogeological Study Report.

A brief description of JMEPL is given as under:

J.M. EnviroNet Pvt. Ltd., one of the companies of JM Group, was established in the year 1993. 'JM' the name of the Company is derived from the name of 'Lord Shiva' - the temple of 'Jharkhand Mahadev' (JM). The Temple is located at Queens Road, Vaishali Nagar, Jaipur.

The Registered office of JMEPL is at 403, 4th Floor, Jaipur Centre, B2 Bye pass, Tonk Road, Jaipur - 302018 (Rajasthan). Its Delhi-NCR Corporate office is at Emaar Digital Greens, Tower – B, Unit No. 1517, Golf Course Ext. Road, Sector – 61, Gurugram (Haryana) - 122 011.

J.M. EnviroNet Pvt. Ltd. is accredited with ISO-9001: 2015 for EIA Division. EIA Division is also approved by National Accreditation Board for Education and Training (NABET) formerly NRBPT (Quality Council of India) *vide* Certificate no. NABET/EIA/2326/RA0308 dated November 29, 2023 and validity accreditation till 07th August, 2026. Copy of the Certificate has been incorporated herewith as Figure no. 12.1 in this chapter.

J.M. EnviroNet Pvt. Ltd. is listed at serial no. "124" of the List of Accredited EIA Consultant Organization displayed on MoEFCC website (https://www.qcin.org/nabet/EIA/documents/Accredited%20consultan0074s.pdf) updated as of June 26, 2024.

JMEPL is offering Environmental Consultancy Services in various sectors viz. Industrial Projects / Chemical Industries / Cement Plants / Thermal Power Plants / Mining Projects/ Real Estate Projects / Distilleries / Metallurgical Projects (Ferrous and Non-Ferrous) / Mineral Beneficiation etc.

In the Mining sector, JMEPL is covering mines of minerals viz. Limestone, Bauxite, Chromite, Coal, Lead, Zinc, Copper, Gypsum, Soapstone, Iron and Manganese ore, Clay, Silica Sand, Feldspar, Quartz, etc.

JMEPL has a highly qualified team of Subject Experts. As senior executives / Heads of the EIA Division, we have Former EHS Heads of Reputed industries, Ex-Head EIA Division of big Business Group, STP and ETP Designing Experts, Senior Mining and Geology Experts with vast experience in their respective fields.

JM Group's business is spread over 23 States viz.: Telangana, Andhra Pradesh, Kerala, Gujarat, Maharashtra, Odisha, Tamil Nadu, Goa, Jammu and Kashmir, Himachal Pradesh, Punjab, Haryana, Delhi, Rajasthan, Uttar Pradesh, Madhya Pradesh, Chhattisgarh, Assam, West Bengal, Karnataka, Jharkhand, Bihar and Uttarakhand.

JMEPL outsources its laboratory services from J.M. EnviroLab Pvt. Ltd., an Environmental Laboratory at Gurugram (Haryana) approved under EPA (Environment Protection Act) from the Ministry of Environment and Forests and Climate Change (MoEFCC), Govt. of India, New Delhi and by the National Accreditation Board for Testing and Calibration Laboratories (NABL), Government of India (Certification no. TC-6821).

This MoEFCC and NABL approved Environmental Laboratory of JM Group is also providing Analytical Laboratory Services of various elements and environmental parameters.

Annual monitoring as per MoEFCC/CPCB/SPCB guidelines, Risk Assessment and Disaster Management Plan, consultancy for Rain Water Harvesting Plan, detailed Hydro-geological Study, preparation of Environmental Statement Reports (Environmental Clearance Compliance Conditions), etc. are amongst the various other consultancy services offered by the Company.

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National Accreditation Board for Education and Training

Certificate of Accreditation

JM EnviroNet Pvt. Ltd., Gurugram

Unit No. 1517, Tower-B, Emmar Digital Greens, Golf Course Ext. Road, Sector – 61, Gurugram-122011

*The organization is accredited as **Category-A** under the QCI-NABET **Scheme for Accreditation of EIA Consultant Organization, Version 3**: for preparing EIA/EMP reports in the following Sectors*

S. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1.	Mining of minerals including Open cast/ Underground mining	1	1 (a) (i)	A
2.	River Valley Projects	3	1 (c)	A
3.	Thermal power plants	4	1 (d)	A
4.	Mineral beneficiation including pelletisation	7	2 (b)	A
5.	Metallurgical industries (ferrous & non-ferrous)	8	3 (a)	A
6.	Cement Plants	9	3(b)	A
7.	Coke oven plants	11	4(b)	A
8.	Chlor-alkali industry	13	4 (d)	A
9.	Chemical Fertilizers	16	5 (a)	A
10.	Petro-chemical complexes	18	5 (c)	A
11.	Manmade fibers manufacturing	19	5 (d)	A
12.	Petrochemical based processing	20	5 (e)	A
13.	Synthetic organic chemicals industry	21	5 (f)	A
14.	Distilleries	22	5 (g)	A
15.	Pulp & paper industry excluding manufacturing of paper from wastepaper and manufacture of paper from ready pulp without bleaching	24	5 (i)	A
16.	Sugar Industry	25	5 (j)	B
17.	Industrial estates/ parks/ complexes/ Areas, export processing zones (EPZs), Special economic zones (SEZs), Biotech parks, Leather complexes	31	7 (c)	A
18.	Ports, harbours, break waters and dredging	33	7 (e)	A
19.	Common Municipal Solid Waste Management Facility (CMSWMF)	37	7 (i)	B
20.	Building and construction projects	38	8 (a)	B
21.	Townships and Area Development projects	39	8 (b)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RAAC minutes dated October 20, 2023 posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no QCI/NABET/ENV/ACO/23/3044 dated Nov 29, 2023. The accreditation needs to be renewed before the expiry date by JM EnviroNet Pvt. Ltd., Gurugram following due process of assessment.

Issue Date
Nov 29, 2023

Mr. Ajay Kumar Jha
Sr. Director, NABET

Certificate No.
NABET/EIA/23-26/RA 0308

Valid up to
August 07, 2026

Prof (Dr) Varinder S Kanwar
(CEO NABET)

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.

Figure-12.1 Copy of the NABET Certificate

Category "A" Project or Activity 3(a)
MoEF&CC File No. J-11011/479/2006-IA II (I)

Volume - II

REVISED ENVIRONMETAL IMPACT ASSESSMENT REPORT

&

ENVIRONMENTAL MANAGEMENT PLAN

FOR

Proposed Expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) through modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time

At

Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan)

[The EIA/EMP report has been prepared for the expansion of Zinc Smelter from 1,00,000 TPA to 1,40,000 TPA through modernization of process by installing new state-of-the-art with the latest technology equipment to improve efficiency.]

Study Period: Summer Season (March to May, 2022)

APPLICANT

M/s. Hindustan Zinc Ltd.
Debari Zinc Smelter, Village: Debari,
Tehsil: Girwa, District: Udaipur
(Rajasthan)-313 024
Telephone No.02942658028,
Mobile No.9937047170; 9568001100
E-mail: manas.tyagi@vedanta.co.in;
digambar.patil@vedanta.co.in

EIA CONSULTANT

J.M. EnviroNet Pvt. Ltd.
(Registered EIA Consultant Organization from NABET-QCI)
Certificate No.: NABET/EIA/2326/RA 0308, Valid Till 07.08.2026,
Emaar Digital Greens, Tower – B, Unit No. 1517,
Golf Course Ext. Road, Sector – 61, Gurugram (Haryana) – 122 011
E-mail: jmenviron@hotmail.com

JM File No. JMEPL/HZL/JM File No. 811/EIA/Nov, 2024/Final EIA (Revision no. 2) (Copy no. 0)

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*****

F. No. J-11011/479/2006- IA II (I)
Government of India
Ministry Environment and Forests
(I.A. Division)

Paryavaran Bhawan
CGO Complex, Lodhi Road
New Delhi – 110 003

E-mail: pb.rastogi@nic.in
Telefax : 011-24367668
Dated 19th March, 2008

To
M/s Hindustan Zinc Ltd.
Zinc Smelter, Debari – 313004
Udaipur, Rajasthan.

E-mail : csr.mehta@vedanta.co.in / govind.ram@vedanta.co.in
Fax No. : 01472-255816 / 0294-527386 / 011-29837954;

Subject : Expansion of Zinc Smelter (80,000 TPA to 1,00,000 TPA) at Debari, Udaipur, Rajasthan by M/s Hindustan Zinc Ltd. – Environmental clearance reg.

Sir,

This has reference to your letter no. nil dated 6th December, 2006 alongwith Form I, application, EIA/EMP and related project documents and subsequent clarifications furnished by you vide your letters dated 4th January, 2007, 30th January, 2007, 5th February, 2007, 13th March, 2007, 16th March, 2007, 16th April, 2007 and 29th November, 2007 for seeking environmental clearance of the above mentioned project under the EIA Notification, 2006.

2.0 The Ministry of Environment and Forests has examined your application. It is noted that the proposal involves expansion of Zinc Smelter (80,000 TPA to 1,00,000 TPA) at Debari, Udaipur, Rajasthan. Total existing land is 190.05 ha. and no additional land will be required for the expansion project. 18 reserve forests are located within 10 km. of the site. No national park or wildlife sanctuary lies within 10 km. of the site. Total cost of the project is Rs. 220.00 Crores. Following items will be manufactured

Particulars	Present production (TPA)	Proposed production (TPA)	Total production after expansion (TPA)
Zinc metal	80,000	20,000	1,00,000
Sulphuric Acid	1,30,000	2,89,000	4,19,000
Calcine	1,45,000	3,00,000	4,45,000
Cadmium	250	70	320

3.0 Roast-Leach-Electro-winning process (hydro metallurgical route) will be adopted for the Zinc extraction. During expansion, Roaster and Sulphuric acid plant will be installed. Zinc concentrate will be sourced from the captive mines of HZL and also imported.

4.0 Bag filters will be provided to control particulate matters from Zn smelter and Moore cake treatment plant. Cyclone, scrubber, wet ESP, Fluoride removal plant, absorption tower, demister

etc. will be installed in the Sulphuric acid plant. Total requirement of water from Udai Sagar Dam will be 8,000 m^3/day and 'Agreement' is signed with Govt. of Rajasthan vide letter dated 23.7.97 and revalidated vide letter dated 4th January, 2007 till 22nd July, 2012. Existing ETP will be used for the effluent treatment. ETP cake will be used in Moore cake treatment plant. 'Zero' discharge will be adopted. All the process residues including spent catalyst, Cobalt cake, anode mud, cooler coke, Copper cake etc. except Jarosite Mercury sludge will be disposed off in CHWMF at Gudli of M/s Ramky. Jarosite sludge will be disposed off in secured landfill (SLF).

5.0 Public Hearing / Public Consultation meeting was held on 30th April, 2007.

6.0. The Ministry of Environment and Forests hereby accords environmental clearance to the above project under the provisions of EIA Notification dated 14th September, 2006 subject to strict compliance of the following specific and general conditions.

A. SPECIFIC CONDITIONS:

i. The company shall install on-line stack emission monitoring equipments for continuous monitoring of SO_2, NO_x, SPM and O_2 and all the pollution control measures shall be inter-locked. The company shall install fume extractors and bag filters to control the emissions from all melting and casting units including Moore cake treatment plant. Cyclone, scrubber, wet ESP, Fluoride removal plant, absorption tower, demister etc. shall be installed in the Sulphuric acid plant I & II to control dust and SO_2 emissions within the stipulated limits of 50 mg/Nm^3 and reports submitted to the Ministry including its Regional Office at Lucknow, CPCB and RSPCB.

ii. SO_2 emissions shall be controlled less than 1.5 kg/ton of Sulphuric acid (H_2SO_4) produced and acid mist less than 50 mg/Nm^3.

iii. Secondary fugitive emissions from all the sources including Roaster plant shall be controlled, regularly monitored and data submitted to the Regional Office of the Ministry at Lucknow, UPPCB and CPCB.

iv. Total water requirement from Udai Sagar Dam shall not exceed 8,000 m^3/day as per the agreement signed with Govt. of Rajasthan. No ground water will be used. As reflected in the EIA/EMP, all the effluent generated from gas cleaning plant, Sulphuric acid plant, anode & cathode washing, demineralization plant and cooling tower shall be treated in the effluent treatment plant (ETP). The treated effluent shall conform to the prescribed standards and recycled to maintain the 'zero' discharge. Sewage shall be treated in sewage treatment plant (STP).

v. All the process residues, spent catalyst, Cobalt cake, anode mud, cooler coke, Copper cake etc. shall be disposed off in common hazardous waste management facility (CHWMF) at Gudli of M/s Ramky. The Jarosite sludge shall be neutralized with hydrated lime and disposed off in secured landfill (SLF) inside the plant premises. ETP Sludge in the form of cake shall be recycled in the Moore cake treatment plant. Waste/used oil shall be sold to registered recyclers. Valid membership to CHWMF shall be obtained.

vi. As proposed in EIA/EMP, canopy based green belt of adequate width and density in and around the around the periphery of plant in 67.5 ha. out of total 190.05 ha. shall be developed as per CPCB guidelines.

vii. Permission and recommendations of the State Forest Department regarding impact of the proposed expansion on surrounding 18 reserve forests shall be obtained and all the recommendations shall be implemented. Further, Conservation Plan for the conservation of wild fauna in consultation with the State Forest Department shall be prepared and implemented.

viii. Regular medical examination and health monitoring of all the employees for Lead (Pb) and Cadmium (Cd) shall be carried out and if cases of presence of Lead (Pb) and Cadmium (Cd) are detected, necessary compensation shall be arranged under the existing laws. A competent occupational health physician shall be appointed to carry out medical surveillance. Occupational health of all the workers shall be monitored for relevant parameters and records maintained for at least 40 years from the beginning of the employment or 15 years after the retirement or cessation of employment whichever is later.

ix. All the recommendations made in Charter for Corporate Responsibility for Environment Protection (CREP) for Zinc smelters shall be implemented.

B. GENERAL CONDITIONS:

i. The project authorities must strictly adhere to the stipulations made by the Rajasthan State Pollution Control Board (RSPCB) and the State Government.

ii. No expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment and Forests.

iii. The gaseous emissions from various process units shall conform to the standards prescribed by the concerned authorities from time to time. The Rajasthan State Pollution Control Board (RSPCB) may specify more stringent standards for the relevant parameters keeping in view the nature of the industry and its size and location. At no time, the emissions level shall go beyond the prescribed standards. In the event of failure of any pollution control system adopted by the unit, the respective unit shall not be restarted until the control measures are rectified to achieve the desired efficiency.

iv. Adequate number of ambient air quality monitoring stations shall be established in the downward direction as well as where maximum ground level concentration of SPM, SO_2 and NO_x are anticipated in consultation with the Rajasthan State Pollution Control Board. Data on ambient air quality and stack emission shall be regularly submitted to this Ministry including its Regional Office at Lucknow and the CPCB / RSPCB once in six months.

x. Fugitive emissions, acid mist vapours, fumes and SO_2 shall be controlled and work environment monitored for prevailing contaminants regularly. Fugitive dust emissions in the handling area and at various transfer points shall be minimized by provision of dust suppression system. Bag filters shall be installed in the Roaster, Calcine handling & storage section, Zn atomizing unit, Dross milling section to control fugitive emissions. The Company shall improve overall house keeping by asphalting the internal roads and to reduce the generation of fugitive dust from vehicle movements.

v. Industrial wastewater shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May, 1993 and 31st December,

1993 or as amended form time to time. The treated wastewater shall be recycled in the plant as well as utilization for plantation purposes.

vi. The project authorities must strictly comply with the rules and regulations with regard to handling and disposal of hazardous wastes in accordance with the Hazardous Wastes (Management and Handling) Rules, 2003. Authorization from the State Pollution Control Board must be obtained for collection, storage, treatment and disposal of hazardous wastes.

vii. The overall noise levels in and around the plant area shall be kept well within the standards (85 dBA) by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels should conform to the standards prescribed under EPA Rules, 1989 viz. 75 dBA (daytime) and 70 dBA (nighttime).

viii. Occupational Health Surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.

ix. The project proponent shall also comply with all the environmental protection measures and safeguards recommended in the EIA / EMP /risk analysis and DMP report.

x. The project authorities shall provide Rs. 78.00 Crores towards environmental pollution control measures to implement the conditions stipulated by the Ministry of Environment and Forests as well as the State Government and submit an implementation schedule for all the conditions stipulated herein to this Ministry and its Regional Office at Lucknow. The funds so provided shall not be diverted for any other purposes.

xi. The Regional Office of this Ministry at Lucknow, CPCB / RSPCB shall monitor the stipulated conditions. A six monthly compliance report and the monitored data along with statistical interpretation should be submitted to them regularly.

xii. The Project Proponent shall inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the Rajasthan State Pollution Control Board and may also be seen at Website of the Ministry of Environment and Forests at http.//envfor.nic.in. This shall be advertised within seven days from the date of issue of the clearance letter at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same shall be forwarded to the Regional office.

xiii. The Project Authorities shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of commencing the land development work.

7.0. The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.

8.0. The Ministry reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner shall implement these conditions.

9.0. Any appeal against this environmental clearance shall lie with the National Environment Appellate Authority, if preferred within a period of 30 days as prescribed under Section 11 of the National Environment Appellate Act, 1997.

10.0. The above conditions shall be enforced, inter-alia under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, the Hazardous Wastes (Management and Handling) Rules, 2003 and the Public Liability Insurance Act, 1991 along with their amendments and rules.

(Dr. P. B. Rastogi)
Director

Copy to :

1. Chairman, Central Pollution Control Board, Parivesh Bhavan, CBD-cum-Office Complex, East Arjun Nagar, Delhi - 110032.
2. Chairman, Rajasthan State Pollution Control Board, 4, Institutional area, Jhalana, Doongri, Jaipur, Rajasthan.
3. Chief Conservator of Forests (Central), Ministry of Environment and Forests, Central Region, Kendriya Sadan, Sector H, Aliganj, Lucknow – 226 024, U.P.
4. Secretary, Department of Environment and Forests, Government of Rajasthan, Jaipur, Rajasthan.
5. Adviser (IA-II), Ministry of Environment and Forests, Paryavaran Bhawan, CGO Complex, New Delhi.
6. Monitoring Cell, Ministry of Environment and Forests, Paryavaran Bhawan, CGO Complex, New Delhi.
7. Guard File.
8. Monitoring File.
9. Record File.

(Dr. P. B. Rastogi)
Director

IV/ENV/R/IND-104/720/2009

I/59040/2023

By Speed Post/e-Mail

भारत सरकार
GOVERNMENT OF INDIA
पर्यावरण,वन एवं जलवायु परिवर्तन मंत्रालय
MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE
क्षेत्रीय कार्यालय, गांधीनगर/उप क्षेत्रीय कार्यालय,जयपुर /**Regional Office, Gandhinagar/(Sub-Regional Office, Jaipur)**

ए-218 "अरण्यभवन ", झालानासंस्थानिक क्षेत्र, जयपुर - ३०२००४/ **A-218, "ARANYA BHAWAN" ,Jhalana Institutional Area, Jaipur**-302004
दूरभाष/**Tel No:** 0141-2713786, 2713778 **Email:** iro.jaipur-mefcc@gov.in

Dated:04th December, 2023

सेवा में,
निदेशक/वैज्ञानिक-'एफ'/ **The Director/Scientist-'F',**
पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय/
Ministry of Environment, Forest & Climate Change,
3rd मंजिल, वायु विंग, इंदिरा पर्यावरण भवन/
3rd Floor, Vayu Wing, Indira Paryavaran Bhawan,
जोर बाग, नई दिल्ली/ **Jor Bagh, New Delhi – 110003.**

Sub: Environmental Clearance for "Expansion of Zinc Smelter (80,000 TPA to 1,00,000 TPA) at Debari, Udaipur, Rajasthan by M/s Hindustan Zinc Ltd."- Certified Compliance Report Reg.

Ref: EC granted by MoEF vide letter No. F.No- J-11011/479/2006-IA II(I) dated 19.03.2008.

Sir,

In reference to the cited subject, it is bring to your kind notice that the aforesaid project was Inspected/ Monitored by the undersigned on 27/10/2023for the purpose of issuing certified compliance report of the Environmental clearance issued vide letter no. F.No. J-11011/479/2006-IA II(I) dated 19.03.2008.

2. Accordingly, a detailed monitoring report along with key observations is being attached herewith for perusal and further appropriate action.

भवदीय,

4/12/23

ई. महेश दत्त पुरोहित/ **Er. Mahesh Dutt Purohit**
सं. निदे./ वैज्ञा. 'डी' / **Joint Director (S)/Scientist-D**

Copy to: -

1. Manas Tyagi, SBU Director, Zinc Smelter Debari, Udaipur, Rajasthan-313004 - With directions to submit clarifications on partially complied/not complied conditions directly to the Ministry under intimation to this office.

Ministry of Environment, Forest & Climate Change
Regional Office, Gandhinagar/ (Sub-Regional Office, Jaipur)
MONITORING REPORT
PART – I
DATA SHEET

1.	Project Type	Industry
2.	Name of the Project	Environmental Clearance for "Expansion of Zinc Smelter (80,000 TPA to 1,00,000 TPA) at Debari, Udaipur, Rajasthan by M/s Hindustan Zinc Ltd."
3.	Clearance letter / O.M No. & date	Environmental clearance issued vide letter F.No. J-11011/479/2006-IA II(I) dated 19-03-2008.
4.	**Location** a) Tehsil b) District (s) c) State (s) d) Latitudes/Longitudes	Zinc Smelter Debari Tehsil: Girwa, Dist: Udaipur Rajasthan.
5.	**Address for correspondence** **a)** Address of Concerned Project Chief Engineer (with Pin Code/ Tel No./ Telex/Fax No./E-mail address) **b)** Address of Executive Project Engineer/Manager (with Pin Code/ Tel No./ Telex/Fax No./E-mail address)	Manas Tyagi, SBU Director, Zinc Smelter Debari, Udaipur, Rajasthan- 313004
6.	**Salient features** a) of the project b) of the environmental management plans	Proposed Expansion of Zinc Smelter (1,00,000 TPA to 1,40,000 TPA) within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time. This expansion will be carried out in 2 phases, in 1st phase the capacity expansion will be done up to 1,20,000TPA (20%) along with Roaster installation and in the 2nd Phase, capacity will be further increased up to 1,40,000TPA (40%).by Modernization of process by installation of new state of art with latest technology equipment's to improve efficiency. Recovery, reduction in power consumption & GHG emission as well as elimination of manual activities. Introducing higher efficiency TGT, DCDA & WHRB for Roaster & Acid plant and other PCEs for process.

7.	Product/Process/Activity Details	Extraction of Zinc metal by Hydrometallurgy (Roast-Leach- Electrowinning Process)
8.	Production Capacity	Existing: 1,00,000 TPA Zinc Metal Proposed :1,40,000 TPA Zinc Metal
9.	Break-up of project affected population	-
10.	**Financial details: (as reported by the PP)** a) Project cost as originally planned and subsequent revised estimates and the year of price reference b) Allocations made for environmental management plans with item wise and year wise break up c) Benefit cost ratio/internal rate of return and the year of assessment d) Whether (c) includes the cost of environmental management as shown in b) above e) Actual expenditure incurred on the project so far f) Actual expenditure incurred on the environmental management plans so far	Details not provided.
11.	Forest land requirement:	Not Applicable
12.	The status of clear felling in non-forest areas	Not Applicable
13.	Status of construction: a) Date of commencement (*actual and/or planned*) b) Date of completion (*actual and/or planned*)	-
14.	Reasons for the delay, if the project is yet to start	-
15.	Details of correspondence with project Authorities for obtaining act on plans/information on status of compliance to safeguards other than the routine letters for logistic support for site visits). (The first monitoring report may contain the details of all the letters issued so far, but the later reports may cover only the letter issued subsequently)	-

PART – II

DESCRIPTIVE REPORT ON STATUS OF COMPLIANCE TO CONDITIONS OF ENVIRONMENTAL CLEARANCE issued vide letter no. F. No. J-11011/479/2006-IA II(I) dated 19.03.2008.

A	SPECIFIC CONDITIONS	
1.	The company shall install on-line stack emission monitoring equipments for continuous monitoring of SO_2, NOx, SPM and O_2, and all the pollution control measures shall be inter-locked The company shall install fume extractors and bag filters to control the emissions from all melting and casting units including Moore cake treatment plant Cyclone, scrubber wet ESP Fluoride removal plant absorption tower, demister etc. shall be installed in the Sulphuric acid plant I & II to control dust and SO_2, emissions within the stipulated limits of 50 mg/Nm and reports submitted to the Ministry including its Regional Office at Lucknow CPCB and RSPCB.	**Being complied.** Online analyzers have been installed and are connected with RSPCB & CPCB servers. During inspection it was observed that PCM's like Cyclone, scrubber, wet ESP, absorption tower, demister etc. have been installed. PP has also submitted the AAQ monitoring reports.
2.	SO_2 emissions shall be controlled less than 1.5 kg/ton of Sulphuric acid (H_2SO_4) produced and acid mist less than 50 mg/Nm^3.	**Being complied.** SO_2 & Acid mist have been monitored on regular basis. PP has submitted the stack monitoring reports.
3.	Secondary fugitive emissions from all the sources including Roaster plant shall be controlled regularly monitored and data submitted to the Regional Office of the Ministry at Lucknow, UPPCB and CPCB.	**Being complied.** PP has submitted the AAQ monitoring reports from accredited laboratory.
4.	Total water requirement from Udai Sagar Dam shall not exceed 8.000 m/day as per the agreement signed with Govt of Rajasthan. No ground water will be used As reflected in the EIA/EMP all the effluent generated from gas cleaning plant. Sulphuric acid plant anode & cathode washing, demineralization plant and cooling tower shall be treated in the effluent treatment plant (ETP) The treated effluent shall conform to the prescribed standards and recycled to maintain the zero discharge Sewage shall be treated in sewage treatment plant (STP).	**Being complied.** As appraised by unit representative, presently Source of fresh water is Mansiwakal and treated water from Common Sewage Treatment Plant. No ground water abstraction for industrial use has been reported and observed during the inspection. The industrial effluent is being treated through ETP-RO & RO-ZLD with MVR system. The treated water is being recycled and zero discharge is being maintained
5.	All the process residues spent catalyst Cobalt cake anode mud, cooler coke Copper cake etc shall be disposed off in common hazardous	**Being Complied.** During the inspection no unscientific storage and handling of hazardous waste was observed. The PP has

	waste management facility (CHWMF) at Guds of M/s Ramky. The Jarosite sludge shall be neutralized with hydrated ime and disposed off in secured landfill (SLF) inside the plant premises. ETP Sludge in the form of cake shall be recycled in the Moore cake treatment plant Waste/used of shall be sold to registered recyclers Valid membership to CHWMF shall be obtained.	obtained membership from CHWMF through UCCI, Udaipur and authorization under the hazardous waste rules from RPCB. Anode mud is recycled & Cooler cake, Spent catalyst are disposed at CHWMF Gudli. Waste oil/used oil are being sold to registered recyclers. The Jarosite sludge is being neutralized with hydrated lime and filtered. Further filtered cake is further sent to cement industries for recycling. ETP sludge is being disposed in CTDF.
6.	As proposed in EIA/EMP, canopy based green belt of adequate width and density in and around the around the periphery of plant in 67.5 ha out of total 190.05 ha shall be developed as per CPCB guidelines.	**Being Complied.** During the inspection it was observed that decent efforts have been done for plantation within the project area and development of green areas. The PP was also advised to submit a detailed report on proposed plantation planning, incorporating all the details of green area and area under plantation along with next 6 monthly compliance report. As per the records submitted about 68 Ha area has been covered under green belt.
7.	Permission and recommendations of the State Forest Department regarding impact of the proposed expansion on surrounding 18 reserve forests shall be obtained and all the recommendations shall be implemented. Further, Corfservation Plan for the conservation of wild fauna in consultation with the State Forest Department shall be prepared and implemented.	**Being Complied.** In consultation with forest department following actions have been taken by the unit for conservation of wild fauna around premises: • Biodiversity study of Flora, Fauna & butterfly for Zinc Smelter, Debari within 10 Km radius have been completed by the expert. • Display board for awareness indicating conservation of wild fauna. • 1000 nos. of medicinal plants have been planted in colony. • Preservation of trees and shrubs for providing better niche for the animals. • Installation of artificial nesting of Birds to promote Biodiversity conservation has been proposed. • Awareness program has been conducted for employees and their families on the occasion of Sparrow Day, Water Day, Biodiversity Day, Earth Day & World Environment Day.
8.	Regular medical examination and health monitoring of all the employees	**Complied.** A health center was observed during

	for Lead (Pb) and Cadmium (Cd) shall be carried out and if cases of presence of Lead (Pb) and Cadmium (Cd) are detected, necessary compensation shall be arranged under the existing laws. A competent occupational health physician shall be appointed to carry out medical surveillance Occupational health of all the workers shall be monitored for relevant parameters and records maintained for at least 40 years from the beginning of the employment or 15 years after the retirement or cessation of employment whichever is later.	course of inspection and it was appraised by the unit representative that all the employees are undergoing periodical medical check-ups for health impact due to industrial activity. Check up for lead and cadmium is being carried out. Relevant records are being maintained on site regarding the same.
9	All the recommendations made in Charter for Corporate Responsibility for Environment Protection (CREP) for Zinc smelters shall be implemented.	**Being Complied.** Following steps have been taken for implementation of CREP guidelines: • Meeting SO_2 emission 950 mg/NM^3 1.5 Kg/tonne of 100% H_2SO_4 produced, 50 mg/Nm^3 of acid mist. • Online SO_2 monitoring system has been installed at Acid Plant-2 & Acid Plant-3 and real time data is transmitted to PCB server. • Solid and Hazardous Waste disposal: Jarosite cake is being sent to Cement industries after neutralization and filteration, and other wastes are recycled / disposed as per authorization under HW (M, H & T) Rules 2016. • Wastewater treatment and disposal: Dedicated ETP plant and RO-ZLD with MAR system is in operation and zero discharge is maintained by reuse/recycle of treated effluent. Domestic effluent is treated in STP and treated water is used in plantation. • Housekeeping: Reduction of the generation of fugitive dust by Water spray, Regular water spray on roads, regular road repairing and drain cleaning in entire plant area, routine cleaning activities, using Mechanical truck mounted heavy duty road sweepers and hand-driven road vacuum cleaners and by installing Bag filters in Zinc melting, Calcine handling system and Moore cake section to minimize the dust emission. Avenue plantation is ensured to reduce impact of dust emission due to vehicular

		movement. • Green Belt: efforts have been done for development of green belt along the plant premises and within the project area.
B. General Conditions		
1.	The project authorities must strictly adhere to the stipulations made by the Rajasthan State Pollution Control Board (RSPCB) and the State Government.	**Agreed for compliance by the unit.**
2.	No expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment and Forests.	**Agreed for compliance by the unit.**
3.	The gaseous emissions from various process units shall conform to the standards prescribed by the concerned authorities from time to time. The Rajasthan State Pollution Control Board (RSPCB) may specify more stringent standards for the relevant parameters keeping in view the nature of the industry and its size and location At no time the emissions level shall go beyond the prescribed standards In the event of failure of any pollution control system adopted by the unit the respective unit shall not be restarted until the control measures are rectified to achieve the desired efficiency.	**Complied.** Online analyzers have been installed and are connected with RSPCB & CPCB servers. During inspection it was observed that PCM's like Cyclone, scrubber, ESP, absorption tower, demister etc. have been installed. PP has also submitted the AAQ monitoring reports from accredited laboratory.
4.	Adequate number of ambient air quality monitoring stations shall be established in the downward direction as well as where maximum ground level concentration of SPM, SO_2 and NOx, are anticipated in consultation with the Rajasthan State Pollution Control Board Data on ambient air quality and stack emission shall be regularly submitted to this Ministry including its Regional Office at Lucknow and the CPCB RSPCB once in six months	**Complied.** The PP has established 4 Nos. of ambient air quality monitoring stations in consultation with RSPCB and in addition to above, quarterly ambient air quality monitoring is being carried out by MoEF&CC/NABL approved laboratory. A centralized CAAQMS within the complex for monitoring of PM10, PM2.5, SO_2, NOx has been provided.
5.	Fugitive emissions, acid mist vapours, fumes and SO, shall be controlled and work environment monitored for prevailing contaminants regularly Fugitive dust emissions in the handling area and at various transfer points shall be minimized by provision of dust suppression system Bag filters shall be installed in the Roaster. Calcine handling & storage section Zn atomizing unit, Dross milling section to control fugitive emissions The Company shall	**Being complied.** PP has installed water sprinkling system in Raw Material Handling areas. During inspection it was observed that all the roads are asphalted & cemented. To minimize the fugitive dust, mechanized vacuum dust cleaner is used for road sweeping/cleaning. PP has also submitted the Ambient air quality monitoring reports.

	improve overall housekeeping by asphalting the internal roads and to reduce the generation of fugitive dust from vehicle movements.	
6.	Industrial wastewater shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19" May, 1993 and 31 December 1993 or as amended form time to time The treated wastewater shall be recycled in the plant as well as utilization for plantation purposes.	**Being complied.** • The industrial effluent is being treated through ETP-RO & RO-ZLD with MVR system to ensure effective treatment and maintaining ZLD. • The treated water is being recycled and no discharge outside the unit premises was observed during the inspection.
7.	The project authorities must strictly comply with the rules and regulations with regard to handling and disposal of hazardous wastes in accordance with the Hazardous Wastes (Management and Handling) Rules, 2003 Authorization from the State Pollution Control Board must be obtained for collection, storage treatment and disposal of hazardous wastes.	**Agreed for compliance by the unit.** PP has obtained Authorization from RSPCB under the HW Rules vide letter dated 17.03.2023 which is valid upto 31.12.2027.
8.	The overall noise levels in and around the plant area shall be kept well within the standards (85 dBA) by providing noise control measures including acoustic hoods silencers enclosures etc on all sources of noise generation The ambient noise levels should conform to the standards prescribed under EPA Rules 1989 viz 75 dBA (daytime) and 70 dBA (night time).	**Complied.** PP has provided acoustic hoods, silencers, enclosures etc. for abatement of noise pollution. The unit has also submitted analysis reports from accredited laboratory regarding the ambient noise levels.
9.	Occupational Health Surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.	**Complied.** A health center was observed during course of inspection and It was appraised by the unit representative that Periodic Medical Examination for occupational health is done on regular basis and relevant records are being maintained on the site.
10	The project proponent shall also comply with all the environmental protection measures and safeguards recommended in the EIA/ EMP/risk analysis and DMP report.	**Being Complied.** Although no separate report has been submitted by the unit with reference to safeguards recommended in the EIA/ EMP/risk analysis and DMP report however based on the overall compliance status and safety provisions provided in the plant operations, the condition is being considered as complied for the present visit.

<table>
<tr>
<td>11.</td>
<td>The project authorities shall provide Rs 76.00 Crores towards environmental pollution control measures to implement the conditions stipulated by the Ministry of Environment and Forests as well as the State Government and submit an implementation schedule for all the conditions stipulated herein to this Ministry and its Regional Office at Lucknow The funds so provided shall not be diverted for any other purposes</td>
<td>Being complied.
PP has submitted the itemized expenditure incurred on Environmental pollution control measures.
<table>
<tr><th>Area/Equipments</th><th>Cost (Rs. in Crores)</th></tr>
<tr><td>Acid Plant</td><td>33.0</td></tr>
<tr><td>Gas Cleaning</td><td>16.0</td></tr>
<tr><td>ESP,Bag Filter,Stacks</td><td>13.0</td></tr>
<tr><td>Stack Analyser</td><td>0.5</td></tr>
<tr><td>Covered conveyers</td><td>2.0</td></tr>
<tr><td>Modification/addition in water/ Effluent Treatment Facilities/RO Plant</td><td>5.0</td></tr>
<tr><td>Solid waste disposal facilities (Jarosite SLF etc)</td><td>5.0</td></tr>
<tr><td>Monitoring Facilities (Additional)</td><td>0.5</td></tr>
<tr><td>Green belt</td><td>1.0</td></tr>
<tr><td>Total</td><td>76.0</td></tr>
</table>
The Environmental expenditure for last five years are as under:
2017-2018 Rs. 92.31 Lacs
2018-2019 Rs. 171.94 Lacs
2019-2020 Rs. 522.98 Lacs
2020-2021 Rs. 1078 Lacs
2021-2022 Rs. 1876 Lacs
2022-2023 Rs. 1632 Lacs</td>
</tr>
<tr>
<td>12.</td>
<td>The Regional Office of this Ministry at Lucknow CPCB / RSPCB shall monitor the stipulated conditions. A six monthly compliance report and the monitored data along with statistical interpretation should be submitted to them regularly.</td>
<td>Complied.
Last six-monthly compliance report has been submitted by the unit.</td>
</tr>
<tr>
<td>13.</td>
<td>The Project Proponent shall inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the Rajasthan State Pollution Control Board and may also be seen at Website of the Ministry of Environment and Forests at http /envfor.nic in. This shall be advertised within seven days from the date of issue of the clearance letter at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular</td>
<td>Complied.
PP has submitted the copy of advertisement published in the newspaper.</td>
</tr>
</table>

	language of the locality concerned and a copy of the same shall be forwarded to the regional office.	
14.	The Project Authorities shall inform the Regional Office as well as the Ministry the date of financial closure and final approval of the project by the concerned authorities and the date of commencing the land development work.	**Agreed for compliance by the unit.**

Concluding Remarks:

The project under reference named as Environmental Clearance for "Expansion of Zinc Smelter (80,000 TPA to 1,00,000 TPA) at Debari, Udaipur, Rajasthan by M/s Hindustan Zinc Ltd" is a zinc smelter unit. The project was inspected on 27.10.2023 for the purpose of issuing Certified Compliance Report. Accordingly, monitoring of the conditions of environment clearance was done as narrated above.

27/12/23

(Mahesh Dutt Purohit)
Joint Director/Scientist 'D'

Cyclone at roaster

Gas cleaning plant

Bag filter MCTP

ETP Plant

STP

CAAQMS

Green area

Cooler cake Storage area & PF cake storage area		**Jarosite Storage area**

Annexure 3(a)

Ph 2711263
2712631
Fax 2710647

Registered A/D

RAJASTHAN STATE POLLUTION CONTROL BOARD

4, Institutional Area, Jhalana Doongri, Jaipur

F: 12(30-86) RPCB/Gr III/ 5705

Date: 20/1/03

M/s Hindustan Zinc Limited,
Zinc Smelter, Debari,
Udaipur

Subject: - Grant of consent to establish under the provisions of water (Prevention & Control of Pollution) Act 1974for your industry M/s Hindustan Zinc Limited, Debari, Udaipur for installation of Captive Power Plant of 29.6 MW (4 X 7.4 MW Diesel Generator Sets).

Reference: - The applications for consent to establish dated 20/8/2002 submitted along with pollution control scheme & other documents and subsequent correspondence.

Consent to Establish under section 25/26 of the Water (Prevention & Control of Pollution) Act 1974 as amended to date and rules & orders made thereof (hereinafter to be referred as the Water Act) is granted to M/s Hindustan Zinc Limited, Debari, Udaipur under the provisions of the said Acts subject to the following terms and conditions:

1) That the consent to establish shall be valid for premises of unit M/s Hindustan Zinc Limited, situated at Debari, Udaipur only for installation of captive Power Plant of following capacities as given below:-

S.No.	Product	Capacity
1.	**Diesel Generator Sets**	**29.6 Mega Watt (4 X 7.4 Mega Watt)**

2) In case of any increase in capacity or addition/modification/alteration or change in process or machinery or in the emission point or discharge points, you have to obtain fresh consent to establish again.

3) That the consent to establish shall be valid for three years from date of application or date of commissioning of plant, whichever is earlier.

4) That the cost of project shall not to exceed Rs 5253.0 lakhs and the cost of plant and machinery in this shall not be more than Rs 5003.85 lakhs.

5) That the control equipments and scheme as suggested by you shall be installed before trial or actual production is started. For which you will have to obtain the consent form the Board as contemplated under the relevant provisions of the Air Act, 1981. This consent to establish shall not be treated as consent to operate in any way.

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Ph 2711263
2712631
Fax 2710647

RAJASTHAN STATE POLLUTION CONTROL BOARD
4, Institutional Area, Jhalana Doongri, Jaipur

6) That the industrial/domestic effluent shall be treated before disposal so as to conform to the standards prescribed by the board, viz the general standards for discharge of effluent as notified under the Environment (Protection) Act, 1986 for disposal in to inland surface water. The main parameters for regular monitoring shall be as under

S.No.	Parameters	Limits
1.	pH	5.5 to 9.0
2.	TSS	100 mg/l
3.	Oil and Grease	10 mg/l
4.	BOD 3 days 27°C	30 mg/l
5.	COD	250 mg/l

7) That the waste water shall be used by the unit for plantation/gardening with in the premises after treating it.

8) All the streams carrying effluent shall be combined in a single stream for the final discharge into the terminal manhole. All the individual streams and also the combined streams shall be maintained in good condition. The combined stream shall be provided with suitable flow measuring device.

9) The terminal manhole shall be provided at the end of the collection system with in the premises and adequate arrangement for measuring the flow and collection of the effluent samples. Effluent shall be admitted into the drain only through a single designated outlet from the terminal manhole and no effluent shall be discharged into the drain through any bypass.

10) That power supply to the production shall be so interlocked with the pollution control equipments that in the event of nonfunctioning of the pollution control equipment the production process stop automatically.

11) That the responsibility for performance evaluation shall be of industry and industry will not commence production unless the satisfactory operation of the pollution control measures is done by the industry in presence of official of Regional office and is duly certified by him before commencement of production.

12) That you shall comply with the provisions of Manufacture Storage and Import of Hazardous chemicals Rules 19 and Hazardous waste (Management & Handling) Rules 989 and you will submit the details in the prescribed forms under these rules to this Board and take necessary safety measures and envisaged in above rules. Also necessary authourisation for disposal of hazardous waste shall be taken from the Board separately before establishment of the industry.

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Ph 2711263
2712631
Fax 2710647

RAJASTHAN STATE POLLUTION CONTROL BOARD
4, Institutional Area, Jhalana Doongri, Jaipur

13) That you shall submit monthly progress to this office about the individual compliance of above conditions and progress of installation of pollution control equipments and effluent treatment plant.

14) That 33% of the total area of premises shall be covered by tree plantation and proper scheme for the same shall be submitted.

15) The consent granted to aforesaid unit to ensure control of pollution from the premises of the unit in accordance with various pollution control acts and in no way confers the right to the unit to exist in violation of other laws and statutory provisions.

16) That any incorrect information submitted in the consent application form or affidavit shall make the industry liable for legal action under section 43 of the Water Act.

17) That the factory authorities shall comply with the provisions of water (Prevention & Control of Pollution) Cess Act 1977 and industry shall regularly submit to the Board the returns in the prescribed form and the cess as specified under section 3 of the said act.

18) Notwithstanding anything contained in this conditional letter of the State Board hereby reserves to it the right and power under section 27(2) of the Water (Prevention & control of Pollution) Act 1974 to review anyone/or all the conditions imposed herein above and to make such variation as deemed fit for the purpose of the Act by the State Board.

19) That this consent to establish/operate shall in no way be treated as clearance for the conversion of land and the land conversion shall be done by the district administration as per the relevant laws.

Non-compliance of any of the above conditions would tantamount to withdrawal of this consent to establish and action under the provisions of concern Acts will be initiated against you.

Member Secretary

F: 12(30-86) RPCB/Gr III

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Annexure 3(b)

Registered A/D

Ph. 2711261
2712631
Fax 2710647

RAJASTHAN STATE POLLUTION CONTROL BOARD

4, Institutional Area, Jhalana Doongri, Jaipur

F. 12(30-86)/RPCB/Gr III/ 1 7 4 2 78

Date: [illegible]

M/s Hindustan Zinc Limited,
Zinc Smelter, Debari,
Udaipur

Subject: - Grant of consent to establish under the provisions of Air (Prevention & Control of Pollution) Act 1981 for your industry M/s Hindustan Zinc Limited, Debari, Udaipur for proposed expansion of the capacity from 59000 TPA to 80000 TPA Zinc Ingots.

Reference: - Your applications for consent to establish dated 3/4/2003 submitted along with pollution control scheme & other documents and subsequent correspondence.

Sir,

Consent to Establish under section 21 of the Air (Prevention & Control of Pollution) Act 1981 (hereinafter to be referred as the Air Act) as amended to date and under rules & orders made thereof is granted for proposed expansion of the capacity to M/s Hindustan Zinc Limited, Debari, Udaipur subject to the following terms and conditions

1) That the consent to establish is valid for premises of unit M/s Hindustan Zinc Limited, situated at Debari, Udaipur only for proposed expansion of the capacity as given below:-

S No.	Product	Capacity	
1.	**Zinc Ingots (total After Expansion)**	**80000**	**Ton per annum**
2.	**Sulphuric Acid**	**1,30,000**	**Ton per annum**
3.	**Cadmium (Pencil & Sphere)**	**250**	**Ton per annum**

2) In case of any increase in capacity or addition of new product or addition/modification/alteration or change in process or process emissions or discharges or in the emission point or discharge points, you have to obtain fresh consent to establish again.

3) That the consent to establish shall be valid for three years from date of issue of this letter or date of commissioning of plant, whichever is earlier.

4) That the recommendation of the CREP shall be implemented as per the action plan submitted with in the prescribed time schedule concurrent with the implementation of the proposed expansion work.

5) That the control equipments and scheme as suggested by you shall be installed before trial production is started for which you will have to obtain the consent to operate from the Board as contemplated under the relevant provisions of the Water Act, 1974 & Air Act, 1981. This consent to establish shall not be treated as consent to operate in any way.

6) That stacks having height as per norms shall be provided on air pollution sources and pollution control equipments attached to them.

7) That power supply to the production shall be so interlocked with the pollution control equipments that in the event of nonfunctioning of the pollution control equipment the production process stop automatically.

8) That you shall achieve prescribed standards for ambient air and the stack/process emissions which are as given here under:

S. No.	Ambient Air	Stack/process
SPM	500 µg/M³	100 mg/NM³ at bag filter & cyclone
SO_2	120 µg/M³	4 Kg per ton of Sulphuric Acid (100 %)
NO_x	120 µg/M³	
CO	5000 µg/M³	
Acid Mist		50 mg/NM³

9) That you shall provide the necessary infrastructure facilities for the monitoring of stack emission in accordance with the suggestion given to you by the Pollution Control Board's Officials from time to time.

10) That the responsibility for performance evaluation shall be of industry and industry will not commence commercial production unless the satisfactory operation of the pollution control measures is done by the industry in presence of official of Regional office of the Board.

11) That you shall comply with the provisions of Manufacture Storage and Import of Hazardous chemicals Rules 19 and Hazardous waste (Management & Handling) Rules 989 and you will submit the details in the prescribed forms under these rules to this Board and take necessary safety measures and envisaged in above rules. Also necessary authourisation for disposal of hazardous waste shall be taken from the Board separately before establishment of the industry.

12) That you shall submit monthly progress to this office about the individual compliance of above conditions and progress of installation of pollution control equipments and effluent treatment plant.

13) That 33% of the total area of factory premises shall be covered by tree plantation.

14) This consent is being granted to ensure control of pollution from the sources in the premises of the unit in accordance with various pollution control acts and in no way confers the right to the unit to exist in violation of other laws and statutory provisions.

15) That any incorrect information submitted in the consent application form or affidavit shall make the industry liable for legal action under section 38 of the Air Act.

Ph 271263
272631
Fax 271047

RAJASTHAN STATE POLLUTION CONTROL BOARD
2, Institutional Area, Jhalana Doungri, Jaipur

(7) That the factory authorities shall comply with the provisions of Water (Prevention & Control of Pollution) Cess Act 1977 and amendments till date and industry shall regularly submit to the Board the returns in the prescribed form and the cess as specified under section 3 of the said act.

(8) Notwithstanding anything contained in this conditional letter of the State Board hereby reserves to it the right and power under section 27(2) of the Water (Prevention & control of Pollution) Act 1974 to review anyone/or all the conditions imposed herein above and to make such variation as deemed fit for the purpose of the Act by the State Board.

Non compliance of any of the above conditions would amount to withdrawal of this consent to establish and action under the provisions of concern Acts will be initiated against you.

Yours truly,

Member Secretary

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Rajasthan State Pollution Control Board

4, Institutional Area , Jhalana Doongari, Jaipur-302004

Annexure 3(c)

F: 12(30-86) RPCB/Gr II/ 49 Date: 5-4-08

M/s Hindustan Zinc Limited,
Zinc Smelter, Debari,
Udaipur

Subject: Grant of Consent to Establish under the provisions of Water (Prevention & Control of Pollution) Act, 1974 & Air (Prevention & Control of Pollution) Act, 1981 for expansion of capacity of M/s Hindustan Zinc Limited Zinc smelter, Debari, Udaipur.

Reference: I. Industry's applications for Consent to Establish under Water Act, 1974 & Air Act, 1981, dated 08/09/2007 and subsequent correspondence
II. Environment Clearance dated 19/03/2008 issued by the MoEF, GOI for expansion of capacity of M/s Hindustan Zinc Limited Zinc smelter, Debari, Udaipur.

Sir,

Subsequent to Environment Clearance granted by Ministry of Environment & Forests, Government of India,(MoEF) vide letter No.J-11011/479/2006-IA (I) dated 19/03/2008, referred above for expansion of capacity of M/s Hindustan Zinc Limited Zinc smelter, Debari, Udaipur, Consent to Establish under Section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 (hereinafter to be referred as Water Act) and under section 21 of the Air (Prevention & Control of Pollution) Act, 1981, (hereinafter to be referred as Air Act) as amended till date and rules & order made thereof is granted to M/s Hindustan Zinc Limited, Debari, Udaipur for the proposed expansion of Zinc smelter capacity at Debari, Udaipur. This Consent to Establish is granted subject to the provisions of the said Acts and the rules and the orders that may be made further and based on the information provided in Consent applications, conditions of Env. Clearance & the documents/information thereof with following conditions:

1. That this Consent to Establish shall be valid for a period of three years or till the date of commissioning of the expanded capacity which ever is earlier.
2. That this consent is valid for expansion of capacity of M/s Hindustan Zinc Limited, Zinc smelter, Debari, Udaipur, as under:

S.No.	Product	Present Production(TPA)	Proposed production(TPA)	Total production after expansion of capacity(TPA)
1.	Zinc metal	80,000	20,000	1,00,000
2.	Sulphuric Acid	1,30,000	2,89,000	4,19,000
3.	Calcine	1,45,000	3,00,000	4,45,000
4.	Cadmium	250	70	320

3. The reported investment of the project shall be Rs 220 crores, as specified under EC letter dated 19/03/2008.
4. That the industry shall comply with all the conditions imposed by Ministry of Environment & Forest, Govt. of India in Environmental Clearance to the expansion project, issued vide letter No.J-11011/479/2006-IA (I) dated 19/3/2008.
5. That the total water requirement of the capacity expansion of the industry shall not exceed to 3,800 m^3/day which shall be met from Udaisagar Dam. The industry shall submit copy of agreement with competent authority of the State Govt. for the drawl of additional 3,800 m^3/day of water over and above the existing drawl of 4200 m^3/day from Udaisagar i.e. total drawl of 8000 m^3/day before commencement of expanded capacity.
6. That industry shall not draw any ground/ sub-soil water to meet with industrial/domestic requirement.
7. That industry shall comply with the recommendations of Corporate Responsibility for Environmental Protection (CREP) for Zinc smelters.

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expanded capacity so as to achieve the standards for ambient air and the process emissions as per specific conditions of EC letter dated 19/03/2008 which are

S. No.	Ambient Air		Stack/process	
SPM	500	$\mu g/M^3$	50	mg/NM^3 (Particulate Matter)
SO_2	120	$\mu g/M^3$	1.5	Kg/ton of Acid produced
NO_x	120	$\mu g/M^3$		
CO	5000	$\mu g/M^3$		
Acid Mist			50	mg/NM^3

9. That industry shall install stack of 100 meters height (from ground level) with new acid plant based on Double Conversion Double Absorption (DCDA) technology.
10. That industry shall install on line stack emission monitoring equipment with all the major stacks for continuous monitoring of SPM, SO2, NOx & O_2 as per specific conditions of EC letter dated 19/03/2008.
11. That the industry shall install fume extractors & bag filters to control the emissions from all melting & casting units including Moore Cake Treatment plant. Besides cyclone, scrubber, wet ESP, fluorite removal plant, absorption tower, demister etc., shall be installed with Sulphuric acid plant I & II, for controlling dust & SO_2 emissions.
12. That secondary fugitive emission from all the sources including Roaster plant shall be controlled effectively to meet with the ambient air quality standards referred above.
13. That industry shall install SO_2 sensors on periphery of the industry at suitable sites with threshold limit of $100\mu g/M^3$ so as to keep watch on concentration of SO_2 in ambient air.
14. That the industrial/domestic effluent shall be treated before reuse/ recycle/ disposal so as to conform to the standards prescribed by the Board, viz the general standards for discharge of treated effluent into Inland surface water as notified under the Environment (Protection) Act, 1986. The main parameters for regular monitoring shall be as under

S.No.	Parameters	Limits
1.	pH	5.5 to 9.0
2.	TSS	Not to exceed 100 mg/l
3.	Oil and Grease	Not to exceed 10 mg/l
4.	BOD 3 days 27°C	Not to exceed 30 mg/l
5.	COD	Not to exceed 250 mg/l
6.	Lead (as Pb)	Not to exceed 0.10 mg/l
7.	Zinc (as Zn)	Not to exceed 5.0 mg/l
8	Cadmium(as Cd)	Not to exceed 2.0 mg/l
9.	Copper (as Cu)	Not to exceed 3.0 mg/l
10.	Mercury	Not to exceed 0.01 mg/l
11.	Fluoride(as F)	Not to exceed 2.0 mg/l
12.	Sulphates(as SO_4)	Not to exceed 1000 mg/l
13.	TDS	Not to exceed 2100 mg/l

15. That the quantity of waste water generation as well as quantity of discharge (outside the premises) of the industry after commencement of the proposed expansion shall not exceed the following.

S. No.	Type of effluent	Maximum Generation(KLD)	Discharge outside the premises(KLD)
1.	Domestic	1000	Nil
2.	Industrial	2250	Nil

16. That the industry shall reuse/ recycle the entire quantity of treated effluent in process, Jarosite slurry dilution or for development of plantation/gardening with in the premises so as to maintain zero discharge outside the premises.
17. That as committed by the industry during public hearing for EC, it shall install Reverse Osmosis (R.O.) plant of adequate capacity for increasing the recycling of the treated industrial effluent and/or treated sewage back into process so as to reduce the in take quantity of water from Udaisagar. The back-wash of R.O. Plant may be utilized for Jarosite slurry dilution. Capacity & time schedule for installation of R.O. plant be submitted within 15 days of issue of this letter.
18. That the industry shall install adequately designed flow measuring devices at suitable points for recording of the quantity of daily reused/recycled treated industrial effluent/sewage.
19. That the industry shall make suitable arrangements before the final outlet on periphery so as to collect any overflow of treated effluent holding tank or unforeseen discharges from ETP/industry

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shall develop canopy based green belt around the periphery in 67.5 hectare out of 90.05 hecture as per conditions of EC letter dated 19/03/2008.

stry shall obtain prior permission & recommendations of Forest Deptt. to protect adverse impact on surrounding 18 reserve forests. All the recommendations made by the Forest Deptt shall be implemented in defined time schedule.

22. That industry shall undertake regular health check-up of the staff, workers & nearby residents specifically for adverse health impact due to lead & Cadmium. The health check-up shall be carried through expert & recognized medical personals.
23. That power supply to the production shall be so interlocked with the pollution control equipments so that in the event of nonfunctioning of the pollution control equipment the production process stops automatically.
24. That the industry shall provide the necessary infrastructure facilities for the monitoring of stack emission in accordance with the suggestion given by the Pollution Control Board's Officials from time to time.
25. That the required air pollution control measures shall always be kept in operation whenever the plant is in running condition.
26. That the industry shall ensure that the noise level does not exceed the prescribed standards for the industrial area i. e.75 dB Leq during the day time and 70 dB Leq during the night time to meet the prescribed ambient noise standards. The day time is reckoned in between 6 am and 9 pm and the night time is reckoned between 9 pm and 6 am.
27. That industry shall apply for obtaining prior Consent to operate under the provisions of Air (Prevention & Control of Pollution) Act-1981 & Water (Prevention & Control of Pollution) Act, 1974 from the Board, 90 days in advance of commencing production of the expanded capacity.
28. That the industry shall comply with the Water (Prevention & Control of Pollution) Cess Act, 1977 and submit cess returns regularly and deposit the Cess as per assessment order.
29. That the industry shall comply with the provisions of Hazardous Waste (Management & Handling) Rules1989 and Manufacture, Storage and Import of Hazardous Chemicals Rules1989 notified under Environment (Protection) Act, 1986.
30. That industry shall submit Environmental Statement for the period ending in March by September every year.
31. That the industry shall develop plantation in at least 33% of total area to maintain ambient air quality around the industry.
32. That this consent is valid subject to fulfillment of all the other statutory requirements in other Laws/Acts/Rules as applicable.
33. That the industry shall submit monthly compliance report of all the above stated conditions by first week of following month
34. That any incorrect information submitted in the consent application form or affidavit shall make the industry liable for legal action under the Air Act & Water Act.
35. Not withstanding anything contained in this letter of consent, the State Board hereby reserves to it the right and power under section 21(6) of the Air(Prevention and control of pollution) Act-1981 and section 27(2) of the Water (Prevention & Control of Pollution) Act 1974 to review anyone/or all the conditions imposed hereinabove and to make such variation as deemed fit for the purpose of Air Act & Water Act.

Please note that, non compliance of any of the above stated conditions would tantamount to revocation of consent to establish and industry shall be liable for prosecution under the relevant provisions of Water (Prevention & Control of Pollution) Act, 1974 and Air (Prevention & Control of Pollution) Act, 1981.

This bears the approval of the competent Authority.

Yours Faithfully,

Sr.Environment Engineer (Gr.II)

Copy to following for information & necessary action:

1. SPA to Chairperson, RPCB, Jaipur.
2. SPA to Member Secretary, RPCB, Jaipur
3. RO,RPCB,Udaipur: Enclosing a copy of Environment Clearance issued to the unit by the MoEF, GOI, you are requested to monitor the compliance of conditions of the same as well as of this letter and report accordingly.
4. Consent Register Gr.II RPCB,Jaipur
5. Registry Cell,RPCB,Jaipur

Annexure 4(a)

Rajasthan State Pollution Control Board
4, Institutional Area, Jhalana Doongri Jaipur-302 004
Ph: 2711202, 2711431 Fax: 2710647

F-12(34)-RS/PCB/08-09 \n(F

Date- 5-7-06

M/s Hindustan Zinc Limited.
Zinc Smelter, Debari.
Udaipur.

Subject - Grant of consent to operate under Water (Prevention & Control of Pollution) Act, 1974 for your smelter situated at Debari, Udaipur.

Reference - Your application for consent to operate dated 18/5/2006 and subsequent correspondence.

Sir,

Consequent upon the examination of consent to operate application and the relevant documents submitted by you and in view of your submissions made in the application, consent to operate is hereby granted to M/s Hindustan Zinc Limited, under the provisions of section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 as amended till date (hereinafter to be referred as the Water Act) and subject to rules & orders made there under and with following terms and conditions:-

1. That this consent to operate is valid for a period from 1/12/2005 to 30/11/2006.
2. That the consent to operate is valid for premises of unit *M/s Hindustan Zinc Limited*, situated at Debari, Udaipur.
3. That this consent to operate is valid for manufacturing/producing following products/by products

S.No.	Item	Capacity
1	Zinc	80,000 Tons/year
2	Sulphuric Acid	1,36,000 Tons/year
3	Cadmium (Pencils & Spheres)	250 Tons/year

No change in process/products/capacities shall be made without prior permission of the Board.

4. That this consent to operate is for existing plant and process and separate consent to establish & operate is required to be taken for any addition/ modification/ alteration or change in capacity/process/material/product and before taking any step for such a change.
5. That the maximum daily discharge/generation of effluent shall not exceed the following:-

Type of effluent	Max. discharge (KLD)
a) Domestic	1000
b) Industrial (Process, floor and equipment washing, cooling and bleed waters)	1700

6. That the trade/domestic effluent shall be treated before disposal so as to confirm to the standards prescribed by the Board viz. the general standards for discharge for effluent as notified under the Environment (Protection) Act -1986 for disposal into inland surface water. The main parameters for regular monitoring shall be as under:-

S. No.	Parameters	Limits
1.	pH	Between 5.5 to 9.0
2.	Total Suspended Solids	Not to exceed 100 mg/l
3.	Oil and Grease	Not to exceed 10 mg/l
4.	BOD at 27 C°, 3 days	Not to exceed 30 mg/l
5.	COD	Not to exceed 250 mg/l
6.	TDS	Not to exceed 2100 mg/l
7.	Zinc (as Zn)	Not to exceed 5.0 mg/l
8.	Lead (as Pb)	Not to exceed 0.1 mg/l
9.	Cadmium (as Cd)	Not to exceed 2.0 mg/l
10.	Copper (as Cu)	Not to exceed 3.0 mg/l
11.	Mercury	Not to exceed 0.01 mg/l
12.	Flouride (as F)	Not to exceed 2.0 mg/l
13.	Sulphates (as SO_4)	Not to exceed 1000 mg/l

7. That industrial effluent shall be treated up to prescribed standards and completely recycled and reused so as to maintain zero discharge.
8. The combined stream shall be provided with suitable flow measuring devices and sampling points, both at inlet and outlet of treatment works.
9. That the domestic waste water generated from the industry shall be treated in STP. The treated effluent should conform to standards as prescribed by the state Board at conditions number 6 in this letter
10. Sample of treated industrial effluent shall be collected at the terminal manhole once in a month on any fixed working day of normal production and shall be analysed for all the parameters in respect of which limits have been fixed vide condition no.6 stated above. Report of analysis shall be submitted to the Board regularly/ immediately after the analysis. The analysis shall be done as per IS 4733 and IS 2433 or other standard method, as the case may be, approved by the Board.

Registered A.D.

Rajasthan State Pollution Control Board
4, Institutional Area, Jhalana Doongri Jaipur-302 004
Ph. 2711263, 2711631 Fax: 2710547

11. That management shall get daily waste water/emission samples analysed with frequency as specified for which unit may avail the facilities of Regional Office or Head Office of RPCB on payment basis.
12. That total gross block in unit shall not exceed Rs. 97.56 crores.
13. That the industry shall make an application for renewal of consent to operate in the prescribed form in triplicate along with the requisite consent to operate fees, at least 90 days before the date of expiry of consent to operate or 90 days before the "New or altered status" is proposed to be made, whichever is earlier.
14. That all the general conditions as per Comprehensive Guidelines - 1998 as published by the Board shall be complied with.
15. That notwithstanding anything contained in this conditional letter of consent to operate, the State Board hereby reserves to it the right and power under section 27(2) of the Water (Prevention & Control of Pollution) Act-1974 to review anyone or all the conditions imposed herein above and to make such variation as deemed fit for the purpose of the Act by the State Board.
16. That any incorrect information submitted in the consent application form shall make the industry liable for legal action under Section 41 of the Water Act.
17. The industry shall comply with the Water (Prevention & Control of Pollution) Cess Act, 1977 and deposit the Cess as per norms.
18. Hydraulic loading in case of application of treated trade effluent on land for irrigation purposes shall be in accordance with following norms:

Soil Texture	Dosage of settled industrial effluent applied (BOD up to 300 mg/L) M^3/Hectare/Day
Sandy	180 to 225
Sandy Loam	134 to 180
Loam	90 to 134
Clay Loam	44 to 90
Clayey	28 to 44

19. That the industry shall comply with the provisions of Hazardous Waste (Management & Handling) Rules, 1989 and Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 (as amended till date) as notified under Environment (Protection) Act-1986.
20. That the power supply to the production shall be so interlocked with the pollution control equipments that in the event of non functioning of the pollution control equipment, the production process stops automatically.
21. The power supply to all parts relating operation of effluent treatment and air pollution control system shall be measured by separate electricity meters and separate log book for readings in respects of running hours, energy and chemical consumption in PCM shall be maintained in a log book every 4 hours and be shown to Regional Office as and when asked for.
22. That 33% of the total area of factory premises shall be covered by the tree plantations.
23. That the management shall maintain good house keeping in the plant.
24. That the management shall get policy under Public Liability Insurance Act (PLIA) and submit its copy to the Board.
25. The recommendation of CREP shall be implemented within prescribed time schedule according to action plan submitted to the Board.
26. That the industry shall comply with the recommendations of charter on Corporate Responsibility for Environmental Planning made by CPCB.
27. That the management shall submit quarterly compliance report of all the above stated conditions by first week of following month.
28. The consent is granted to aforesaid unit to ensure control of pollution from the premises of the unit in accordance with various pollution acts and in no way confers the right to the unit to exits in violations of other laws and statutory provisions.
29. That the industry shall submit Environmental Statement for the year ending March by September of the following year.
30. That this consent to operate shall in no case be treated as Consent to Establish for further expansion, if any.

Please note that non compliance of any of the above stated conditions would tantamount to revocation /withdrawal of this consent to operate and the industry shall liable for prosecution under the provisions of Water (Prevention & Control of Pollution) Act, 1974.

Your's sincerely,

Member Secretary

Copy to:-

1. Regional Officer, Rajasthan State Pollution Control Board, Udaipur to ensure the compliance of above.
2. Registrar of Registry Cell, Rajasthan State Pollution Control Board, Jaipur.
3. Master File of Consent, Group III, Rajasthan State Pollution Control Board, Jaipur

Environmental Engineer, (Group III)

Annexure 4(b)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302004

F: 12(10-86) RPCB/Gr II/ 2702

Date: 17-9-09

M/s Hindustan Zinc Limited,
Zinc Smelter, Dehari,
Udaipur

Sub: Grant of Consent to Operate under Water(Prevention & Control of Pollution) Act, 1974 to M/s Hindustan Zinc Limited,Zinc Smelter,Dehari,Udaipur.
Ref.: Your consent application dated 11/03/2008 and subsequent correspondence

Sir,

With reference to above, Consent to Operate under Water (Prevention & Control of Pollution) Act, 1974,as amended till date and rules & orders made thereof (hereinafter to be referred as Water Act) is granted to M/s Hindustan Zinc Limited,Zinc Smelter,Dehari,Udaipur. This consent is granted subject to the provisions of the said Act and the rules and the orders that may be made further and based on the information provided in the consent application along with documents & correspondence received in this office and the information there of and subject to the following conditions:

1. That this consent to operate is valid from 31/03/2008 to 31/03/2009.
2. That this consent to operate shall be valid for expanded capacity of zinc smelter (80,000 to 1, 00,000 TPA) at Dehari, Udaipur of unit M/s. Hindustan Zinc Limited, Udaipur. Following items shall be manufactured:

S.No.	Product	Present Production(TPA)	Proposed Production(TPA)	Total Production after expansion in Capacity
1.	Zinc metal	80,000	20,000	1,00,000 Tons per annum
2.	Sulphuric Acid	1,30,000	2,89,000	4,19,000 Tons per annum
3.	Calcine	1,45,000	3,00,000	4,45,000 Tons per annum
4.	Cadmium	250	70	320 Tons per annum

3. That the industry shall comply with all the conditions imposed by Ministry of Environment & Forest, Govt. of India in Environmental Clearance to your project, issued vide letter no. F. No. J-11011/479/2006-IAII (I) dated 19/03/2008.
4. That industry shall comply with the recommendations of the Charter on "Corporate Responsibility for Environment Protection" of CPCB for Zinc Smelters.
5. That industry shall comply with all the conditions imposed by the Board in the letter issued vide letter dated 05/04/2008 for Consent to Establish.
6. That the unit will complete the remaining activities as detailed vide their letter dated 16/9/2008 within the time schedule mentioned in the aforesaid letter as under:

S. No.	Activity	To be completed latest by
1	Upgradation of Bag Filters in melting, slag grinding units & casting area	September, 2009
2	Installation of SO_2 sensors on periphery & SPM, NOx analyzers at Sulphuric Acid plant stack	August, 2009
3	Installation of flow measuring devices	March,2009
4	Green Belt development as per Environmental Clearance	December, 2009

Any violation in the above time scheduled will automatically result in withdrawal of the consent granted to the industry.

7. That the unit will submit Bank Guarantee of 10% of the total cost which will be incurred in completing the remaining activities. The Bank Guarantee along with detailed cost estimates for each activity will be submitted within a period of 15 days, from the date of issue of this letter.

8. The standard for treated effluent will be as per the Environment Clearance & Consent to Establish.
9. That the industrial/domestic effluent shall be treated before disposal so as to conform to the standards prescribed by the Board, viz the general standards for discharge of effluent as notified under the Environment (Protection) Act, 1986 for disposal in to inland surface water. The main parameters for regular monitoring shall be as under

S.No.	Parameters	Limits
1	pH	5.5 to 9.0
2.	TSS	Not to exceed 100 mg/l
3.	Oil and Grease	Not to exceed 10 mg/l
4.	BOD 3 days 27°C	Not to exceed 30 mg/l
5.	COD	Not to exceed 250 mg/l
6.	Lead (as Pb)	Not to exceed 0.10 mg/l
7.	Zinc (as Zn)	Not to exceed 5 mg/l
8.	Cadmium(as Cd)	Not to exceed 2.0 mg/l
9.	Copper (as Cu)	Not to exceed 3.0 mg/l
10.	Mercury	Not to exceed 0.01 mg/l
11.	Flouride(as F)	Not to exceed 2.0 mg/l
12.	Sulphate(as SO4)	Not to exceed 1000 mg/l
13.	TDS	Not to exceed 2100 mg/l

10. That the total quantity of the treated industrial effluent (2250KLD) & treated domestic effluent(1000KLD) shall be reused/ recycled in process, Jarocite slurry dilution or for green belt development within the premises so as to maintain zero discharge from the premises. No waste water treated/ untreated shall be discharged from the premises, under any circumstances.
11. Hydraulic loading in case of application of treated trade effluent on land for irrigation purposes shall be in accordance with following norms:

Soil Texture	Dosage of settled industrial effluent applied (BOD up to 300 mg/l) m³/Hectare/Day
Sandy	180 to 226
Sandy Loam	134 to 180
Loam	90 to 134
Clay Loam	44 to 90
Clayey	28 to 44

12. That at least 33% of the total area shall be covered & maintained under adequate plantation.
13. That Environmental Cell shall be established within your industry to take care of monitoring and other issues related to environment.
14. That this Consent is for existing unit and fresh consent to establish & operate under the provisions of the Act shall be obtained by the unit for further change/alteration/modification/expansion.
15. That industry shall comply with the Water (Prevention & Control of Pollution) Cess Act, 1977 and submit Cess returns regularly and deposit the Cess as per assessment order.
16. That industry shall comply with the provisions of Hazardous waste (Management & Handling) Rules, 1989 and Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 notified under Environment (Protection) Act, 1986.
17. That industry shall submit Environmental statement for the period ending in March by September every year.
18. That this Consent is valid subject to fulfillment of all other statutory requirements under any other law/rules /notifications applicable.
19. That industry shall submit, monthly compliance of all the conditions mentioned herein above, to the Board.
20. Not withstanding any thing contained in this conditional letter of Consent, the State Board hereby reserves to it the right and power to review anyone/or all the conditions imposed herein above and to make such variation as deemed fit for the purpose of the Act by the State Board.

Please note that non-compliance of any of the above stated conditions would tantamount to revocation/withdrawal of this Consent to operate and the industry shall be liable for prosecution under the provisions of the Water (Prevention & Control of Pollution) Act, 1974.

This bears the approval of the competent authority.

Yours faithfully

Sr. Environment Engineer (Gr II)

Copy to following for information & necessary action:

1. SPA to Chairperson, RPCB, Jaipur.
2. SPA to Member Secretary, RPCB, Jaipur
3. Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Udaipur. You are advised to carryout detailed inspection/monitoring/sampling as soon as the plant is commissioned. You are also advised to keep watch on the progress made by the unit on the time scheduled for various activities agreed by the unit & report.
4. Registry Cell, RPCB, Jaipur.
5. Master File, Group-II, RPCB, Jaipur
6. In-charge N.I.C. RPCB, Jaipur

Sr. Environment Engineer (Gr.II)

Head Office (CPM)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695 Fax: 0141-5159697

Revised Consent

File No : F(Plan)/Udaipur(Girwa)/5(1)/2017-2018/4223-4226

Order No : 2018-2019/CPM/5329

Date: 17/09/2018

Unit Id : 589

M/s Hindustan Zinc Limited

Zinc Smelter , Debari Tehsil:Girwa
District:Udaipur

Sub: **Consent to Operate** under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and under section 21(4) of Air (Prevention & Control of Pollution) Act, 1981.

Ref: Your application for Consent to Operate dated 26/11/2016 and subsequent correspondence.

Sir,

Consent to Operate under the provisions of section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 (hereinafter to be referred as the Water Act) and under section 21 of the Air (Prevention & Control of Pollution) Act, 1981, (hereinafter to be referred as the Air Act) as amended to date and rules & the orders issued thereunder **is hereby granted** for your **Zinc Smelter plant** situated at **Zinc Smelter DEBARI , Debari Tehsil:Girwa District:Udaipur** , Rajasthan, subject to the following conditions:-

1 That this Consent to Operate is valid for a period from **01/04/2017** to **31/03/2022** .

2 That this Consent is granted for manufacturing / producing following products / by products or carrying out the following activities or operation/processes or providing following services with capacities given below.

Particular	Type	Quantity with Unit
CADMIUM	By Product	320.00 TPA
CALCINE	Product	445,000.00 TPA
Power generation from waste heat recovery	Product	8.00 MW
Solar Power Plant	Product	12.50 MW
SULPHURIC ACID	By Product	419,000.00 TPA
ZINC METAL	Product	100,000.00 TPA

3 That this consent to operate is for existing plant, process & capacity and separate consent to establish/operate is required to be taken for any addition / modification / alteration in process or change in capacity or change in fuel.

Head Office (CPM)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695 Fax: 0141-5159697

Revised Consent

File No : F(Plan)/Udaipur(Girwa)/5(1)/2017-2018/4223-4226

Order No : 2018-2019/CPM/5329

Date: 17/09/2018

Unit Id : 589

4 That the quantity of effluent generation along with mode of disposal for the treated effluent shall be as under:

Type of effluent	Max. effluent generation (KLD)	Recycled Qty of Effluent (KLD)	Disposed Qty of effluent (KLD)and mode of disposal
Domestic Sewage	120.000	NIL	120.000 To be treated in STP and to be utilized in plantation and horticulture within the factory premises
Trade Effluent	3425.000	2,725.000	700.000 Forced Evaporation

5 That the sources of air emmissions along with pollution control measures and the emission standards for the prescribed parameters shall be as under:

Sources of Air Emmissions	Pollution Control Measures	Prescribed	
		Parameter	Standard
One Calcine Handing Plant	ADEQUATE STACK HEIGHT , Bag Filter	Particulate Matter	50 mg/NM3
One Slag Grinding Plant (0.5 Ton/Hr.)	ADEQUATE STACK HEIGHT , Bag Filter , Cyclone	Particulate Matter	50 mg/NM3

Head Office (CPM)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695 Fax: 0141-5159697

Revised Consent

File No : F(Plan)/Udaipur(Girwa)/5(1)/2017-2018/4223-4226

Order No : 2018-2019/CPM/5329

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Unit Id : 589

Sulphuric Acid Plant II	ADEQUATE STACK HEIGHT , Cyclone , Double Conversion Double Absorption Plant , ESP , Gas Conditioning Plant , Scrubber	SO2 Acid Mist	950 mg/NM3 1.5 kg/Ton of 100 percent concentrated acid produced from acid plant 50 mg/Nm3
Sulphuric Acid Plant III	ADEQUATE STACK HEIGHT , Cyclone , Double Conversion Double Absorption Plant , ESP , Gas Conditioning Plant , Scrubber	SO2 Acid Mist	950 mg/NM3 1.5 kg/Ton of 100 percent concentrated acid produced from acid plant 50 mg/NM3
Three Zinc Melting Furnaces (4 Ton/Hr. capacity each)	ADEQUATE STACK HEIGHT , Bag Filter , Cyclone	Particulate Matter	50 mg/NM3
Two oil fired Boilers (10 Ton/Hr. capacity each)	ADEQUATE STACK HEIGHT , Cyclone		

		SO2 Particulate Matter NOx	600 mg/NM3 at 3 percent dry 02 600 mg/NM3 300 mg/NM3 at 3 percent dry 02

6 That the **Zinc Smelter plant** will comply with the standards as prescribed vide MOEF notification No. GSR 826(E) dated 16th November, 2009 with respect to National Ambient Air Quality Standards.

7 That the domestic sewage shall be treated before disposal so as to conform to the standards prescribed under the Environvent (Protection) Act-1986for disposal **Into Inland Surface Water.** The main parameters for regular monitoring shall be as under.

Parameters	Standards
Total Suspended Solids	**Not to exceed 100 mg/l**
pH Value	**Between 5.5 to 9.0**
Oil and Grease	**Not to exceed 10 mg/l**
Ammonical Nitrogen (as N)	**Not to exceed 50 mg/l**
Biochemical Oxygen Demand (3 days at 27°C)	**Not to exceed 30 mg/l**
Chemical Oxygen Demand	**Not to exceed 250 mg/l**
Nitrate (as NO3)	**Not to exceed 50 mg/l**

8 That the trade effluent shall be treated before disposal so as to conform to the standards prescribed under the Environment (Protection) Act-1986 for disposal **Into Inland Surface Water** . The main parameters for regular monitoring shall be as under

Head Office (CPM)
Rajasthan State Pollution Control Board
4, Institutional Area, Jhalana Doongari, Jaipur-302 004
Phone: 0141-5159600,5159695 Fax: 0141-5159697

Revised Consent

File No : F(Plan)/Udaipur(Girwa)/5(1)/2017-2018/4223-4226
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Parameters	Standards
Total Suspended Solids	Not to exceed 100 mg/l
pH Value	Between 5.5 to 9.0
Oil and Grease	Not to exceed 10 mg/l
Biochemical Oxygen Demand (3 days at 27°C)	Not to exceed 30 mg/l
Lead (as Pb)	Not to exceed 0.1 mg/l
Cadmium (as Cd)	Not to exceed 2.0 mg/l
Copper (as Cu)	Not to exceed 3.0 mg/l
Zinc (as Zn)	Not to exceed 5.0 mg/l
Nickel (as Ni)	Not to exceed 3.0 mg/l
Cyanide (as CN)	Not to exceed 0.2 mg/l
Fluoride (as F)	Not to exceed 2.0 mg/l
Sulphide (as S)	Not to exceed 2.0 mg/l
Chlorides	Not to exceed 1000 mg/l
Iron (as Fe)	Not to exceed 1.0 mg/l
Chemical Oxygen Demand	Not to exceed 250 mg/l

9 That the consent to operate is valid for zinc smelter of 1,00,000 TPA capacity and for production of products/by products mentioned at condition no. 2. That the industry has to seek fresh consent to establish & operate for any change in product/by product/process and any modification/alteration.

10 That capital investment as on 05.11.2016 as per the C.A. certificate submitted by the unit is Rs. 463.8053 Crores which includes the cost of Land, Building, Plant & Machinery & miscellaneous assets and total capital investment for the Solar Power Plant (12.5 MW AC/ 14.4 MW DC) as on 31.10.2017 as per the C.A. certificate submitted by the unit is Rs. 61.18 Crores. Thus, total capital investment for Zinc Smelter plant including Solar Power Plant is Rs. 524.98 Crore.

Head Office (CPM)
Rajasthan State Pollution Control Board
4, Institutional Area, Jhalana Doongari, Jaipur-302 004
Phone: 0141-5159600,5159695 Fax: 0141-5159697

Revised Consent

File No : F(Plan)/Udaipur(Girwa)/5(1)/2017-2018/4223-4226
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11 That Hazardous Waste as defined under schedule IV of Hazardous & others Waste (Management, and Transboundary Movement) Rules, 2016 shall not be used as raw material without obtaining prior registration & authorization from the State Board.

12 That all the conditions imposed by MOE&F, New Delhi in the environmental clearance granted vide letter no. J-11011/479/2006-IA.II (I) dated 19/25.03.2008 shall be complied with.

13 That total water consumption for Zinc Smelter Plant shall not exceed to 7100 KLD (Industrial use-6950 KLD and Domestic use- 150 KLD) which shall be met from Udai Sagar Dam/ Reservoir and treated domestic waste water from Sewage Treatment Plants (STPs) of 20 MLD and 25 MLD located at Udaipur.

14 That no ground water shall be abstracted without prior permission from the CGWA and the State Board.

15 That water flow meters shall be provided and maintained at all suitable points to measure quantity of water received from Udai Sagar Dam/ Reservoir, STPs operated at Udaipur and water consumption for different purposes. Record of the same shall be maintained on daily basis.

16 That the trade effluent (3425 KLD) shall be treated in the effluent treatment plant (ETP) of 5760 KLD capacity alongwith trade effluent generated from other plants located in this premises upto the norms mentioned at condition no. 8.

17 That out of 3425 KLD ETP treated trade effluent about 325 KLD shall be used in jarosite pond, about 900 KLD in moorcake treatment plant/fire fighting etc and about 200 KLD for plantation within the premises and remaining 2000 KLD will be further treated through reverse osmosis (R.O.) plant of adequate capacity. The R.O. permeate (1300 KLD) will be recycled/ reused in the process & roaster cooling.

18 That R.O. reject (700 KLD) shall be disposed of through scientifically designed forced evaporation system like MEE of adequate capacity and no reject shall be disposed within or outside the premises on land, nallah, well etc in any case.

19 That for treatment of domestic waste water (120 KLD) generated from the plant premises sewage treatment plant (STP) of 200 KLD capacity will be installed and commissioned by 10.09.2018 positively else the bank guarantee of Rs. 20.00 lacs , valid upto 30.03.2019, submitted by the industry will be forfeited without any notice.

20 That domestic waste water (120 KLD) generated from the plant premises shall be disposed of through septic tank and soak pit till sewage treatment plant (STP) of 200 KLD capacity is installed.

21 That after providing STP, the domestic waste water (120 KLD) shall be treated up to the norms mentioned at condition no. 7 and treated domestic waste water shall be used for plantation within the premises.

Head Office (CPM)
Rajasthan State Pollution Control Board
4, Institutional Area, Jhalana Doongari, Jaipur-302 004
Phone: 0141-5159600,5159695 Fax: 0141-5159697

Revised Consent

File No : F(Plan)/Udaipur(Girwa)/5(1)/2017-2018/4223-4226
Order No : 2018-2019/CPM/5329
Date: 17/09/2018
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22 That no waste water (domestic & trade effluent) shall be discharged inside or outside the factory premises in to a stream or well or sewer or on land in any case and complete zero discharge status shall be maintained.

23 That separate energy meter & hour meter shall be provided and maintained at all the air pollution control measures & ETP/STP/R.O. and record of daily running hours of pollution control measures and daily energy consumption shall be maintained in log book separately.

24 That all the recommendation made in the charter of Corporate Responsibly for Environment Protection (CREP) for Lead and Zinc smelter plant shall be implemented and complied.

25 That the unit shall maintain online continuous monitoring systems at all the existing main stacks to monitor the gaseous emission level and particulate matter (PM) alongwith for effluents and connectivity of the same shall be ensured with RPCB/CPCB server whenever plant is operated.

26 That industry shall provide and maintain at least four continuous ambient air quality monitoring stations in all directions for monitoring of gaseous emissions and particulate matter in the ambient air.

27 That SO2 emissions from Zinc Smelter plant shall be taken to the Sulphuric Acid plant for proper conversion and recovery as Sulphuric Acid through Double Conversion Double Absorption (DCDA) system.

28 That continuous Sulphur Di-Oxide monitoring system installed at Acid Plants shall be maintained properly and operated regularly. Daily record of Sulphur Di-Oxide emission shall be maintained.

29 That adequate measures shall be taken for handling the accidental leakages of gaseous emissions (SO2) along with interlocking arrangement for corrective action and stoppage of the plant.

30 That the industry shall maintain stack of adequate height at all the sources of air emissions and air pollution control measures shall be operated regularly and efficiently so as to achieve the prescribed emission standards as per condition no.5.

31 That Industry shall maintain safe & adequate infrastructure facility in accordance with emission regulation part-III issued by the Central Pollution Control Board at all the major stack for stack emission monitoring.

32 That the power supply to the production/process shall be interlocked with the pollution control equipments so that in the event of non functioning of the pollution equipment and/ or increase in emission level from prescribed norms the production process stops automatically.

Head Office (CPM)
Rajasthan State Pollution Control Board
4, Institutional Area, Jhalana Doongari, Jaipur-302 004
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Revised Consent

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33 **That the industry shall carryout effluent sampling/piezometric wells sampling/stack monitoring/ambient air quality monitoring and submit quarterly analysis report from the State Board laboratory/laboratory recognized by Ministry of Environment, Forests & Climate Change (MoEF&CC), Government of India.**

34 **That industry shall comply with the provisions of Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2016 & Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 (as notified under Environment (Protection) Act, 1986 and record of daily hazardous waste generation and its disposal shall be maintained.**

35 **That the industry shall install and maintain adequately designed rain water harvesting structure for recharge of ground water in and around the area.**

36 **That the industry shall get the policy renewed under Public Liability Insurance Act (PLIA) and submit its copy to the Board from time to time.**

37 **That the industry shall obtain Environmental Clearance from competent authority under EIA Notification dated 14.09.2006 before establishing any such activity which attracts Environmental clearance under EIA Notification dated 14.09.2006.**

38 **That industry shall also comply with all the specific conditions mentioned in attached annexure-A.**

39 **That the industry shall submit the quarterly compliance report of all the above conditions to the State Board.**

40 That this revised consent letter shall supercede the earlier consent letter no **F(Plan)/Udaipur(Girwa)/5(1)/2017-2018/3741-3744** dated **31/08/2018**

41 That, not withstanding anything provided hereinabove, the State Board shall have power and reserves its right, as contained **under section 27(2) of the Water Act and under section 21(6) of the Air Act** to review anyone or all the conditions imposed here in above and to make such variation as it deemed fit for the purpose of **Air Act & Water Act.**

42 That the grant of this **Consent to Operate** is issued from the environmental angle only, and does not absolve the project proponent from the other statutory obligations prescribed under any other law or any other instrument in force. The sole and complete responsibility to comply with the conditions laid down in all other laws for the time-being in force, rests with the industry/ unit/ project proponent.

43 That the grant of this **Consent to Operate** shall not, in any way, adversely affect or jeopardize the legal proceeding, if any, instituted in the past or that could be instituted againt you by the State Board for violation of the provisions of the Act or the Rules made thereunder.

This **Consent to Operate** shall also be subject, besides the aforesaid specific conditions, to

Head Office (CPM)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695 Fax: 0141-5159697

Revised Consent

File No : F(Plan)/Udaipur(Girwa)/5(1)/2017-2018/4223-4226

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Date: 17/09/2018

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the general conditions given in the enclosed Annexure. The project proponent will comply with the provisions of the **Water Act and Air Act** and to such other conditions as may, from time to time , be specified, by the State Board under the provisions of the aforesaid Act(s). Please note that, non compliance of any of the above stated conditions would tantamount to revocation of **Consent to Operate** and project proponent / occupier shall be liable for legal action under the relevant provisions of the said Act(s).

This bears the approval of the competent authority.

Yours Sincerely

Group Incharge[CPM]

Copy To:-

1. Chief Scientific Officer, RPCB, Jaipur to carryout air monitoring of industry within a period of one month from issue of this letter.
2. Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Udaipur to ensure the compliance and send the submit verification report alongwith analysis report with respect to condition no. 21 regarding installation and commissioning of STP by 10.09.2018.
3. Master File.

Group Incharge[CPM]

Head Office (HDF)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695

Registered

File No : **F(HDF)/Udaipur(Girwa)/1328(1)/2022-2023/7460-7462**

Order No : **2022-2023/HDF/9282**

Date: **Mar 17 2023 4:53PM**

Unit Id : 589

M/s Hindustan Zinc Limited

Zinc Smelter , Debari Tehsil:Girwa

District:Udaipur

Sub: **Consent to Operate** under Section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and under Section 21(4) of Air (Prevention & Control of Pollution) Act, 1981.

Ref: Your application for Consent to Operate dated 02/12/2021 and subsequent correspondence.

Sir,

Consent to Operate under the provisions of Section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 (hereinafter to be referred as the Water Act) and under Section 21 of the Air (Prevention & Control of Pollution) Act, 1981, (hereinafter to be referred as the Air Act) as amended to date and rules & the orders issued thereunder **is hereby granted** for your **ZINC SMELTER DEBARI plant** situated at **Zinc Smelter Debari Debari Udaipur DEBARI , Debari Tehsil:Girwa District:Udaipur** , Rajasthan, subject to the following conditions:-

1 That this Consent to Operate is valid for a period from **01/04/2022** to **31/03/2027** .

2 That this Consent is granted for manufacturing / producing following products / by products or carrying out the following activities or operation/processes or providing following services with capacities given below:

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Particular	Type	Quantity with Unit
CADMIUM	By Product	320.00 MTPA
CALCINE	Product	445,000.00 MTPA
Calomel	By Product	15.00 MTPA
Power generation from waste heat recovery	Product	8.00 MW
Sodium Chloride	By Product	2,000.00 MTPA
SODIUM SULPHATE	By Product	16,500.00 MTPA
Solar Power Plant	Product	12.50 MW
Sulphuric Acid	By Product	419,000.00 MTPA
ZINC METAL	Product	100,000.00 MTPA

3 That this Consent to Operate is for existing plant, process & capacity and separate Consent to Establish/Operate is required to be taken for any addition / modification / alteration in process or change in capacity or change in fuel.

4 That the quantity of effluent generation along with mode of disposal for the treated effluent shall be as under:

Type of effluent	Max. effluent generation (KLD)	Recycled Qty of Effluent (KLD)	Disposed Qty of effluent (KLD)and mode of disposal
Domestic Sewage	200.000	NIL	200.000 To be treated in STP and to be utilized in plantation and horticulture within the factory premises
Trade Effluent	3425.000	3,082.000	NIL Reuse in Process

Head Office (HDF)
Rajasthan State Pollution Control Board
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5 That the sources of air emissions along with pollution control measures and the emission standards for the prescribed parameters shall be as under:

Sources of Air Emissions	Pollution Control Measures	Prescribed	
		Parameter	Standard
Slag Grinding Plant(0.5T/HR.)	ADEQUATE STACK HEIGHT , Bag Filter , Cyclone	Particulate Matter	50 mg/Nm3
Sulphuric Acid Plant II(200TON PER DAY)	ADEQUATE STACK HEIGHT , Cyclone , Double Conversion Double Absorption Plant , ESP , Gas Conditioning Plant , Scrubber	SO2 Acid Mist	950 mg/Nm3 1.5 kg/Ton of 100 percent concentrated acid product from acid plant 50 mg/Nm3
Sulphuric Acid Plant III(900TON PER DAY)	ADEQUATE STACK HEIGHT , Cyclone , Double Conversion Double Absorption Plant , ESP , Gas Conditioning Plant , Scrubber		

		SO2 Acid Mist	950 mg/Nm3 1.5 kg/Ton of 100 percent concentrated acid product from acid plant 50 mg/Nm3
Three Zinc Melting Furnaces(4T/HR. EACH)	ADEQUATE STACK HEIGHT . Bag Filter . Cyclone	Particulate Matter	50 mg/Nm3
Two oil fired Boilers(10T/HR. EACH)	ADEQUATE STACK HEIGHT . Cyclone	SO2 Particulate Matter NOx	600 mg/Nm3 at 3 percent dry O2 600 mg/Nm3 450 mg/Nm3

6 That the **ZINC SMELTER DEBARI plant** will comply with the standards as prescribed vide MoEF notification No. GSR 826(E) dated 16th November, 2009 with respect to National Ambient Air Quality Standards.

7 That the domestic sewage shall be treated before disposal so as to conform to the standards prescribed under the Environvent (Protection) Act-1986for disposal **Into Inland Surface Water.** The main parameters for regular monitoring shall be as under:

Head Office (HDF)
Rajasthan State Pollution Control Board
4, Institutional Area, Jhalana Doongari, Jaipur-302 004
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Parameters	Standards
Total Suspended Solids	Not to exceed 100 mg/l
pH Value	Between 5.5 to 9.0
Oil and Grease	Not to exceed 10 mg/l
Ammonical Nitrogen (as N)	Not to exceed 50 mg/l
Biochemical Oxygen Demand (3 days at 27°C)	Not to exceed 30 mg/l
Chemical Oxygen Demand	Not to exceed 250 mg/l
Nitrate (as NO3)	Not to exceed 50 mg/l

8 That the trade effluent shall be treated before disposal so as to conform to the standards prescribed under the Environment (Protection) Act-1986 for disposal **Into Inland Surface Water** . The main parameters for regular monitoring shall be as under

Head Office (HDF)
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Unit Id : 589

Parameters	Standards
Total Suspended Solids	Not to exceed 100 mg/l
pH Value	Between 5.5 to 9.0
Oil and Grease	Not to exceed 10 mg/l
Biochemical Oxygen Demand (3 days at 27°C)	Not to exceed 30 mg/l
Lead (as Pb)	Not to exceed 0.1 mg/l
Cadmium (as Cd)	Not to exceed 2.0 mg/l
Copper (as Cu)	Not to exceed 3.0 mg/l
Zinc (as Zn)	Not to exceed 5.0 mg/l
Nickel (as Ni)	Not to exceed 3.0 mg/l
Cyanide (as CN)	Not to exceed 0.2 mg/l
Fluoride (as F)	Not to exceed 2.0 mg/l
Sulphide (as S)	Not to exceed 2.0 mg/l
Iron (as Fe)	Not to exceed 3.0 mg/l
Chlorides	Not to exceed 1000 mg/l
Chemical Oxygen Demand	Not to exceed 250 mg/l

9 That the consent to operate is valid for zinc smelter of 1,00,000 TPA capacity and for production of products/by products mentioned at condition no. 2. That the industry has to seek fresh consent to establish & operate for any change in product/by product/process and any modification/alteration.

10 That capital investment as on 31.03.2021 as per the C.A. certificate submitted by the unit is Rs. 524.99 Crores which includes the cost of Land, Building, Plant & Machinery & miscellaneous assets.

11 That Hazardous Waste as defined under schedule IV of Hazardous & others Waste (Management, and Transboundary Movement) Rules, 2016 shall not be used as raw material without obtaining prior registration & authorization from the State Board.

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12 That all the conditions imposed by MOE&F, New Delhi in the environmental clearance granted vide letter no. J-11011/479/2006-IA.II (I) dated 19/25.03.2008 shall be complied with.

13 That total water consumption for Zinc Smelter Plant shall not exceed to 7100 KLD (Industrial use-6950 KLD and Domestic use- 150 KLD) which shall be met from Udai Sagar Dam/ Reservoir and treated domestic waste water from Sewage Treatment Plants (STPs) of 20 MLD and 25 MLD located at Udaipur.

14 That ground water shall be abstracted within the allowable permission from the CGWA and electromagnetic flow meters shall be installed and maintained at all sources ground water sources.

15 That water flow meters shall be provided and maintained at all suitable points to measure quantity of water received from Udai Sagar Dam/ Reservoir, STPs operated at Udaipur and water consumption for different purposes. Record of the same shall be maintained on daily basis.

16 That the trade effluent (3425 KLD) shall be treated in the effluent treatment plant (ETP) of 5760 KLD capacity alongwith trade effluent generated from other plants located in this premises upto the norms mentioned at condition no. 8.

17 That whole treated effluent shall be used in process/firefighting/plantation etc activities and no treated effluent shall be discharged outside the premises.

18 That R.O. reject (700 KLD) shall be disposed of through scientifically designed forced evaporation system like MEE of adequate capacity and no reject shall be disposed within or outside the premises on land, nallah, well etc in any case.

19 That whole domestic waste water generated from the plant premises shall be treated through sewage treatment plant (STP) of 200 KLD capacity .

20 That the domestic waste water shall be treated up to the norms mentioned at condition no. 7 and treated domestic waste water shall be used for plantation & other gainful purposes within the premises.

21 That no untreated waste water (domestic & trade effluent) shall be discharged inside or outside the factory premises in to a stream or well or sewer or on land in any case and complete zero discharge status shall be maintained.

22 That separate energy meter & hour meter shall be provided and maintained at all the air pollution control measures & ETP/STP/R.O. and record of daily running hours of pollution control measures and daily energy consumption shall be maintained in log book separately.

23 That unit shall ensure continuous data transmission to RSPCB & CPCB through all Online Continuous Monitoring Systems(OCEMS).

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24 That all the recommendation made in the charter of Corporate Responsibly for Environment Protection (CREP) for Lead and Zinc smelter plant shall be implemented and complied.

25 That industry shall maintain all four continuous ambient air quality monitoring stations (CAAQMS) and ensure more than 85% data transmission.

26 That SO2 emissions from Zinc Smelter plant shall be taken to the Sulphuric Acid plant for proper conversion and recovery as Sulphuric Acid through Double Conversion Double Absorption (DCDA) system.

27 That continuous Sulphur Di-Oxide monitoring system installed at Acid Plants shall be maintained properly and operated regularly. Daily record of Sulphur Di-Oxide emission shall be maintained.

28 That adequate measures shall be taken for handling the accidental leakages of gaseous emissions (SO2) along with interlocking arrangement for corrective action and stoppage of the plant.

29 That the industry shall maintain stack of adequate height at all the sources of air emissions and air pollution control measures shall be operated regularly and efficiently so as to achieve the prescribed emission standards as per condition no.5.

30 That Industry shall maintain safe & adequate infrastructure facility in accordance with emission regulation part-III issued by the Central Pollution Control Board at all the major stack for stack emission monitoring.

31 That the power supply to the production/process shall be interlocked with the pollution control equipments so that in the event of non functioning of the pollution equipment and/ or increase in emission level from prescribed norms the production process stops automatically.

32 That the industry shall carryout effluent sampling/piezometric wells sampling/stack monitoring/ambient air quality monitoring and submit quarterly analysis report from the State Board laboratory/laboratory recognized by Ministry of Environment, Forests & Climate Change (MoEF&CC), Government of India.

33 That industry shall comply with the provisions of Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2016 & Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 (as notified under Environment (Protection) Act, 1986 and record of daily hazardous waste generation and its disposal shall be maintained.

34 That the industry shall install and maintain adequately designed rain water harvesting structure for recharge of ground water in and around the area.

35 That the industry shall get the policy renewed under Public Liability Insurance Act (PLIA) and submit its copy to the Board from time to time.

Registered

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36 That the industry shall obtain Environmental Clearance from competent authority under EIA Notification dated 14.09.2006 before establishing any such activity which attracts Environmental clearance under EIA Notification dated 14.09.2006.

37 That the industry shall submit the quarterly compliance report of all the above conditions to the State Board.

38 That unit shall conduct R & D activities and best possible solution for reduction of emission may be found and implemented within a period of 6 months for generation of acidic fumes from cell house.

39 That unit shall carry out monthly monitoring of nallah during the next rainy season and submit the report to the State Board.

40 That unit shall ensure that no treated/untreated water/waste water to be mixed with the flowing water of nallah.

41 That unit shall increase the height of stack with Zinc Melting Furnace (4 Ton/Hr) upto 30 Meters by 31.03.2023 positively and intimate the State Board with evidence for the same.

42 That unit shall get amendment in the Environmental Clearance for by-products Calomel, Sodium sulphate and Sodium Chloride and submit the revised Environmental Clearance within a period of 3 months to the State Board.

43 That unit shall ensure the proper operation and maintenance of the Mercury Removal Tower.

44 That unit shall store the calomel in a safe and scientific manner within the unit only until the unit obtain amended Environmental Clearance.

45 That, notwithstanding anything provided hereinabove, the State Board shall have the power and reserves its right, as contained **under Section 27(2) of the Water Act and under Section 21(6) of the Air Act** to review anyone or all of the conditions imposed here in above and to make such variation as it deems fit for the purpose of **Air Act & Water Act.**

46 That the grant of this **Consent to Operate** is issued from the environmental angle only, and does not absolve the project proponent from the other statutory obligations prescribed under any other law or any other instrument in force. The sole and complete responsibility to comply with the conditions laid down in all other laws for the time-being in force, rests with the industry/ unit/ project proponent.

47 That the grant of this **Consent to Operate** shall not, in any way, adversely affect or jeopardize the legal proceeding, if any, instituted in the past or that could be instituted againt you by the State Board for violation of the provisions of the Water Act and Air Act or the Rules made thereunder.

Registered

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48 That the Project Proponent shall comply with provisions of the E-waste (Management) Rules, 2016 and ensure that e-waste generated by them is channelized through collection centre or dealer of authorized producer or dismantler or recycler or through designated take back service provider of the producer to authorized dismantler or recycler.

49 That the Project Proponent shall maintain record of e-waste generated by them in Form-2 and make such records available for scrutiny by the Board.

50 That the Project Proponent shall file annual returns in Form-3, to the Board on or before the 30th day of June following the financial year to which that return relates.

51 That the transportation of e-waste shall be carried out as per the manifest system whereby the transporter shall be required to carry a document (three copies) prepared by the sender, giving the details as per Form-6.

52 That the Project Proponent shall comply with provisions of the Batteries (Management and Handling) Rules, 2001 (as amended) and submit half yearly returns (as bulk consumer, importer, auctioneer, recycler as the case may be) to the State Board as provided under Rule 10 (2) (ii) of the Battery (Management and Handling) Rules, 2001 (as amended). In case the Project Proponent is not a bulk consumer even then the used batteries shall be returned to the authorized dealers or recyclers only.

53 That the record of batteries purchased and sold/ returned to registered dealers and/ or authorized recyclers shall be maintained and made available to the officers of the Board during inspections.

This **Consent to Operate** shall also be subject, besides the aforesaid specific conditions, to the general conditions given in the enclosed Annexure. The Project Proponent will comply with the provisions of the **Water Act and Air Act** and to such other conditions as may, from time to time , be specified, by the State Board under the provisions of the aforesaid Act(s). Please note that, non compliance of any of the above stated conditions would tantamount to revocation of **Consent to Operate** and Project Proponent / occupier shall be liable for legal action under the relevant provisions of the said Act(s).

This bears approval of the competent authority.

Yours sincerely,

Group Incharge[HDF]

Head Office (HDF)
Rajasthan State Pollution Control Board
4, Institutional Area, Jhalana Doongari, Jaipur-302 004
Phone: 0141-5159600,5159695

Registered

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(A) **Copy to:-**

1. Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Udaipur to ensure the compliance of the conditions of the consent.
2. Master File.

Group Incharge[HDF]

Annexure 4(e)

Registered A/D

RAJASTHAN STATE POLLUTION CONTROL BOARD

4, Institutional Area, Jhalana Doongri, Jaipur

Ph: 2711263
2711631
Fax: 2711640

F: 12(30-488) RPCB/Gr III/ 702 CRI(16) Date: 12/1/

M/s Hindustan Zinc Limited,
Zinc Smelter, Debari,
Udaipur

Subject: - Grant of consent to establish under the provisions of water (Prevention & Control of Pollution) Act 1974for your industry M/s Hindustan Zinc Limited, Debari, Udaipur for proposed installation of Stockpiled Moore cake Treatment Unit at Zinc Smelter, Debari, of the capacity 200 TPD Cake treatment.

Reference: - The applications for consent to establish dated 28/1/2004 submitted along with pollution control scheme & other documents and subsequent correspondence.

Sir,

Consent to Establish under section 25/26 of the Water (Prevention & Control of Pollution) Act 1974 as amended to date and rules & orders made thereof (hereinafter to be referred as the Water Act) is granted for proposed installation of Stockpiled Moore cake Treatment Unit at Zinc Smelter, Debari, to M/s Hindustan Zinc Limited, Debari, Udaipur subject to the following terms and conditions:

1) That the consent to establish shall be valid for premises of unit M/s Hindustan Zinc Limited, situated at Debari, Udaipur only for proposed installation of Stockpiled Moore cake Treatment Unit at Zinc Smelter, Debari, of the capacity as given below:-

S.No	Product	Capacity
1.	**Treatment of Stock Piled Moore Cake (Maximum Oxide Production 50 Tons per Day)**	**200 Ton per Day**

2) In case of any increase in capacity or addition of new product or addition/modification/alteration or change in process or process emissions or discharges or in the emission point or discharge points, you have to obtain fresh consent to establish again.

3) That the consent to establish shall be valid for three years from date of issue of this letter or date of commissioning of plant, whichever is earlier.

4) That the control equipments and scheme as suggested shall be installed before trial production is started for which you will have to obtain the consent to operate form the Board as contemplated under the relevant provisions of the Water Act, 1974 & Air Act, 1981. This consent to establish shall not be treated as consent to operate in any way.

5) That the recommendation of the CREP shall be implemented as per the action plan submitted with it the prescribed time schedule concurrent with the implementation of the proposed work.

Ph.: 2711263
2711631
Fax 2710647

RAJASTHAN STATE POLLUTION CONTROL BOARD

4, Institutional Area, Jhalana Doongri, Jaipur

6) That the industrial/domestic effluent shall be treated before disposal so as to conform to the standards prescribed by the board, via the general standards for discharge of effluent as notified under the Environment (Protection) Act, 1986 for disposal in to inland surface water. The main parameters for regular monitoring shall be as under

S.No.	Parameters	Limits
1	pH	5.5 to 9.0
2	TSS	100 mg/l
3	Oil and Grease	10 mg/l
4	BOD 3 days 27°C	30 mg/l
5	COD	250 mg/l
6	Lead	0.10 mg/l
7	Zinc	5 mg/l
8	Total Heavy Metals	7 mg/l

7) That the quantity of waste water shall not exceed 28 KLD from the proposed Moore cake treatment unit. The unit shall maintain zero discharge by way of reuse the treated effluent in process or in plantation/gardening with in the premises it self.

8) The combined stream shall be provided with suitable flow measuring device and sampling points both at inlet & outlet of treatment works.

9) A polishing pond of treated water will be provided to store and reuse the treated water for process and plantation.

10) That power supply to the production shall be so interlocked with the pollution control equipments that in the event of nonfunctioning of the pollution control equipment the production process stop automatically.

11) That the responsibility for performance evaluation shall be of industry and industry will not commence commercial production unless the satisfactory operation of the pollution control measures is done by the industry in presence of official of Regional office of the Board.

12) That you shall comply with the provisions of Manufacture Storage and Import of Hazardous chemicals Rules 19 and Hazardous waste (Management & Handling) Rules 989 and you will submit the details in the prescribed forms under these rules to this Board and take necessary safety measures and envisaged in above rules. Also necessary authourisation for disposal of hazardous waste shall be taken from the Board separately before establishment of the industry.

13) That you shall submit monthly progress to this office about the individual compliance of above conditions and progress of installation of pollution control equipments and effluent treatment plant.

14) That 33% of the total area of premises shall be covered by tree plantation and proper scheme for the same shall be submitted with in 4 weeks time.

F 12(30-488) RPCB/Gr III

159

RAJASTHAN STATE POLLUTION CONTROL BOARD
4, Institutional Area, Jhalana Doongri, Jaipur
Ph. 2711263
2711631
Fax 2710647

15) This consent is being granted to ensure control of pollution from the source in premises of the unit in accordance with various pollution control acts and in no way confers the right to the unit to exist in violation of other laws and statutory provisions

16) That any incorrect information submitted in the consent application form or affidavit shall make the industry liable for legal action under section 43 of the Water Act.

17) That the factory authorities shall comply with the provisions of Water (Prevention & Control of Pollution) Cess Act 1977 and amendments till date and industry shall regularly submit to the Board the returns in the prescribed form and the cess as specified under section 3 of the said act.

18) Notwithstanding anything contained in this conditional letter of the State Board hereby reserves to it the right and power under section 27(2) of the Water (Prevention & control of Pollution) Act 1974 to review anyone/or all the conditions imposed herein above and to make such variation as deemed fit for the purpose of the Act by the State Board.

Non-compliance of any of the above conditions would tantamount to withdrawal of this consent to establish and action under the provisions of concern Acts will be initiated against you

Yours truly,

Member Secretary

Head Office (CPM)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No : F(CPM)/Udaipur(Girwa)/16()/2017-2018/3562-3564

Order No : 2018-2019/CPM/5310

Date: 27/08/2018

Unit Id : 589

M/s Hindustan Zinc Limited

Zinc Smelter , Debari Tehsil:Girwa

District:Udaipur

Sub: **Consent to Operate** under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and under section 21(4) of Air (Prevention & Control of Pollution) Act, 1981.

Ref: Your application for Consent to Operate dated 24/01/2018 and subsequent correspondence.

Sir,

Consent to Operate under the provisions of section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 (hereinafter to be referred as the Water Act) and under section 21 of the Air (Prevention & Control of Pollution) Act, 1981, (hereinafter to be referred as the Air Act) as amended to date and rules & the orders issued thereunder **is hereby granted** for your **Stockpiled Moore Cake Treatment plant** situated at **Zinc Smelter DEBARI , Debari Tehsil:Girwa District:Udaipur** , Rajasthan, subject to the following conditions:-

1 That this Consent to Operate is valid for a period from **01/06/2018** to **31/05/2023** .

2 That this Consent is granted for manufacturing / producing following products / by products or carrying out the following activities or operation/processes or providing following services with capacities given below.

Particular	Type	Quantity with Unit
RAW ZINC OXIDE POWDER	Product	50.00 MT/DAY

3 That this consent to operate is for existing plant, process & capacity and separate consent to establish/operate is required to be taken for any addition / modification / alteration in process or change in capacity or change in fuel.

4 That the quantity of effluent generation along with mode of disposal for the treated effluent shall be as under:

Head Office (CPM)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No : F(CPM)/Udaipur(Girwa)/16()/2017-2018/3562-3564

Order No : 2018-2019/CPM/5310

Date: 27/08/2018

Unit Id : 589

Type of effluent	Max. effluent generation (KLD)	Recycled Qty of Effluent (KLD)	Disposed Qty of effluent (KLD)and mode of disposal
Trade Effluent	28.000	28.000	NIL

5 That the sources of air emmissions along with pollution control measures and the emission standards for the prescribed parameters shall be as under:

Sources of Air Emmissions	Pollution Control Measures	Prescribed	
		Parameter	Standard
Moore Cake Treatment Plant (Kiln)	ADEQUATE STACK HEIGHT , Bag Filter , Cooling Chamber , DUST SETTING CHAMBER	Particulate Matter Lead	50 mg/NM3 10 mg/NM3

6 That the **Stockpiled Moore Cake Treatment plant** will comply with the standards as prescribed vide MOEF notification No. GSR 826(E) dated 16th November, 2009 with respect to National Ambient Air Quality Standards.

7 That the trade effluent shall be treated before disposal so as to conform to the standards prescribed under the Environment (Protection) Act-1986 for disposal **Into Inland Surface Water .** The main parameters for regular monitoring shall be as under

Head Office (CPM)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No : F(CPM)/Udaipur(Girwa)/16()/2017-2018/3562-3564

Order No : 2018-2019/CPM/5310

Date: 27/08/2018

Unit Id : 589

Parameters	Standards
Total Suspended Solids	Not to exceed 100 mg/l
pH Value	Between 5.5 to 9.0
Oil and Grease	Not to exceed 10 mg/l
Biochemical Oxygen Demand (3 days at 27°C)	Not to exceed 30 mg/l
Lead (as Pb)	Not to exceed 0.1 mg/l
Cadmium (as Cd)	Not to exceed 2.0 mg/l
Copper (as Cu)	Not to exceed 3.0 mg/l
Zinc (as Zn)	Not to exceed 5.0 mg/l
Nickel (as Ni)	Not to exceed 3.0 mg/l
Cyanide (as CN)	Not to exceed 0.2 mg/l
Fluoride (as F)	Not to exceed 2.0 mg/l
Sulphide (as S)	Not to exceed 2.0 mg/l
Chlorides	Not to exceed 1000 mg/l
Iron (as Fe)	Not to exceed 1.0 mg/l
Chemical Oxygen Demand	Not to exceed 250 mg/l

8 That this consent to operate is valid for treatment of 200 TPD of Stockpiled Moore Cake to produce 50 TPD raw Zinc Oxide Powder.

9 The industry has to seek fresh consent to establish & operate for any change in product/by product/process/ activity/services and any modification/alteration.

10 That industry shall comply with all the conditions of environmental clearance (E.C.) issued by the MOEF&CC, New Dehli vide letter No. J-11011/479/2006-IA II (I) dated 25.03.2008.

11 That total capital investment as on 16.01.2018 as per the C.A. certificate submitted by the industry is Rs. 13.5899 crore which includes the cost of Building and Plant & Machinery.

Head Office (CPM)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No : F(CPM)/Udaipur(Girwa)/16()/2017-2018/3562-3564

Order No : 2018-2019/CPM/5310

Date: 27/08/2018

Unit Id : 589

12 That total water consumption shall not exceed to 104 KLD (4 KLD fresh water and 100 KLD treated water from smelter ETP) and fresh water requirement shall be met from Udai Sagar Dam.

13 That all the conditions imposed by Water Resource Department, Udaipur in the agreement dated 14.12.2017 w.r.t. water withdrawal from Udai Sagar Dam/ Reservoir shall be complied with.

14 That no ground water shall be used/abstracted for this plant without obtaining prior permission from CGWA.

15 That water meters shall be maintain at all suitable points to measure quantity of daily water received from Udai Sagar Dam and water consumed for different purposes. Record of the same shall be maintained on daily basis.

16 That the overflow of quenching waste water shall be collected separately and shall be treated in effluent treatment plant (ETP) of 5760 KLD capacity provided for treatment of waste water generated from Zinc Smelter.

17 That industry shall maintain effluent treatment plant (ETP) of adequate capacity so as to treat the trade effluent generated from process up to the norms prescribed at condition no.7.

18 That flow measuring devices /meters shall be provided and maintained at all suitable points to measure the quantity of effluent generated, treated and reused & record of same shall be maintained on daily basis.

19 That no waste water (treated and untreated) shall be discharged outside the premises and zero discharge status shall be maintained within or outside the premises.

20 That the emission generated from process shall be collected and transferred to the air pollution control system (Dust Setting Chamber, Tubular, Coolers and Bag Filter) followed by stack of at least 50 meters height from ground level.

21 That adequate air pollution control measures shall be maintained & operated at Moore Cake Treatment Plant to achieve the prescribed norms as mentioned at condition no.5.

22 That the industry shall maintain online continuous monitoring systems at the stack of kiln to monitor the emission level of particulate matter(PM), SO2 and NOx alongwith for effluents and connectivity of the same shall be ensured with RPCB/CPCB server whenever plant is operated.

23 That Industry shall maintain safe & adequate infrastructure facility in accordance with emission regulation part-III issued by the Central Pollution Control Board at stack of kiln (Moore Cake Treatment Plant) for stack emission monitoring.

Head Office (CPM)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No : F(CPM)/Udaipur(Girwa)/16()/2017-2018/3562-3564

Order No : 2018-2019/CPM/5310

Date: 27/08/2018

Unit Id : 589

24 That industry shall comply with the provisions of Hazardous & others Waste (Management & Transboundary Movement) Rules, 2016 and record of daily hazardous waste generation and its disposal shall be maintained.

25 That the energy meters and hour meters shall be installed and maintained with pollution control measures and record of energy consumption and running hour shall be maintained in separate log book on daily basis.

26 That the power supply to the production/process shall be interlocked with the pollution control equipment that in the event of non functioning of the pollution equipment the production process stops automatically.

27 That no additional source of air emission shall be installed without prior permission from the State Board.

28 That the industry shall carryout stack monitoring/ ambient air quality monitoring and submit quarterly analysis report from the State Board laboratory/laboratory recognized by Ministry of Environment, Forests and Climate Change (MoEF&CC),Government of India.

29 That the plantation of local species in the 33% of total area of the project shall be carried out.

30 That suitable measure for rain water harvesting for artificial recharge of ground water shall be taken.

31 That the industry shall not use petcoke/furnace oil in any process/service/utility in compliance to the order dated 17/11/2017 of Hon'ble Supreme Court, wherein ban has been imposed on the use of pet coke and furnace oil in the State of Rajasthan.

32 That the industry shall ensure compliance of all the conditions of Consent to operate issued vide order no. 2015-2016/CPM/3471 dated 15.03.2016.

33 That the industry shall submit quarterly compliance report of all the above conditions to the State Board.

34 That, not withstanding anything provided hereinabove, the State Board shall have power and reserves its right, as contained **under section 27(2) of the Water Act and under section 21(6) of the Air Act** to review anyone or all the conditions imposed here in above and to make such variation as it deemed fit for the purpose of **Air Act & Water Act.**

35 That the grant of this **Consent to Operate** is issued from the environmental angle only, and does not absolve the project proponent from the other statutory obligations prescribed under any other law or any other instrument in force. The sole and complete responsibility to comply with the conditions laid down in all other laws for the time-being in force, rests with the industry/ unit/ project proponent.

Head Office (CPM)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No : F(CPM)/Udaipur(Girwa)/16()/2017-2018/3562-3564

Order No : 2018-2019/CPM/5310

Date: 27/08/2018

Unit Id : 589

36 That the grant of this **Consent to Operate** shall not, in any way, adversely affect or jeopardize the legal proceeding, if any, instituted in the past or that could be instituted againt you by the State Board for violation of the provisions of the Act or the Rules made thereunder.

This **Consent to Operate** shall also be subject, besides the aforesaid specific conditions, to the general conditions given in the enclosed Annexure. The project proponent will comply with the provisions of the **Water Act and Air Act** and to such other conditions as may, from time to time , be specified, by the State Board under the provisions of the aforesaid Act(s). Please note that, non compliance of any of the above stated conditions would tantamount to revocation of **Consent to Operate** and project proponent / occupier shall be liable for legal action under the relevant provisions of the said Act(s).

This bears the approval of the competent authority.

Yours Sincerely

Group Incharge[CPM]

Copy To:-

1 Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Udaipur to ensure the compliance.

2 Master File.

Group Incharge[CPM]

Head Office (HDF)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695

Registered

File No : **F(HDF)/Udaipur(Girwa)/1330(1)/2023-2024/4374-4376**

Order No : **2023-2024/HDF/9464** **Date:** **Oct 9 2023 4:30PM**

Unit Id : 589

M/s Hindustan Zinc Limited

Zinc Smelter , Debari Tehsil:Girwa

District:Udaipur

Sub: **Consent to Operate** under Section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and under Section 21(4) of Air (Prevention & Control of Pollution) Act, 1981.

Ref: Your application for Consent to Operate dated 21/01/2023 and subsequent correspondence.

Sir,

Consent to Operate under the provisions of Section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 (hereinafter to be referred as the Water Act) and under Section 21 of the Air (Prevention & Control of Pollution) Act, 1981, (hereinafter to be referred as the Air Act) as amended to date and rules & the orders issued thereunder **is hereby granted** for your **Stockpiled Moore Cake Treatment Plant Zinc Smelter Debari plant** situated at **Zinc Smelter Debari DEBARI , Udaipur Tehsil:Girwa District:Udaipur** , Rajasthan, subject to the following conditions:-

1 That this Consent to Operate is valid for a period from **01/06/2023** to **31/05/2028** .

2 That this Consent is granted for manufacturing / producing following products / by products or carrying out the following activities or operation/processes or providing following services with capacities given below:

Particular	Type	Quantity with Unit
RAW ZINC OXIDE POWDER	Product	50.00 MT

3 That this Consent to Operate is for existing plant, process & capacity and separate Consent to Establish/Operate is required to be taken for any addition / modification / alteration in process or change in capacity or change in fuel.

4 That the quantity of effluent generation along with mode of disposal for the treated effluent shall be as under:

Head Office (HDF)
Rajasthan State Pollution Control Board
4, Institutional Area, Jhalana Doongari, Jaipur-302 004
Phone: 0141-5159600,5159695

Registered

File No : F(HDF)/Udaipur(Girwa)/1330(1)/2023-2024/4374-4376
Order No : 2023-2024/HDF/9464
Date: Oct 9 2023 4:30PM

Unit Id : 589

Type of effluent	Max. effluent generation (KLD)	Recycled Qty of Effluent (KLD)	Disposed Qty of effluent (KLD)and mode of disposal
Trade Effluent	28.000	28.000	NIL Effluent Treatment Plant

5 That the sources of air emissions along with pollution control measures and the emission standards for the prescribed parameters shall be as under:

Sources of Air Emissions	Pollution Control Measures	Prescribed	
		Parameter	Standard
Moore Cake Treatment Plant (Kiln)(50MT)	ADEQUATE STACK HEIGHT , Bag Filter , Cooling Chamber , DUST SETTING CHAMBER	Particulate Matter Lead	50 mg/NM3 10 mg/NM3

6 That the **Stockpiled Moore Cake Treatment Plant Zinc Smelter Debari plant** will comply with the standards as prescribed vide MoEF notification No. GSR 826(E) dated 16th November, 2009 with respect to National Ambient Air Quality Standards.

7 That the Trade Effluent shall be treated before disposal so as to conform to the standards prescribed under the Environvent (Protection) Act-1986for disposal **Into Inland Surface Water.** The main parameters for regular monitoring shall be as under:

Head Office (HDF)
Rajasthan State Pollution Control Board
4, Institutional Area, Jhalana Doongari, Jaipur-302 004
Phone: 0141-5159600,5159695

Registered

File No : F(HDF)/Udaipur(Girwa)/1330(1)/2023-2024/4374-4376
Order No : 2023-2024/HDF/9464
Date: Oct 9 2023 4:30PM

Unit Id : 589

Parameters	Standards
Total Suspended Solids	Not to exceed 100 mg/l
pH Value	Between 5.5 to 9.0
Oil and Grease	Not to exceed 10 mg/l
Biochemical Oxygen Demand (3 days at 27°C)	Not to exceed 30 mg/l
Lead (as Pb)	Not to exceed 0.1 mg/l
Cadmium (as Cd)	Not to exceed 2.0 mg/l
Copper (as Cu)	Not to exceed 3.0 mg/l
Zinc (as Zn)	Not to exceed 5.0 mg/l
Nickel (as Ni)	Not to exceed 3.0 mg/l
Cyanide (as CN)	Not to exceed 0.2 mg/l
Fluoride (as F)	Not to exceed 2.0 mg/l
Sulphide (as S)	Not to exceed 2.0 mg/l
Chlorides	Not to exceed 1000 mg/l
Iron (as Fe)	Not to exceed 1.0 mg/l
Chemical Oxygen Demand	Not to exceed 250 mg/l

8 That this consent to operate is valid for treatment of 200 TPD of Stockpiled Moore Cake to produce 50 TPD raw Zinc Oxide Powder.

9 The industry has to seek fresh consent to establish & operate for any change in product/by product/process/ activity/services and any modification/alteration.

10 That industry shall comply with all the conditions of environmental clearance (E.C.) issued by the MOEF&CC, New Dehli vide letter No. J-11011/479/2006-IA II (I) dated 25.03.2008.

11 That total capital investment as on 31.12.2022 as per the C.A. certificate submitted by the industry is Rs. 1413.74 Lakh which includes the cost of Building, Plant & Machinery and misc. assets.

Registered

File No : F(HDF)/Udaipur(Girwa)/1330(1)/2023-2024/4374-4376
Order No : 2023-2024/HDF/9464
Date: Oct 9 2023 4:30PM

Unit Id : 589

12 That total water consumption shall not exceed to 104 KLD (4 KLD fresh water and 100 KLD treated water from smelter ETP) and fresh water requirement shall be met from existing reservoir of Zinc Smelter debar.

13 That all the conditions imposed by Water Resource Department, Udaipur in the agreement dated 14.12.2017 w.r.t. water withdrawal from Udai Sagar Dam/ Reservoir shall be complied with.

14 That no ground water shall be used/abstracted for this plant without obtaining prior permission from CGWA.

15 That water meters shall be maintain at all suitable points to measure quantity of daily water received from Udai Sagar Dam and water consumed for different purposes. Record of the same shall be maintained on daily basis

16 That the overflow of quenching waste water shall be collected separately and shall be treated in effluent treatment plant (ETP) of 5760 KLD capacity provided for treatment of waste water generated from Zinc Smelter

17 That industry shall maintain effluent treatment plant (ETP) of adequate capacity so as to treat the trade effluent generated from process up to the norms prescribed at condition no.7.

18 That flow measuring devices /meters shall be provided and maintained at all suitable points to measure the quantity of effluent generated, treated and reused & record of same shall be maintained on daily basis.

19 That no waste water (treated and untreated) shall be discharged outside the premises and zero discharge status shall be maintained within or outside the premises.

20 That the emission generated from process shall be collected and transferred to the air pollution control system (Dust Setting Chamber, Tubular, Coolers and Bag Filter) followed by stack of at least 50 meters height from ground level.

21 That adequate air pollution control measures shall be maintained & operated at Moore Cake Treatment Plant to achieve the prescribed norms as mentioned at condition no.5.

22 That the industry shall maintain online continuous monitoring systems at the stack of kiln to monitor the emission level of particulate matter(PM), SO2 and NOx alongwith for effluents and connectivity of the same shall be ensured with RPCB/CPCB server whenever plant is operated.

23 That Industry shall maintain safe & adequate infrastructure facility in accordance with emission regulation part-III issued by the Central Pollution Control Board at stack of kiln (Moore Cake Treatment Plant) for stack emission monitoring.

Registered

File No : F(HDF)/Udaipur(Girwa)/1330(1)/2023-2024/4374-4376
Order No : 2023-2024/HDF/9464 **Date: Oct 9 2023 4:30PM**

Unit Id : 589

24 **That industry shall comply with the provisions of Hazardous & others Waste (Management & Transboundary Movement) Rules, 2016 and record of daily hazardous waste generation and its disposal shall be maintained.**

25 **That the energy meters and hour meters shall be installed and maintained with pollution control measures and record of energy consumption and running hour shall be maintained in separate log book on daily basis.**

26 **That the power supply to the production/process shall be interlocked with the pollution control equipment that in the event of non functioning of the pollution equipment the production process stops automatically.**

27 **That no additional source of air emission shall be installed without prior permission from the State Board.**

28 **That the industry shall carryout stack monitoring/ ambient air quality monitoring and submit quarterly analysis report from the State Board laboratory/laboratory recognized by Ministry of Environment, Forests and Climate Change (MoEF&CC),Government of India.**

29 **That the plantation of local species in the 33% of total area of the project shall be carried out.**

30 **That suitable measure for rain water harvesting for artificial recharge of ground water shall be taken**

31 **That the industry shall not use petcoke/furnace oil in any process/service/utility in compliance to the order dated 17/11/2017 of Hon'ble Supreme Court, wherein ban has been imposed on the use of pet coke and furnace oil in the State of Rajasthan.**

32 **That the industry shall ensure compliance of all the conditions of Consent to operate issued vide order no. 2018-2019/CPM/5310 dated 27.08.2018.**

33 **That the industry shall submit quarterly compliance report of all the above conditions to the State Board.**

34 That, notwithstanding anything provided hereinabove, the State Board shall have the power and reserves its right as contained **under Section 27(2) of the Water Act and under Section 21(6) of the Air Act** to review anyone or all of the conditions imposed here in above and to make such variation as it deems fit for the purpose of **Air Act & Water Act.**

35 That the grant of this **Consent to Operate** is issued from the environmental angle only, and does not absolve the project proponent from the other statutory obligations prescribed under any other law or any other instrument in force. The sole and complete responsibility to comply with the conditions laid down in all other laws for the time-being in force, rests with the industry/ unit/ project proponent.

Registered

File No : F(HDF)/Udaipur(Girwa)/1330(1)/2023-2024/4374-4376
Order No : 2023-2024/HDF/9464 **Date:** Oct 9 2023 4:30PM

Unit Id : 589

36 That the grant of this **Consent to Operate** shall not, in any way, adversely affect or jeopardize the legal proceeding, if any, instituted in the past or that could be instituted againt you by the State Board for violation of the provisions of the Water Act and Air Act or the Rules made thereunder.

37 That the Project Proponent shall comply with provisions of the E-waste (Management) Rules, 2016 and ensure that e-waste generated by them is channelized through collection centre or dealer of authorized producer or dismantler or recycler or through designated take back service provider of the producer to authorized dismantler or recycler.

38 That the Project Proponent shall maintain record of e-waste generated by them in Form-2 and make such records available for scrutiny by the Board.

39 That the Project Proponent shall file annual returns in Form-3, to the Board on or before the 30th day of June following the financial year to which that return relates.

40 That the transportation of e-waste shall be carried out as per the manifest system whereby the transporter shall be required to carry a document (three copies) prepared by the sender, giving the details as per Form-6.

41 That the Project Proponent shall comply with provisions of the Batteries (Management and Handling) Rules, 2001 (as amended) and submit half yearly returns (as bulk consumer, importer, auctioneer, recycler as the case may be) to the State Board as provided under Rule 10 (2) (ii) of the Battery (Management and Handling) Rules, 2001 (as amended). In case the Project Proponent is not a bulk consumer even then the used batteries shall be returned to the authorized dealers or recyclers only.

42 That the record of batteries purchased and sold/ returned to registered dealers and/ or authorized recyclers shall be maintained and made available to the officers of the Board during inspections.

This **Consent to Operate** shall also be subject, besides the aforesaid specific conditions, to the general conditions given in the enclosed Annexure. The Project Proponent will comply with the provisions of the **Water Act and Air Act** and to such other conditions as may, from time to time , be specified, by the State Board under the provisions of the aforesaid Act(s). Please note that, non compliance of any of the above stated conditions would tantamount to revocation of **Consent to Operate** and Project Proponent / occupier shall be liable for legal action under the relevant provisions of the said Act(s).

Head Office (HDF)
Rajasthan State Pollution Control Board
4, Institutional Area, Jhalana Doongari, Jaipur-302 004
Phone: 0141-5159600,5159695

Registered

File No : F(HDF)/Udaipur(Girwa)/1330(1)/2023-2024/4374-4376
Order No : 2023-2024/HDF/9464 **Date:** Oct 9 2023 4:30PM

Unit Id : 589

This bears approval of the competent authority.

Yours sincerely,

Group Incharge[HDF]

(A) **Copy to:-**

1 Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Udaipur to ensure the compliance.
2 Master File.

Group Incharge[HDF]

Head Office (CPM)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No : F(CPM)/Udaipur(Girwa)/16()/2017-2018/2043-2045

Order No : 2019-2020/CPM/5509

Date: 30/08/2019

Unit Id : 589

M/s Hindustan Zinc Limited

Zinc Smelter , Debari Tehsil:Girwa

District:Udaipur

Sub: **Consent to Operate** under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and under section 21(4) of Air (Prevention & Control of Pollution) Act, 1981.

Ref: Your application for Consent to Operate dated 30/10/2018 and subsequent correspondence.

Sir,

Consent to Operate under the provisions of section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 (hereinafter to be referred as the Water Act) and under section 21 of the Air (Prevention & Control of Pollution) Act, 1981, (hereinafter to be referred as the Air Act) as amended to date and rules & the orders issued thereunder **is hereby granted** for your **Captive Power Plant (D.G. Set 2x7.4 MW) plant** situated at **Zinc Smelter DEBARI , Udaipur Tehsil:Girwa District:Udaipur** , Rajasthan, subject to the following conditions:-

1 That this Consent to Operate is valid for a period from **01/03/2019** to **29/02/2024** .

2 That this Consent is granted for manufacturing / producing following products / by products or carrying out the following activities or operation/processes or providing following services with capacities given below.

Particular	Type	Quantity with Unit
ELECTRIC POWER	Product	14.80 MW

3 That this consent to operate is for existing plant, process & capacity and separate consent to establish/operate is required to be taken for any addition / modification / alteration in process or change in capacity or change in fuel.

4 That the quantity of effluent generation along with mode of disposal for the treated effluent shall be as under:

Head Office (CPM)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No : F(CPM)/Udaipur(Girwa)/16()/2017-2018/2043-2045

Order No : 2019-2020/CPM/5509

Date: 30/08/2019

Unit Id : 589

Type of effluent	Max. effluent generation (KLD)	Recycled Qty of Effluent (KLD)	Disposed Qty of effluent (KLD)and mode of disposal
Boiler blow down	41.000	41.000	NIL

5 That the sources of air emmissions along with pollution control measures and the emission standards for the prescribed parameters shall be as under:

Sources of Air Emmissions	Pollution Control Measures	Prescribed	
		Parameter	Standard
Two DG Sets (7.4 MW each)	ACOUSTIC ENCLOSURE , ADEQUATE STACK HEIGHT	CO	150 mg/Nm3
		Particulate Matter	75 mg/Nm3
		NOx	710 mg/Nm3
		NMHC	100 mg/Nm3

6 That the **Captive Power Plant (D.G. Set 2x7.4 MW) plant** will comply with the standards as prescribed vide MOEF notification No. GSR 826(E) dated 16th November, 2009 with respect to National Ambient Air Quality Standards.

7 **That this consent to operate is being issued for generation of 14.80 MW electric power from two DG Sets of 7.4 MW capacity each. The industry has to seek fresh consent to establish & operate for any change in product/by product/process/modification/alteration.**

8 **That the total capital investment as on 30.09.2018 as per the C.A. certificate submitted by the industry is Rs. 27.99 Crore which includes the cost of Building, Plant & Machinery and Miscellaneous assets**

9 **That industry shall maintain adequate stack height and acoustic enclosure at two DG Sets of 7.4 MW capacity each.**

Head Office (CPM)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695 Fax: 0141-5159697

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File No : F(CPM)/Udaipur(Girwa)/16()/2017-2018/2043-2045

Order No : 2019-2020/CPM/5509

Date: 30/08/2019

Unit Id : 589

10 That industry shall maintain adequate infrastructure facility for stack emission monitoring at the stack of D.G. Sets.

11 That total fresh water consumption for this plant shall not exceed to 60 KLD and same shall be met from Udai Sagar Dam.

12 That the industry shall not abstract ground water without prior permission/NOC from CGWA.

13 That water meters shall be maintained at all suitable points to measure quantity of daily water received from Udai Sagar Dam and water consumption for different purposes. Record of the same shall be maintained on daily basis.

14 That industry shall not use any water in the process except cooling purpose (60KLD), thus no trade effluent will be generated from this plant.

15 That effluent (41 KLD) generated from cooling tower as blow down will be reuse in process.

16 That no trade effluent will be discharged inside or outside the factory premises in to a stream or well or sewer or on land.

17 That the industry shall carryout effluent sampling/stack monitoring/ambient air quality monitoring and submit quarterly analysis report from the State Board laboratory/ laboratory recognized by Ministry of Environment & Forests (MoE&F), Government of India.

18 That industry shall comply with the provisions of Hazardous & others Waste (Management, & Transboundary Movement) Rules, 2016 and daily record of hazardous waste generation and its disposal shall be maintained.

19 That the industry shall obtain Environmental Clearance from competent authority under EIA Notification dated 14.09.2006 for any such activity which attracts Environmental clearance under EIA Notification dated 14.09.2006.

20 That the industry shall not use pet coke/furnace oil in any process/service/utility in compliance to the order dated 24/10/2017 of Hon'ble Supreme Court, wherein ban has been imposed on the use of pet coke and furnace oil in the State of Rajasthan.

21 That the industry shall install & maintain adequately designed rain water harvesting structure for recharge of ground water in and around the area.

22 That the plantation of local species in the 33% of total area of the project shall be carried out & maintained.

23 That this consent to operate shall be subjected to compliance of any direction or order passed by NGT/ Honorable Court of law in the matter.

24 That the industry shall ensure compliance of all the conditions of Consent to operate imposed by Board's order no. 2017-2018/CPM/4844 dated 01.05.2017.

Head Office (CPM)

Rajasthan State Pollution Control Board

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Order No : 2019-2020/CPM/5509

Date: 30/08/2019

Unit Id : 589

25 **That in case industry founds flouting any of the above conditions and/ or with inadequate pollution control measures during post inspection, the consent to operate will be revoked without any notice.**

26 **That the industry shall submit the quarterly compliance of all the above conditions to the State Board.**

27 That, not withstanding anything provided hereinabove, the State Board shall have power and reserves its right, as contained **under section 27(2) of the Water Act and under section 21(6) of the Air Act** to review anyone or all the conditions imposed here in above and to make such variation as it deemed fit for the purpose of **Air Act & Water Act.**

28 That the grant of this **Consent to Operate** is issued from the environmental angle only, and does not absolve the project proponent from the other statutory obligations prescribed under any other law or any other instrument in force. The sole and complete responsibility to comply with the conditions laid down in all other laws for the time-being in force, rests with the industry/ unit/ project proponent.

29 That the grant of this **Consent to Operate** shall not, in any way, adversely affect or jeopardize the legal proceeding, if any, instituted in the past or that could be instituted againt you by the State Board for violation of the provisions of the Act or the Rules made thereunder.

This **Consent to Operate** shall also be subject, besides the aforesaid specific conditions, to the general conditions given in the enclosed Annexure. The project proponent will comply with the provisions of the **Water Act and Air Act** and to such other conditions as may, from time to time , be specified, by the State Board under the provisions of the aforesaid Act(s). Please note that, non compliance of any of the above stated conditions would tantamount to revocation of **Consent to Operate** and project proponent / occupier shall be liable for legal action under the relevant provisions of the said Act(s).

This bears the approval of the competent authority.

Yours Sincerely

Group Incharge[CPM]

Head Office (CPM)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No : F(CPM)/Udaipur(Girwa)/16()/2017-2018/2043-2045

Order No : 2019-2020/CPM/5509

Date: 30/08/2019

Unit Id : 589

Copy To:-

1. Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Udaipur to ensure the compliance and norms and submit stack monitoring report within one month.
2. Master File.

Group Incharge[CPM]

Regional Office Udaipur
Rajasthan State Pollution Control Board
F / 470, Madri Ind. Area, Udaipur
Phone: 0294-2491269

Registered

File No : **F(BMW)/Udaipur(Girwa)/7008(1)/2021-2022/1340-1341**
Order No : **2021-2022/Udaipur/8773**
Date: **Jan 21 2022 5:23PM**
Unit Id : 116609

M/s Central Hospital, HZL, Debari

Zinc Smelter Debari, Hindustan Zinc Limited , Udaipur
Tehsil:Girwa
District:Udaipur

Sub: **Consent to Operate** under section 25/26 of the Water (Prevention & Control of Pollution) Act. 1974.

Ref: Your application for Consent to Operate dated 28/12/2021 and subsequent correspondence.

Sir,

Consent to Operate under the provisions of section 25/26 of the Water (Prevention & Control of Pollution) Act. 1974 (hereinafter to be referred as the Water Act) as amended to date and rules & the orders issued thereunder **is hereby granted** for your **Central Hospital Zinc smelter Debari plant** situated at **Zinc Smelter Debari, Hindustan Zinc Limited Udaipur Tehsil:Girwa District:Udaipur** , Rajasthan, subject to the following conditions:-

1 That this Consent to Operate is valid for a period from **01/05/2022** to **30/04/2027** .

2 That this Consent is granted for manufacturing / producing following products / by products or carrying out the following activities or operation/processes or providing following services with capacities given below.

Particular	Type	Quantity with Unit
HOSPITAL ACTIVITY	Activity	16.00 BEDS

3 That this consent to operate is for existing plant, process & capacity and separate consent to establish/operate is required to be taken for any addition / modification / alteration in process or change in capacity or change in fuel.

4 That the quantity of effluent generation along with mode of disposal for the treated effluent shall be as under:

Regional Office Udaipur
Rajasthan State Pollution Control Board
F / 470, Madri Ind. Area, Udaipur
Phone: 0294-2491269

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File No : F(BMW)/Udaipur(Girwa)/7008(1)/2021-2022/1340-1341
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Type of effluent	Max. effluent generation (KLD)	Recycled Qty of Effluent (KLD)	Disposed Qty of effluent (KLD)and mode of disposal
Domestic Sewage	2.000	2.000	NIL Nil

5 **It may be clarified that if hospital activities are carried on without valid authorization of the Board, it would be treated as violation of the provisions of Environment Protection Act-1986.**

6 **That the hospital shall submit the copy of valid agreement with CBMWTDF(i.e. En-Vision Enviro Engineers Pvt. ltd)before expiry of present agreement, failing which this Authorization shall be treated as cancelled.**

7 **That the unit shall install STP (sewerage treatment plant) for treatment of domestic waste water generated from hospital utilities if required.**

8 **That no waste water shall be discharge outside the premises in any case and unit shall maintain Zero Discharge Status.**

9 **This consent to operate is being issued on the basis of validity of membership of CBWTF.**

10 That, not withstanding anything provided hereinabove, the State Board shall have power and reserves its right, as contained **under section 27(2) of the Water Act** to review anyone or all the conditions imposed here in above and to make such variation as it deemed fit for the purpose of **Water Act.**

11 That the grant of this **Consent to Operate** is issued from the environmental angle only, and does not absolve the project proponent from the other statutory obligations prescribed under any other law or any other instrument in force. The sole and complete responsibility to comply with the conditions laid down in all other laws for the time-being in force, rests with the industry/ unit/ project proponent.

12 That the grant of this **Consent to Operate** shall not, in any way, adversely affect or jeopardize the legal proceeding, if any, instituted in the past or that could be instituted againt you by the State Board for violation of the provisions of the Act or the Rules made thereunder.

Regional Office Udaipur
Rajasthan State Pollution Control Board
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Date: Jan 21 2022 5:23PM
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13 That the Project Proponent shall comply with provisions of the E-waste (Management) Rules, 2016 and ensure that e-waste generated by them is channelized through collection centre or dealer of authorized producer or dismantler or recycler or through designated take back service provider of the producer to authorized dismantler or recycler.

14 That the Project Proponent shall maintain record of e-waste generated by them in Form-2 and make such records available for scrutiny by the board.

15 That the Project Proponent shall file annual returns in Form-3, to the Board on or before the 30th day of June following the financial year to which that return relates

16 That the transportation of e-waste shall be carried out as per the manifest system whereby the transporter shall be required to carry a document (three copies) prepared by the sender, giving the details as per Form-6.

17 That the Project Proponent shall comply with provisions of the Batteries (Management and Handling) Rules, 2001 (as amended) and submit half yearly returns (as bulk consumer, importer, auctioneer, recycler as the case may be) to the State Board as provided under Rule 10 (2) (ii) of the Battery (Management and Handling) Rules, 2001 (as amended). In Case the Project Proponent is not a bulk consumer even then the used batteries shall be returned to the authorized dealers or recyclers only.

18 That the record of batteries purchased and sold/ returned to registered dealers and/ or authorized recyclers shall be maintained and made available to the officers of the Board during inspections.

This **Consent to Operate** shall also be subject, besides the aforesaid specific conditions, to the general conditions given in the enclosed Annexure. The project proponent will comply with the provisions of the **Water Act** and to such other conditions as may, from time to time , be specified, by the State Board under the provisions of the aforesaid Act(s). Please note that, non compliance of any of the above stated conditions would tantamount to revocation of **Consent to Operate** and project proponent / occupier shall be liable for legal action under the relevant provisions of the said Act(s).

Yours Sincerely

Regional Officer[Udaipur]

Regional Office Udaipur
Rajasthan State Pollution Control Board
F / 470, Madri Ind. Area, Udaipur
Phone: 0294-2491269

Registered

File No : F(BMW)/Udaipur(Girwa)/7008(1)/2021-2022/1340-1341
Order No : 2021-2022/Udaipur/8773
Date: Jan 21 2022 5:23PM
Unit Id : 116609

(A) **Copy To:-**
1 Master File.

Regional Officer[Udaipur]

Annexure 5.

RAJASTHAN STATE POLLUTION CONTROL BOARD
4, Institutional Area, Jhalana Doongari, Jaipur-302 004
Phone: 0141-5159600,5159695Fax: 0141-5159697

Registered

File No: **F(HSW)/Udaipur(Girwa)/7034(1)/2022-2023/7463-7465** **Date:-** 17/03/2023

Unit Id : 589

M/s Hindustan Zinc Limited
Zinc Smelter , Debari Tehsil:Girwa
District:Udaipur

Sub:- Authorization for operating a facility for Collection, Disposal, Disposal at landfill, Generation, Recycler, Reuse, Storage, Treatment, Utilisation, Waste Processing of Hazardous Wastes Under Hazardous and Other Waste (Management and Transboundary Movement) Rules, 2016.

Ref:- Your application received on 25/01/2022 and subsequent correspondence.

Sir

1 Number of authorization RPCB/HWM/2022-2023/HDF/HSW/88.

2 Application Number : 300049 dated : 25/01/2022 .

3 **.Site SBU Director of M/s Hindustan Zinc Limited is hereby granted an authorization based on the enclosed signed inspection report for Collection, Disposal, Disposal at landfill, Generation, Recycler, Reuse, Storage, Treatment, Utilisation, Waste Processing of Hazardous waste on the premises situated at Zinc Smelter Debari Debari Udaipur Tehsil: Girwa District: Udaipur.**

Details of Authorization

SNo	Type of Hazardous waste	Category		Quantity/ Unit	Hazardous Waste Disposal Practice
		Sch	Code		
1	Discarded asbestos	1	15.2	350.00 MTPA	CTDF Udaipur
2	Spent catalyst*	1	17.2	27.00 MTPA	CTDF Udaipur
3	Empty barrels/containers contaminated with hazardous chemicals/wastes	1	33.1	10.00 MTPA	CTDF Udaipur
4	Sludge from treatment of waste water arising out of cleaning/disposal of barrels/containers	1	34.2	10.00 MTPA	CTDF Udaipur

RAJASTHAN STATE POLLUTION CONTROL BOARD
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File No: **F(HSW)/Udaipur(Girwa)/7034(1)/2022-2023/7463-7465** **Date:-** 17/03/2023

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5	Water Purification resin or spent ion exchange resin containing toxic metals	I	35.2	2.00 MTPA	CTDF Udaipur
6	Chemical sludge from waste water treatment	I	35.3	18000.00 MTPA	CTDF Udaipur
7	Concentration or evaporation residues	I	37.3	18250.00 MTPA	CTDF Udaipur
8	Used or spent oil	I	5.1	55.00 MTPA	Sales to Registered Recycler
9	Filters contaminated with oil	I	5.2	2.00 MTPA	CTDF Udaipur/Utilization for co processing in cement plant
10	Wastes or residues containing oil	I	5.2	970.00 MTPA	Sales to Registered Recycler
11	Anode Mud	I	7.2	1500.00 MTPA	Co processing in cement palnt /Registered recycler/Reprocessso
12	cooler cake	I	7.2	1017.00 MTPA	CTDF Udaipur
13	Process residues	I	7.2	50.00 MTPA	CTDF Udaipur
14	Process residues	I	7.2	1200.00 MTPA	Sales to Registered Recycler/CTDF Udaipur
15	Purification Cake	I	7.2	2000.00 MTPA	Reuse in process/sales to registered recyclers
16	Jerosite cake	III	OW	125000.00 MTPA	Co Processing in Cement kiln
17	Zinc ash/skimming/other zinc bearing wastes arising from smelting and refining	IV	14	5250.00 MT/ANNUM	Sales to Registered Recycler/ Reprocess

RAJASTHAN STATE POLLUTION CONTROL BOARD
4, Institutional Area, Jhalana Doongari, Jaipur-302 004
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File No: **F(HSW)/Udaipur(Girwa)/7034(1)/2022-2023/7463-7465** **Date:-** 17/03/2023

Unit Id : 589

4 The authorization shall be in force for period from **25/01/2022** to **31/12/2027** .

RAJASTHAN STATE POLLUTION CONTROL BOARD
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Unit Id : 589

The authorization is subject to the following general and specific conditions :

A. General conditions of Authorization

1. The authorised person shall comply with the provisions of the Environment (Protection) Act. 1986, and the rules made there under.

2. The authorisation or its renewal shall be produced for inspection at the request of an officer authorised by the State Pollution Control Board.

3. The person authorised shall not rent, lend, sell, transfer or otherwise transport the hazardous and other wastes except what is permitted through this authorisation.

4. Any unauthorised change in personnel, equipment or working conditions as mentioned in the application by the person authorised shall constitute a breach of his authorisation.

5. The person authorised shall implement Emergency Response Procedure (ERP) for which this authorisation is being granted considering all site specific possible scenarios such as spillages, leakages, fire etc. and their possible impacts and also carry out mock drill in this regard at regular interval of time:

6. The person authorised shall comply with the provisions outlined in the Central Pollution Control Board guidelines on "Implementing Liabilities for Environmental Damages due to Handling and Disposal of Hazardous Waste and Penalty"

7. It is the duty of the authorised person to take prior permission of the State Pollution Control Board to close down the facility.

8. The imported hazardous and other wastes shall be fully insured for transit as well as for any accidental occurrence and its clean-up operation.

9. The record of consumption and fate of the imported hazardous and other wastes shall be maintained.

10. The hazardous and other waste which gets generated during recycling or reuse or recovery or pre-processing or utilisation of imported hazardous or other wastes shall be treated and disposed

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of as per specific conditions of authorisation.

11. The importer or exporter shall bear the cost of import or export and mitigation of damages if any.
12. An application for the renewal of an authorisation shall be made as laid down under these Rules.
13. Any other conditions for compliance as per the Guidelines issued by the Ministry of Environment, Forest and Climate Change or Central Pollution Control Board from time to time.

14. Annual return shall be filed by June 30th for the period ensuring 31st March of the year.

B. Specific Conditions

5 **That this authorization shall cease to be valid & shall be liable to be revoked without any further notice in case of refusal/expiry of consent to operate under the provisions of Water(Prevention and Control of Pollution) Act,1974 and Air(Prevention and Control of Pollution)Act,1981 by the State Board.**

6 **That no recycling/ re-processing of the hazardous waste covered under schedule IV shall be carried out without prior authorization from Rajasthan State Pollution Control Board as recycler/ re-processor of hazardous waste under the rule 6 of the Hazardous and Other Wastes (Management and Transboundary Movement)Rules, 2016.**

7 **That no hazardous waste shall be utilised for co-processing as a supplementary resource or for energy recovery or after processing without prior and valid approval of Central Pollution Control Board under the rule 9 of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.**

8 **That in case of any expansion or change in process or product or change in mode/ practice of disposal of hazardous waste or its quantity, fresh authorization shall be obtained.**

9 **That the arrangements for transportation of the hazardous waste for disposal shall be done by the authorized/ dedicated vehicles only and any environmental damages during Transportation shall be borne by sender/ receiver whoever arranges the transportation.**

10 The authorization is subject to the conditions stated at Annexure "A" enclosed with the authorization letter and the such conditions as may be specified in the Rules for the time being forced under the Environmental (Protection) Act, 1986.

RAJASTHAN STATE POLLUTION CONTROL BOARD
4, Institutional Area, Jhalana Doongari, Jaipur-302 004
Phone: 0141-5159600,5159695Fax: 0141-5159697

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File No: F(HSW)/Udaipur(Girwa)/7034(1)/2022-2023/7463-7465 **Date:-** 17/03/2023

Unit Id : 589

11 The unit has to display and maintain the data online outside the factory main gate in Hindi & English both on a 6'X 4' display board in the manner & format prescribed at Annexure "B" and the report of the Compliance along with photograph shall be submitted to this office & Regional Office, time to time.

12 That the annual reports/returns in the form prescribed under the Rules shall be submitted to the Board by 30th June of every year and records of hazardous waste Generation, handling & management shall be maintained according to the provisions of the Hazardous Waste (Management and Transboundary Movement) Rules, 2016 and shown & submitted to the Board as and when asked for.

13 The hazardous waste should not be stored for a period beyond 90 days, failing which the authorization shall deemed to be revoked.

14 It shall be ensured that the Hazardous waste is handled, managed & disposed of strictly in accordance with the Hazardous and Other Waste (Management and Transboundary Movement) Rules, 2016. Non compliance of the Rules or any of the conditions contained in the authorization shall be tantamount to automatic cancellation/revocation of the authorization.

15 The operator of the facility shall liable to comply any other conditions as per the guidelines isssued by the MoEF or CPCB or State Board related to collection, disposal, reception, storage & treatment of hazardous waste.

16 **That this Authorization is being issued under the provisions of Hazardous and Other Waste (Management and Transboundary Movement) Rules, 2016 from the environmental angle only, and does not absolve the project proponent from the other statutory obligations prescribed under any other law or any other instrument in force. The sole and complete responsibility, to comply with conditions laid down in all other rules for the time-being in force,rests with the industry/unit/project proponent.**

17 That this Authorization shall not, in any way, adversely affect or jeopardize the legal proceeding, if any, instituted in the past or that could be instituted againt you by the State Board for violation of the provisions of the Act or the Rules made thereunder.

RAJASTHAN STATE POLLUTION CONTROL BOARD
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File No: **F(HSW)/Udaipur(Girwa)/7034(1)/2022-2023/7463-7465** **Date:-** 17/03/2023

Unit Id : 589

This bears the approval of the competent authority.

Yours sincerely,

Group Incharge

Copy To:-

1 Regional Officer, Regional Office, Rajasthan State Pollution Control BoardUdaipur to ensure the compliance

2 Master File

Group Incharge

RAJASTHAN STATE POLLUTION CONTROL BOARD

F / 470, Madri Ind. Area, Udaipur

Phone: 0294-2491269

Registered

F(BMW)/Udaipur(Girwa)/7008(1)/2021-2022/1344-1345 **Date: 21/01/2022**

Unit Id : 116609

FORM IV

(SEE Rule 10 of BMW Rules, 2016)

(Authorization for operating a facility for Disposal, Generation, Storage of Biomedical Wastes)

1 Authorization Letter No. BMW/2021-2022/Udaipur/BMW/64.

2 **Mr. Leeladhar Patidar, SUB Director of Central Hospital, HZL, Debari is hereby granted an authorization under Rule 10 of Bio-Medical Waste (Management & Handling) Rules, 2016 (BMW Rules,2016) to operate a facility for Disposal, Generation, Storage of biomedical waste on the premisses situated at Zinc Smelter Debari, Hindustan Zinc Limited, Udaipur, Tehsil Girwa, District Udaipur.**

3 This authorization shall be in force for a period from 01/05/2022 to 30/04/2027 .

4 This authorization is valid for operation of the Hospital with 16 (sixteen) number of beds.

5 This authorization is subject to the conditions contained in enclosed annexure and to such other conditions/guidlines as may be specified under BMW Rules, 2016 by Central Pollution Control Board, Delhi or Ministry of Environment & Forests(MoEF), Government of India (GOI) or Department of Environment (DOE), Government of Rajasthan (GOR).

6 Segregation, packing, transportation, storage, treatment & disposal of bio medical waste shall be in accordance with Rule 7 & 8 of BMW Rules, 2016. The bio medical waste shall be disposed of at Common Biomedical Waste Treatment & Disposal Facility (CBMWTDF) established for the area viz Envision, Umrada, Udaipur, Rajasthan.

7 The mercury bearing waste arising due to breakage of thermometers,pressure gauges and other instruments is not to be treated as bio-medical waste or other solid waste.The mercury bearing waste is to be segregated, collected , stored and disposed in accordance with the provisions of Hazardous Waste and other wastes
(Management and Transboundary Movement) Rules, 2016.

8 The Annual report in accordance with Rule 13 for the period 1st January to 31st December of previous year shall be submitted On or before 30th June of every year in form - IV as prescribed in the Rules and the annual report shall also be made available on the web-site of the occupier. Further, all the health care facilities shall develop their website within two years from the date of notification of the BMW Rules,2016, in case not already developed.

RAJASTHAN STATE POLLUTION CONTROL BOARD

F / 470, Madri Ind. Area, Udaipur

Phone: 0294-2491269

Registered

F(BMW)/Udaipur(Girwa)/7008(1)/2021-2022/1344-1345 **Date: 21/01/2022**

Unit Id : 116609

9 The hospital shall maintain the record of biomedical waste as per Rule 14 & shall be produced during the inspection.

10 That the hospital shall phase out use of chlorinated plastic bags, gloves and blood bags within two years from the date of notification of the BMW Rules, 2016.

11 That the hospital shall establish a Bar-Code System for bags or containers containing bio-medical waste to be sent out of the premises or place for any purpose within one years from the date of the notification of the BMW Rules, 2016.

12 That the hospital shall provide training to all its health care workers and others, involved in handing of bio-medical waste at the time of induction and thereafter at least once every year and the details of training programs conducted, number of personnel trained and number of personnel not undergone any training shall be provided in the Annual Report.

13 The application for renewal of authorization shall be submitted online in prescribed form along with requisite fee, affidavit, assessment format, annual report & copy of valid agreement with CBMWTDF at least 120 days before the date of expiry of this authorization.

14 In case of expansion in bed capacity or increase in pollution load, the hospital shall obtain prior Consent to Establish under Water (Prevention and Control of Pollution)Act, 1974, Air (Prevention and Control of Pollution) Act, 1981 & revised Authorization under BMW Rules, 2016.

15 That the hospital shall comply the provisions of Bio-medical Waste Management Rules, 2016.

16 That the hospital shall comply with the standards for treatment disposal of Boi-medical Waste as specified under schedule II of Boi-medical Waste Management Rules, 2016.

17 That infected hospital liquied waste must be given chemical treatment by using at least 10% hypochlorite solution or any other equivalent chemical reagent to ensure required disinfection as prescribed in part-2 of schedule-I of the Rules.

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F / 470, Madri Ind. Area, Udaipur
Phone: 0294-2491269

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F(BMW)/Udaipur(Girwa)/7008(1)/2021-2022/1344-1345 **Date: 21/01/2022**

Unit Id : 116609

18 **It may be clarified that if hospital activities are carried on without valid authorization of the Board, it would be treated as violation of the provisions of Environment Protection Act-1986.**

19 **That the hospital shall submit the copy of valid agreement with CBMWTDF(i.e. En-Vision Enviro Engineers Pvt. ltd)before expiry of present agreement, failing which this Authorization shall be treated as cancelled.**

20 **That the unit shall install STP (sewerage treatment plant) for treatment of domestic waste water generated from hospital utilities if required.**

21 That the hospital shall maintain record of collection, storage and transportation of bio-medical waste to Common Bio-Medical Waste Treatment and Disposal Facility (CBWTDF) for disposal. The quarterly abstract related to the collection, storage, transportation and disposal shall be submitted to the H.O. and Regional Office in the format given below:

Sr. No.	Month & Year	Disposal of bio-medical waste as per colour code (in Kg.)				Number of collection trips by CBMWTDF
		Yellow	Red	Blue / White	Black	

22 This Authorization is issued from the environmental angle only, and does not absolve the project proponent from the other statutory obligations prescribed under any other law or any other instrument in force. The sole and complete responsibility, to comply with the conditions laid down in all other laws for the time being in force, rests with the hospital/ unit / project proponent.

23 This Authorization shall not, in any way, adversely affect or jeopardize the legal proceedings, if any, instituted in the past or that could be instituted against you by the State Board for violation of the provisions of the Act or the Rules made there under.

RAJASTHAN STATE POLLUTION CONTROL BOARD

F / 470, Madri Ind. Area, Udaipur

Phone: 0294-2491269

Registered

F(BMW)/Udaipur(Girwa)/7008(1)/2021-2022/1344-1345 **Date: 21/01/2022**

Unit Id : 116609

Enclose :- Annexure

Yours Sincerely

Regional Officer

Copy To:-

1 Master File

Regional Officer

To :

M/s Central Hospital, HZL, Debari

Zinc Smelter Debari, Hindustan Zinc Limited , Udaipur Tehsil:Girwa District:Udaipur

कार्यालय उप वन संरक्षक, उदयपुर (उत्तर)

राजकीय मुद्रणालय के पास, गुलाब बाग रोड़, उदयपुर–31कानोड1
email: dcf.udprn.forest@rajasthan.gov.in Tel. no. & Fax no. 0294-2421962

क्रमांकः एफ( )सर्वे/उवसं–उत्तर/2022–23/986 दिनांकः 23/03/2022

Hindustan Zinc Limited,
Zinc Smelter, Debari,
Dist. Udaipur. 313024.

विषयः– Request for providing list of Flora and Fauna within 10 km. radius of Zinc Smelter Debari, th. Girwa, Dist. Udaipur, Rajasthan.

प्रसंगः– आपके कम में आपके पत्र 09 दिनांक 06.02.2023 के कम में।

महोदय,

उपरोक्त विषयान्तर्गत प्रासंगिक पत्र के कम में लेख है कि आप कार्यालय के द्वारा हिन्दुस्तान जिंक स्मेल्टर कि 10 कि.मी. परिधि में आने वाले फ्लोरा एवं फाउना की सुचना चाही गई है।

जिस कम में आवेदित हिन्दुस्तान जिंक स्मेल्टर का क्षेत्रीय वन अधिकारी उदयपुर पुर्व द्वारा वनपाल नाका देबारी से प्राप्त रिपोर्ट में 10 कि.मी. परिधि में आने वाले फ्लोरा एवं फाउना की सुचना आवश्यक कार्यवाही हेतु संलग्न है।

भवदीय,

(सुयोग शशी)
उप वन संरक्षक,
उदयपुर (उत्तर)

क्रमांकः एफ( )सर्वे/उवसं–उत्तर/2022–23/ दिनांकः
प्रतिलिपिः क्षैत्रीय वन अधिकारी, उदयपुर पुर्व को को सूचनार्थ प्रेषित है।

उप वन संरक्षक,
उदयपुर (उत्तर)

हिन्दुस्तान जिंक स्मेल्टर कि 10 कि.मी. परिधि में आने वाले फ्लोरा एवं फाउना की सुची

फ्लोरा एवं फाउना की सुची

(अ) वृक्ष(Trees)			
कोड संख्या	अर्न्तराष्ट्रीय (लेटीन) नाम	स्थानीय नाम	कुल
2	*Acacia catechu* (L.f) willd.	खैर ,खेड़ा	*Mimosaceae*
4	*Acacia leucophloea* (Roxb.) Willd.	रौंझ ,अरलेंझिया	*Mimosaceae*
5	*Acacia nilotica* (Linn.) Willd.	बोलिला ,बबूल	*Mimosaceae*
8	*Acacia senegal* (Linn.) Willd.	कुमठा	*Mimosaceae*
9	*Ailanthus excelsa* Roxb.	अरडू, पाबा	*Simarubaceae*
15	*Anogeissus latifolia* (Roxb.ex DC.) Wall.	धावडा	*Combretaceae*
18	*Azadirachta indica* A.Juss	नीम	*Meliaceae*
20	*Bauhinia variegata* Linn.	कचनार	*Caesalpiniaceae*
21	*Bombax ceiba* Linn.	सेमल ,सेमला	*Bombacaceae*
22	*Boswellia serrata* Roxb.ex Coleb.	सालर	*Burseraceae*
24	*Butea monosperma* (Lamk.) Taub.	खाखरा ,पलास ,छीला , ढाक	*Fabaceae*
27	*Cassia fistula* Linn.	अमलतास ,बरडावन , करमेला	*Caesalpiniaceae*
49	*Ficus religiosa* Linn.	पीपल	*Moraceae*
56	*Holoptelea integrifolia* (Roxb.) Planch.	कणजी ,कंजडी ,बन्दरबाटी , चुरैल	*Ulmaceae*
61	*Lannea coromandelica* (Houtt.) Merrill	गोदल ,गुर्जन	*Anacardiaceae*
77	*Pongamia pinnata* (Linn.) Pierre	करंज ,कणजी	*Fabaceae*
97	*Wrightia tinctoria* (Roxb.) R.Br.	खिरनी , दूधी ,येरा,खन्नी	*Apocynanceae*

(आ) छोटे वृक्ष, क्षुप(Small trees,shrubs)			
कोड संख्या	अन्तर्राष्ट्रीय (लेटीन) नाम	स्थानीय नाम	कुल
7	*Caesalpinia bonduc* (L.) Roxb.	कटकरंज ,खरकोन्दा , कॉटाबेल	*Caesalpiniaceae*
20	*Dendrocalamus strictus* (Roxb.) Nees	बाँस	*Poaceae*

उपवन संरक्षक
उदयपुर (उ.प्र.)

(इ) छोटी झाड़िया एवं शाक(Under shurbs and Herbs)

कोड संख्या	अन्तर्राष्ट्रीय (लेटीन) नाम	स्थानीय नाम	कुल
7	*Aloe vera* (L.) Burm.f.	ग्वारपाठा	*Liliaceae*
24	*Datura ferox* Linn.	धतूरा	*Solanaceae*
54	*Ocimum gratissimum* Linn.	वन तुलसी	*Lamiaceae*
74	*Ziziphus nummularia* (Burm. f.) Wight & Arn.	चणबीर ,झाडी बैर	*Rhamnaceae*

(उ) घास (Grasses)

कोड संख्या	अन्तर्राष्ट्रीय (लेटीन) नाम	स्थानीय नाम	कुल
2	*Aristida adscensionis* Linn.	लांपला	*Poaceae*

वन्य जीवों की सूची

(क)–क्षैत्र में पाये जाने वाले वन्य जीवों सूची

कोड संख्या	स्थानिय नाम	अंग्रेजी नाम	*लेटिन नाम*
2	बघेरा,तेन्दुआ	Baghera	*Panthera pardus*
3	जंगली बिल्ली	Jungle cat	*Felis chaus*
5	नेवला	ruddy mongoose	*Herpestes smithi*
6	सियार	Jackal	*Canis aureus*
7	लोमड़ी	Indian fox	*Vulpes bengalensis*
8	जरख	Striped hyaena	*Hyaena hyaena*
13	नील गाय	Blue bull	*Boselaphus tragocamelus*
17	गिलहरी	five striped palm	*Funambulus pennant*
21	सेही	Indian porurpine	*Hystvix india*
22	खरगोस	Indian hare	*Lepus nigricollis*

उपवन संरक्षक
उदयपुर (उत्तर)

(ख)–क्षैत्र में पाये जाने वाले पक्षियों की सूची

कोड संख्या	हिन्दी स्थानीय नाम	कॉमन अग्रेंजी नाम	लेटिन नाम
30	मोर(नर),धेलडी(मादा)	Indian peafoul	*Pavo cristatus*
37	टिटहरी	Red-wattled lapwing	*Vanellus indicus*
54	तोता	Roseriyed parakeet	*Psittacula eupatoria*
58	कोयल	Koel	*Eudynam*

(ग) क्षैत्र में पाये जाने वाले सरीश्रृप (Reptiles) की सूची

कोड संख्या	हिन्दी नाम	कॉमन अग्रेंजी नाम	लेटिन नाम
8	गिरगिट	Common garden lizard	*Calotes versicolor*
19	चित्ती	Russell's viper	*Vipera rapelli*

उपवन संरक्षक
उदयपुर (उत्तर)

कार्यालय उप वन संरक्षक, उदयपुर (उत्तर)

क्रमांक–प. ( ) सर्वे / उवस / उत्तर / 4680 दिनांक : 14.07.2014

निमित्

माईन्स मैनेजर,
हिन्दूस्तान जिंक लिमिटेड,
देबारी, उदयपुर।

विषय :– **Issue of certificate regarding National Parks, Wild Life Sanctuaries within 10 Km of the Debari Zinc Smelter, at Debari, Distt. Udaipur (Raj.)**

प्रसंग:– आपका प्रार्थना पत्र कमांक निल **HZL/DZS /env/2014/** दिनांक 07.07.2014

महोदय,

उपरोक्त विषयान्तर्गत प्रासंगिक प्रार्थना पत्र से आप द्वारा पर्यावरण स्वीकृति हेतु हिन्दुस्तान जिंकस्मेल्टर, देबारी के 10 कि.मी सीमा में नेशनल पार्क एवं वाईल्ड लाईफ सेन्चुरी विधमान है या नहीं है के सम्बन्ध में प्रमाण पत्र चाहा गया है। आप द्वारा प्रस्तुत नक्शे का अभिलेख से सत्यापन करवाया गया।

यहां यह स्पष्ट किया जाकर प्रमाणित किया जाता है कि हिन्दुस्तान जिंकस्मेल्टर, देबारी के 10 कि.मी परिधी में कोई भी नेशनल पार्क एवं वाईल्ड लाईफ सेन्चुरी विधमान नहीं है।

भवदीय,

(ओम प्रकाश शर्मा)
उप वन संरक्षक,
उदयपुर (उत्तर)

कार्यालय उप वन संरक्षक, वन्यजीव उदयपुर

बडी रोड देवाली, पोस्ट बॉक्स न. 161, फोन 0294–2453686
Email ID -dcfwl.udpr.forest@rajasthan.gov.in

क्रमांक: एफ 9( ) सर्वे/उवसं/वजी/2022–23/ 1635 दिनांक: 01/03/2023

निमित्त

एस.बी.यू. निदेशक,
जिंक स्मेल्टर देबारी,
उदयपुर

विषय: राष्ट्रीय उद्यान/वन्यजीव अभयारण्य की सीमा से 10 किमी. परिधि से बाहर होने या नही होने के आशय का प्रमाण पत्र के संबंध में।

संदर्भ: आपका पत्रांक: 08 दिनांक 06.02.2023 एवं सहायक वन संरक्षक, वन्यजीव सज्जनगढ का पत्रांक 28 दिनांक 14.02.2023 एवं सहायक वन संरक्षक, वन्यजीव जयसमन्द का पत्रांक 21 दिनांक 14.02.2023 के क्रम में।

महोदय

उपरोक्त विषयान्तर्गत प्रासंगिक पत्र के क्रम में लेख है कि एस.बी.यू. निदेशक, जिंक स्मेल्टर देबारी, अपनी युनिट देबारी जिंक स्मेल्टर, निकट ग्राम देबारी, तहसील गिर्वा, जिला उदयपुर के संबंध मे राष्ट्रीय उद्यान/वन्यजीव अभयारण्य की सीमा से 10 किमी की परिधि मे होने या नही होने का आशय प्रमाण पत्र चाहा गया है। जिसके क्रम मे सहायक वन संरक्षक, वन्यजीव सज्जनगढ एवं जयसमन्द के द्वारा उक्त आवेदित क्षेत्र के जी.पी.एस. लिंकिंग की जांच कर इस कार्यालय को अवगत कराया गया कि उक्त आवेदित क्षेत्र इस वनमण्डल के अभयारण्यों की सीमा से निम्नानुसार है:–

क्र.सं.	विषय	सूचना		
1.	आवेदित क्षेत्र के सीमा स्तम्भों का विवरण	Pillar No.	Latitude	Longitude
		1	24 36 23.631	73 48 33.975
		2	24 36 25.834	73 48 52.931
		3	24 36 30.832	73 49 18.559
		4	24 36 18.957	73 49 21.852
		5	24 36 07.659	73 49 26.754
		6	24 35 44.779	73 49 27.644
		7	24 35 30.895	73 49 37.690
		8	24 35 39.133	73 49 19.129
		9	24 35 32.140	73 49 06.954
		10	24 36 01.946	73 48 43.198
		11	24 36 17.342	73 48 30.063
2.	सज्जनगढ वन्यजीव अभयारण्य की सीमा से दूरी	16.420 किलोमीटर		
3.	सज्जनगढ वन्यजीव अभयारण्य के ईको सेन्सिटिव जोन की सीमा से दूरी	13.706 किलोमीटर		
4.	जयसमन्द वन्यजीव अभयारण्य की सीमा से दूरी	30.420 किलोमीटर		
5.	जयसमन्द वन्यजीव अभयारण्य के ईको सेन्सिटिव जोन की सीमा से दूरी	23.519 किलोमीटर		
6.	फुलवाडी की नाल, वन्यजीव अभयारण्य की सीमा से दूरी।	53.850 किलोमीटर		
7.	फुलवाडी की नाल, वन्यजीव अभयारण्य के ईको सेन्सिटिव जोन की सीमा से दूरी।	43.860 किलोमीटर		

नोट : फुलवाडी की नाल, वन्यजीव अभयारण्य एवं इनके ईको सेन्सिटिव जोन की दूरी अधिसूचित सीमा के अनुसार है।

भवदीय

(अजय चितौडा)
उप वन संरक्षक,
वन्यजीव, उदयपुर

क्रमांक: एफ 9( )सर्वे/उवसं/वजी/उदय/2022–23/ दिनांक:
प्रतिलिपि निम्नांकित को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित है:–
1. प्रधान मुख्य वन संरक्षक एवं मुख्य वन्यजीव प्रतिपालक, राजस्थान, जयपुर
2. मुख्य वन संरक्षक, वन्यजीव उदयपुर

(अजय चितौडा)
उप वन संरक्षक,
वन्यजीव, उदयपुर

Annexure 7(c)(i)

vedanta

HINDUSTAN ZINC
Zinc & Silver of India

HZL/ZSD /ENV/EXP/2022-2023/11

30.03.2023

To
Deputy Conservator of Forest
Forest Division-Udaipur (North)
Udaipur.

Subject: Approval of Schedule-1 Species/Wildlife Conservation Plan (WLCP)of Zinc Smelter Debari Area.

Dear Sir,

With reference to above mentioned subject, we would like to inform you that, Hindustan Zinc Ltd. is operating the existing unit of Debari Zinc Smelter since 1968 at Near Village Debari Tehsil – Girwa, District-Udaipur in the State of Rajasthan.

We are in process of submitting online application to MoEF & CC for our proposed expansion of zinc metal production from 100,000MT to 1,40,000 MT in 2 phases under clause 7(ii) of EIA notification 2006 and subsequent amendment thereunder.

Hence, as per the MoEF&CC guidelines and Standard operating procedure for WLCP issued by Chief Wildlife Warden Rajasthan. we are submitting Schedule-1 Species/Wildlife Conservation Plan for area of Zinc Smelter Debari.

Here you are requested that, kindly find enclosed copy of conservation plan and do the needful for further approval.

Thanking you,

Yours faithfully,

Manas Tyagi,
SBU Director -Zinc Smelter Debari

प्राप्त- लिपिक – Deepi/ex 31/03/2023
कार्यालय उप वन संरक्षक
उदयपुर (उत्तर), पीन–313001
फोन नम्बर – 0294–2421962

Enclosed:
1. Schedule-1 Species/Wild Life Conservation Plan

500

vedanta
transforming for good

HINDUSTAN ZINC
Zinc & Silver of India

HZL/ZSD /ENV/EXP/2024-2025/03 30.07.2024

To
Deputy Conservator of Forest
Forest Division-Udaipur (North)
Udaipur.

Subject: Approval of Schedule-1 Species/Wildlife Conservation Plan (WLCP)of Zinc Smelter Debari Area.

Dear Sir,

With reference to above mentioned subject, we would like to inform you that, Hindustan Zinc Ltd. is operating the existing unit of Debari Zinc Smelter since 1968 at Near Village Debari Tehsil – Girwa, District-Udaipur in the State of Rajasthan.

We are in process of submitting online application to MoEF & CC for our proposed expansion of zinc metal production from 100,000MT to 1,40,000 MT in 2 phases under clause 7(ii) of EIA notification 2006 and subsequent amendment thereunder.

Hence, as per the MoEF & CC guidelines and Standard operating procedure for WLCP issued by Chief Wildlife Warden (CWLW) Rajasthan vide F. No. ( ) WCP / CWLW / 2019 / 6451-6463 dated 24.05.2019.We are submitting here revised Schedule-1 Species/Wildlife Conservation Plan for area of Zinc Smelter Debari.

Here you are requested that, kindly find enclosed copy of revised conservation plan and do the needful for further approval.

Thanking you,

Yours faithfully,

Manas Tyagi,
SBU Director -Zinc Smelter Debari

Enclosed:
1. Schedule-1 Species/Wildlife Conservation Plan (3 copies)

प्रथम लिपिक – 30/7/2024
कार्यालय उप वन संरक्षक
उदयपुर (उत्तर), पीन–313001
फोन नम्बर – 0294–2421962

WILDLIFE CONSERVATION PLAN
For
DEBARI ZINC SMELTER, HINDUSTAN ZINC LTD.
FINAL REPORT

Terracon Ecotech Pvt. Ltd.
J18, First floor, M. R. Colony, STY Relief Rd,
Santacruz West, Mumbai, Maharashtra 400054.
www.terraconindia.com

HINDUSTAN ZINC
Zinc & Silver of India

WILDLIFE CONSERVATION PLAN

Hindustan Zinc Ltd. (HZL)

Debari Zinc Smelter

Location: Village - Debari,
Tehsil - Girwa, District - Udaipur (Rajasthan).

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	CHAPTER – I	**17 – 50**
1.	Brief note about the project and its utility	17
2.	Provision of all relevant acts and regulations applicable to WCP area	21
3.	Villages and habitation within WCP area; demographic and occupational profile; cropping pattern; impact on the WCP area and especially on the forest growth; information about cattle populations and dependency on the forest for grazing; other forest dependents; etc.	22
4.	Description of topography, geology, climate natural disaster natural drainage lines water bodies and whether the landscape in the source or origin of any stream/river.	30
5.	Details of linear infrastructure such as roads, rail lines, water ways and canal; other developmental structure in the WCP area adversely affecting the movement of megafauna in the area and possible ameliorative measures. Details of the water reservoirs, vertical mining pits and unguarded dug wells in the WCP area should also be mentioned with possible safeguard available and proposed.	32
6.	Description of flora and fauna of the WCP area showing the details or endemic, threatened and scheduled species.	34
7.	Description of forest and habitat condition, wildlife scenario of the WCP (Population estimation result if any)	36
8.	Movement of wildlife in the WCP area for last 3 completed financial years and for the current year	38
9.	Man-animal conflict and depredation caused by the wild animal in the WCP area (Date on animal kill/injury, cattle kill and crop damage in WCP area and the date on animal kill due to various reasons will also be analysed and mentioned). Also, the extent of human-wild implementation should be assessed and recorded.	38
10.	Other Industries within the study area	38
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* * * * * * *

Annexure – I

1.	**Name of Project proponent**	:	Hindustan Zinc Limited (HZL)
2.	**Name of Project**	:	Debari Zinc Smelter established in 1968 by M/s Hindustan Zinc Limited (HZL) at Village: Debari, Tehsil: Girwa, District: Udaipur (Rajasthan) in project area of 184.2 ha. HZL is an India-based company, which is engaged in the mining and smelting of Zinc, Lead and Silver metal and Wind energy in India. The Company's operations include five Zinc-Lead mines, over four Zinc Smelters, a Lead Smelter, a Zinc-Lead Smelter, a silver refinery plant and over six captive power plants in the state of Rajasthan.
3.	**Activities to be undertaken in project (in brief)**	:	• Proposed Expansion of Zinc Smelter (1,00,000 TPA to 1,40,000 TPA) within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time. This expansion will be carried out in 2 phases, in 1st phase the capacity expansion will be done up to 1,20,000TPA (20%) along with Roaster installation and in the 2nd Phase, capacity will be further increased up to 1,40,000TPA (40%).by Modernization of process by installation of new state of art with latest technology equipment's to improve efficiency. Recovery, reduction in power consumption & GHG emission as well as elimination of manual activities. • Following activities are planned in Debari Smelter Unit: Increasing existing capacity from 1,00,000 MTPA to 1,20,000 MTPA in Phase-I and then 1,20,000 MTPA to 1,40,000 MTPA in Phase II by: • Expansion in melting capacity section of existing melting of 10.5 TPH by adding 1 induction furnace and 1 slab casting line (24TPH). • Installation of New Jumbo Cellhouse equipped with Crane for improvement in Current efficiency from existing 84% to 87% and then to 92% there by reduction of power consumption • Installation of Automatic cathode stripping machine. • Installation of Anode flattening Machine • Installation of New Leaching and Purification equipped with Automatic filter press. • Present small cells (576 No's) will be replaced by Jumbo cells (80 Nos') • Replacement of existing rectifiers from 58 MVA to 80 MVA capacity, • Installation of Cooling tower for Rectifier heat exchanger • Installation of new Acid Leaching section having higher capacity reactors of 200 m3 and thickeners having diameter of 21 meter. Installation of new Roaster of capacity 3,00,000TPA calcine is

			proposed to be installed along with Sulphuric acid plant capacity of 2,89,000 TPA to treat the SO2 laden off gases from proposed roaster. • Installation of additional 5 nos. of reactor and 2 thickeners in leaching section equipped with calcine dosing system and bag filter to control fugitive dust emission. • Installation of tail gas treatment plant. • For Environment expects separate Ventilation system Bag filters are provided for furnace and work zone and stack has been provided. • Provision of dust control system/ bag filters has been provided at material transfer points. • Installation of additional ETP & RO-ZLD of 2000KLD capacity.
4.	**Cost of project**	:	Project Cost: Rs. 2500 Crores
5.	**Location of project(district, tehsil, revenue village etc. with geo-coordinates)**	:	The Debari Zinc Smelter is situated at Debari Village in Girwa Tehsil of Udaipur District in Rajasthan. The project area falls at the following Geo-coordinates: **Corner Coordinate** S.No. Latitude Longitude S.No. Latitude Longitude 1 24°36'30.87"N 73°49'18.71"E 15 24°35'42.56"N 73°49'18.27"E 2 24°36'27.07"N 73°49'19.58"E 16 24°35'43.37"N 73°49'17.71"E 3 24°36'19.09"N 73°49'22.03"E 17 24°35'50.15"N 73°49'11.18"E 4 24°36'17.02"N 73°49'22.14"E 18 24°35'53.00"N 73°49'6.23"E 5 24°36'11.30"N 73°49'24.12"E 19 24°36'6.13"N 73°48'54.14"E 6 24°36'7.70"N 73°49'26.94"E 20 24°36'20.77"N 73°48'42.39"E 7 24°35'53.05"N 73°49'28.80"E 21 24°36'20.25"N 73°48'34.45"E 8 24°35'50.81"N 73°49'29.82"E 22 24°36'23.85"N 73°48'34.38"E 9 24°35'46.47"N 73°49'29.49"E 23 24°36'28.26"N 73°48'51.07"E 10 24°35'39.28"N 73°49'34.59"E 24 24°36'28.22"N 73°48'58.39"E 11 24°35'37.36"N 73°49'34.96"E 25 24°36'31.71"N 73°49'3.35"E 12 24°35'33.74"N 73°49'36.03"E 26 24°36'31.36"N 73°49'5.91"E 13 24°35'30.90"N 73°49'37.68"E 27 24°36'31.53"N 73°49'10.22"E 14 24°35'31.84"N 73°49'27.25"E 28 24°36'32.40"N 73°49'13.74"E **Corner Coordinate** S.No. Latitude Longitude S.No. Latitude Longitude 1 24°36'17.50"N 73°48'30.31"E 7 24°35'39.33"N 73°49'19.49"E 2 24°36'19.55"N 73°48'33.23"E 8 24°35'32.25"N 73°49'7.07"E 3 24°36'19.93"N 73°48'42.19"E 9 24°36'2.04"N 73°48'43.36"E 4 24°36'0.10"N 73°48'58.30"E 10 24°36'4.31"N 73°48'41.35"E 5 24°35'59.67"N 73°48'58.84"E 11 24°36'10.84"N 73°48'35.18"E 6 24°35'49.03"N 73°49'11.23"E 12 24°36'11.87"N 73°48'32.28"E
6.	**Area of project (in ha) & 10 km buffer area (in ha)**	:	**Project area:** 184.2 ha. **10 km Buffer area:** 37,649.00 ha
7.	**Names of ecologically**	:	22 reserve forests in the buffer area –

	sensitive areas near the project location (see point 2a of instruction)		Panwari, Kantia, Kamlodia, Bara Magra, Bhainsra, Segria, Hinglashia, Bordi, Dhenkli, Gugla, Umra, Bagdara, Santu, Nahar Magra, Amberi, Amarbir, Nauva, Hora, Chirwa ki Ghati, RF (~1.0 km in ENE direction from plant site), RF (~2.0 km in South direction from Plant site), & Kherad these all are RFs present in the WCP area. No other Wildlife Sanctuary, National Park, and migratory routes of fauna within WCP area. **No Objection Certificate (NOC) issued by DCF Udaipur (North) vide letter एफ 9( )सर्वे / उवसं / बजी / 2022-23 / 1635 dated 01.03.2023.**
8.	**Name of Schedule – I species for which Wildlife Conservation Plan (WCP) is made**	:	**Wildlife Conservation Plan is prepared based on the authenticated list of Flora-Fauna (within 10 km study area of the proposed project) issued by DCF Udaipur (North), Rajasthan vide letter एफ( )सर्वे / उवसं - उत्तर / 2022-23 / 936 dated 23.03.2023.** **There are no Schedule – I species within the Debari Zinc Smelter area (core zone), however name of schedule – I species found in buffer zone (10 km from project boundary) are listed as follows:**

S.N.	Common Name	Scientific Name	Family	Status (WPA - 2022)
1.	Leopard	*Panthera pardus*	Felidae	Sch – I
2.	Indian Fox	*Vulpes bengalensis*	Canidae	Sch – I
3.	Golden Jackal	*Canis aureus*	Canidae	Sch – I
4.	Jungle Cat	*Felis chaus*	Felidae	Sch – I
5.	Ruddy Mongoose	*Herpestes smithii*	Herpestidae	Sch – I
6.	Striped Hyena	*Hyaena hyaena*	Hyaenidae	Sch – I
7.	Indian Crested Porcupine	*Hystrix indica*	Hystricidae	Sch – I
8.	Russell's Viper	*Daboia russelii*	Viperidae	Sch – I
9.	Indian Peafowl	*Pavo cristatus*	Phasianidae	Sch – I

9.	**Financial Outlay of WCP as per (see point no. 4 of instructions)**	:	As per the instruction of Wildlife Conservation Plan issued by Addl. PCCF & CWLW, Jaipur vide F. No. ( ) WCP / CWLW / 2019 / 6451-6463 dated 24.05.2019, financial outlay calculation hereunder:
	a) Formula 1		**1% of Project Cost** Project Cost: 2500 Crore 1% of Project cost is **Rs. 25 Crore**

<table>
<tr><td></td><td>b) Formula 2</td><td></td><td>Rs. 0.50 Lacs per ha. of core area + Rs. 5 Lacs (lumpsum) for each Schedule – I species
<table>
<tr><th>S. N.</th><th>Particular</th><th>Details</th><th>Amount (in Crore)</th></tr>
<tr><td>1.</td><td>Rs. 0.50 Lacs per ha. of project area</td><td>184.2ha.</td><td>0.605</td></tr>
<tr><td rowspan="9">2.</td><td rowspan="9">Rs. 5 Lacs (lumpsum) for the buffer area for each schedule – I species</td><td></td><td>0.05</td></tr>
<tr><td>Indian Fox</td><td>0.05</td></tr>
<tr><td>Golden Jackal</td><td>0.05</td></tr>
<tr><td>Jungle Cat</td><td>0.05</td></tr>
<tr><td>Ruddy Mongoose</td><td>0.05</td></tr>
<tr><td>Indian Crested Porcupine</td><td>0.05</td></tr>
<tr><td>Striped Hyena</td><td>0.05</td></tr>
<tr><td>Russell's Viper</td><td>0.05</td></tr>
<tr><td>Indian Peafowl</td><td>0.05</td></tr>
<tr><td colspan="3">Total</td><td>1.055Crore</td></tr>
</table></td></tr>
<tr><td></td><td>c) Final outlay (Maximum of Formula 1 & 2)</td><td></td><td>Financial Outlay – Formula 1:
Total Amount: Rs. 25.00 Crore</td></tr>
<tr><td>10.</td><td>Names of neighbouring concerned forest divisions (from where recommendation / authentication may be required for this project)</td><td>:</td><td>DCF, Udaipur Forest Department (North), Rajasthan</td></tr>
<tr><td>11.</td><td>Request, if any, for seeking reduction in outlay of WCP with grounds</td><td>:</td><td>-</td></tr>
<tr><td>12</td><td>Name of Implementing Agency for the WCP</td><td>:</td><td>DCF, Udaipur Forest Department (North), Rajasthan</td></tr>
</table>

13.	**Date of inspection of site & name of forest officer who has inspected it**	:	-	
14.	**Checklist of attachments**	:	**Reply**	**Reference**
	Map authenticated by DCF		Attached for authentication	Attached as Section 7.4 in Chapter 7
	List of flora & fauna authenticated by DCF		Yes	1. Vide letter एफ( )सर्वे / उवसं - उत्तर / 2022-23 / 936 dated 23.03.2023 **Appendix – II**
	Wildlife Conservation Plan as per format authenticated by DCF		Yes	As per the format of Wildlife Conservation Plan issued by Addl. PCCF & CWLW, Jaipur vide F. No. ( ) WCP / CWLW / 2019 / 6451-6463 dated 24.05.2019, Wildlife Conservation Plan (WCP) has been prepared.

Annexure – II

Executive Summary

Introduction

This Wildlife Conservation Plan has been prepared as an integral part of Environmental Impact Assessment (EIA) study for the "Proposed Expansion of Zinc Smelter (1,00,000 TPA to 1,40,000 TPA) within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time at Debari Village of Girwa Tehsil in Udaipur District (Rajasthan)" by M/s. Hindustan Zinc Limited.

This expansion will be carried out in 2 phases, in 1st phase the capacity expansion will be done up to 1,20,000TPA and in the 2nd Phase, capacity will be further increased up to 1,40,000TPA. This can be classified as Category "A", Project or Activity 3(a) – Metallurgical Industries (ferrous & non–ferrous), which required environment Clearances (EC) from MoEFCC, New Delhi.

The main purpose of this Wildlife Conservation Plan is to manage and conserve the wildlife within the existing Debari Zinc Smelter complex and the buffer area of 10 km identified around the project area (core area). Wildlife management is a science and art of maintaining/ changing the characteristics and interaction of habitat, wild animal population and activities of people in order to achieve specific goals of conservation. The Wildlife Science is of recent origin in India and scientific information base is developing slowly. Wildlife management in India is integral to mainstream forest management, yet, as a resource needing scientific management. Management of wildlife is essentially multidisciplinary, and the success of strategies lies in ensuring Multidisciplinary inputs to the extent needed.

Wildlife conservation aims to prevent the loss of the earth's by taking into consideration ecological principles such as carrying capacity, disturbance, succession, and environmental conditions such as physiological geography, pedology, and hydrology with the aim of balancing the needs of wildlife with the needs of people.

Location

The plant site is located in Debari village of Girwa tehsil in the Udaipur district of Rajasthan state.
The site is approachable from by nearest city is Udaipur (~16.8 km in WSW direction from plant site), Nearest railway stations are Debari RS (~1.5 km in NW direction from plant site), Rana Pratapnagar RS (~7.0 km in WSW direction from plant site) and Khemli RS (~9.5 in NNE direction from plant site), Nearest Highways are NH-27 (Adjacent to Plant Boundary in North direction from plant site), NH-48 (~2.5 km in West direction from plant site), SH-9 (~4.9 km in NNW direction from plant site) and SH-9 (~4.9 km in NNW direction from plant site), Nearest Airport is Maharana Pratap Airport – Udaipur (~5.8 km in East direction from plant site).

Requirement for Expansion of Project and their Process

S.N.	Requirements	Materials
1	Raw Material	Major raw material required for Zinc Smelter is Zinc concentrate, Calcine, High silver Lead and various additives Fuel etc.
2	Fuel Requirement	Fuel HSD/LDO/LP, Fuel LPG at Melting, & fuel HSD/LDO at MCTP
3	Other Basic Requirement	Water, Power, Steam, Manpower etc.

Process Description

The process description of the Zinc Smelter Complex includes the following units:

A. **Zinc Smelter**
   a. Roasting Plant
   b. Gas Cleaning
   c. Sulphuric Acid Plant
   d. Tail Gas Treatment Plant
   e. Leaching Plant
   f. Purification Plant
   g. Cell House
   h. Melting and Casting Plant
B. **Power Generation**
   a. WHRB
   b. Solar Power Plant
   c. DG Set
C. **Other associate Facilities**
   a. ETP
   b. STP
   c. RO-ZLD with MVR
   d. MCTP

Environmental profile of the project area (WCP area)

Land use / Land Cover

As per Satellite Imagery, in the WCP area the Built-up Land (including Human settlement, Industry, Mine quarry, Solar plant, Air Patti, Road & Railway) is 6.4%, Crop Land is about 39.47%, Water Body is 1.96% Forest & Plantation is 17.14%, Open scrub land is 17.38%, open land is 9.70% and stony waste land is 8.31%. There are no wildlife sanctuary, national park and migratory routes of fauna within study area.

Meteorology

Temperature ranged from 15.4°C to 40.4°C and the relative humidity recorded in the range of 5.62% to 52.69%. Climate represents sub-humid conditions. Predominant wind direction is South West with wind speeds ranging from 0.8 to 10.77 m/sec.

Soil quality

For the eight soil sample under consideration the pH ranges between 7.22 and 7.68 indicating soil is Neutral to slightly alkaline. Water holding capacity (41% to 50.37 %) and bulk density (1.29 to 1.43 g/cc) were ideal for the crops. Physical quality of soil samples is good for the plantation. All the major nutrients were present, namely organic matter (0.78% to 1.11%) optimum, nitrogen (160.25 to 333 kg/ha) better to sufficient, phosphorus (42.6 to 98.64 kg/ha) medium to more than sufficient and potassium (513.26 to 1491.02 kg/ha) more than sufficient. This indicates that soil fertility is good with nitrogen, phosphorus in average quantity in some soil samples in the WCP area.

Other nutrients were present in the soil samples, namely calcium (1943 to 3062 mg/kg), magnesium (315 to 614.5 mg/kg), zinc (19.54 to 51.2 mg/kg). SAR value was also calculated for the study and it was found in the range of 0.86 to 1.48.

The texture of the soil samples majorly consists of Sandy Clay to Sandy Clay loam which favours good drainage, fertility of the soil and it has ability to retain moisture and nutrients to the soil. The samples have an optimum content of organic matter which is suitable for the Plant growth. As observed the essential nutrients within the soil of the sampled villages, Nitrogen content was observed to be present in the better to sufficient quantity, whereas the values for phosphorus were found to be medium to more than sufficient & potassium is more than sufficient. The soil sample of the plant site shows a comparatively neutral to lightly alkaline pH in nature and consist majorly Sandy loam Salinity electrical conductivity is also found to be present average.

From the results, it can be concluded that the quality of the soil within the study area is suitable for plantation and greenbelt.

Water quality

The baseline water quality status in the region is established by analysing samples at 12 locations consisting of eight ground water samples and four surface water samples.

Surface water:

As per the CPCB standards, the water quality parameters DO and pH for all sampling sites are within permissible limit of Class A whose designed best use is "Drinking water source without conventional treatment but after disinfection" making it suitable for aquatic life; but due to the higher values of BOD the surface water quality is mildly polluted so it cannot be directly used or consumed as a source of drinking water. The same can be utilized after proper treatment.

Groundwater:

The groundwater that all the samples were observed to be within the permissible limits and complies to the drinking water standard (IS:10500-2012) except Village Debari and Village Lakadwas where Total Hardness are out of the prescribed limit.

Air quality

Eight ambient air quality monitoring stations were selected in and around project site. The minimum and maximum values of $PM_{2.5}$ and PM_{10} were observed in the range of 26.5 µg/m$_3$ to 51.3 µg/m$_3$ and 58.9 µg/m$_3$ to 88.1 µg/m$_3$ respectively. Ambient air quality analysis reveals that these results are well within limits in all locations as per National Ambient Air Quality standards. But it is expected, due to the proposed expansion project, there will be increase in

the pollutant concentration in the nearby villages, primarily in the villages falling in the downwind direction.

Noise Environment

The noise is mainly caused due to nearby anthropogenic activities and transportation. Noise pollution is the major problem in the urban areas but the small towns and the nearby villages all along the road side are also the victim of the noise problems.

The highest value of noise level as monitored in day time were observed at Plant Site due to plant activities and the minimum noise levels were observed at habitation between plant site and Panwari RF during day time and night time as there is less habitation and there is no other major source of noise pollution in proximity of this area.

As per analysis results, it can be concluded that noise levels in the WCP area are well within the prescribed limits as prescribed by the Noise Pollution (Regulation and Control) Rules, 2000.

Biological environment

According to authenticated list of the Udaipur Forest Department (North), the WCP have floral and faunal diversity of the terrestrial environment of the WCP area.

- 22 Reserve Forest lies within 10 km of the study area.
- As per list of Flora; no endemic species of flora have been observed. Total 24 species were reported out of which 17 trees, 2 shrubs, 4 herbs, and 1 species of grass have been recorded in the study area based on primary observation as well as based on information collected from the secondary data (F.D. data).
- Among fauna, 10 species of mammals, 4 species of birds, and 2 species of reptiles were recorded from the study area. No National Park, Sanctuary, Biosphere Reserve, Migratory Corridor of wild animals exists within 10 km radius of the project area. However, 22 Reserve Forest and 1 Protected Forest lies within 10 km of the study area.

Socio-economic environment

The WCP area (10-km radius) area has a total population of 577,495 according to 2011 census. Total male population is about 50.26 % and total female population is around 49.74%. The average literacy rate is 85.62% and working population in the WCP area is 204193 which is 35.36% of the total population.

Environmental impacts and mitigation measures

Discipline	Anticipated Impact	Mitigation Measures
Air	**Construction Phase:** Increase in dust (Particulate Matter) and NO_x concentration due to Leveling activity and Heavy vehicular movement.	• Water spraying on roads and construction site will prevent fugitive dust. • Extensive dust extraction network is provided. • Proper maintenance of vehicle and construction equipment will help in controlling the emissions.

Discipline	Anticipated Impact	Mitigation Measures
		• Construction equipment having PUC Certificate will be deployed during the activity to restrict exhaust emission. • Vehicles having construction materials will be covered with tarpaulin. • Proper training of the drivers so as to ensure adherence to speed limit. • A separate storage area will be demarcated for construction material to confine the dust dispersion. • Covered storage facilities will be provided. • Proper PPEs will be provided to workers to avoid accumulation of dust in respiratory tracts and prevent air borne diseases. • Proper greenbelt development and plantation inside and outside the plant premises.
	Operation Phase: The major air pollutants emitted from the DZS include PM, SO2, Acid Mist, NOx.	• Additional Tail Gas Treatment (TGT) is proposed to minimize SO2 emissions from 1.5 to 1.0 Kg /MT of Sulphuric Acid production in 2nd roaster and proposed roaster. • The PM emission will be reduced by replacement of existing bag filter bags with upgraded/ PTFE coated bags, which will bring down PM emission. • Extensive dust extraction network consisting of Venturi Scrubbers and Bag Filters are provided. • Gas wash tower and Thiessen Disintegrator are provided to capture Furnace Gas. • Continuous monitoring system for SO2. • Spraying of water is being continuously carried out at the various location viz., Belt conveyors, etc., to suppress the dust particles. • Ventilation system followed by bag filters, are provided in the metal tapping area to control work zone emissions. • Ash handling unit & disposal area and unloading point area are provided with

Discipline	Anticipated Impact	Mitigation Measures
		water sprinklers to arrest the dust and fugitive sources of dust. • In order to minimize fugitive emissions Zn concentrate containing 8-10% moisture is being handled • All existing Stacks are connected to CPCB & RSPCB Server. • Mobile vacuum dust sweeping system on industrial roads and vacuum dust cleaning system for plant area exist at smelter to control airborne dust due to the vehicles movement. Regular road washing is being done on internal roads. • Vehicular emissions are maintained as per standard. • 41.41 % of the area is covered with greenbelt / plantation at site.
Noise	**Construction Phase:** Noise increase due to construction equipment may cause disturbance, inconvenience, loss of concentration, hearing problems, etc.	• Selection of low noise generating machinery and equipment will be kept in good condition to keep the noise level within 90 dB(A). • Acoustic enclosures for machines & equipment, providing PPEs (Ear plugs/ Ear defenders) to persons working just close to machines, lubrication & maintenance of machineries/equipment's/ Vehicles. • Greenbelt for attenuation of noise propagation and Periodical noise monitoring is being/ will be carried out with enclosures & barriers.
	Operation Phase: • The expansion project will result in increase in noise levels within the plant area, which will be generated from the operation of machineries and equipment such as Roasting Plant, Casting plant and D.G. Set etc.; and from vehicular	For the proposed expansion project, installation of equipment/ machinery will be with low generation of noise as per design and also, will be housed in a closed system. Therefore, noise level of the surrounding area will not increase significantly. Following noise abatement measures will also be taken: • Machine operators and Persons working just close to machine are being / will be

Discipline	Anticipated Impact	Mitigation Measures
	movements for transportation of construction material and other ancillary activities. • The noise generated may cause a significant impact on workers and surrounding residents and if exceeds the permissible levels for a continuous period of time, this may lead to loss of attention/concentration resulting in accidents also reducing the efficiency of working staff.	provided with PPE viz. Ear plugs / Ear muffs etc. • Proper maintenance, oiling and greasing of machines at regular intervals is being / will be done to reduce generation of noise. • D.G. sets are being / will be provided with acoustic enclosures to control the noise level within the prescribed limit. • Greenbelt along the plant boundary has been developed. The same will enhanced w.r.t area & density. The plant boundary is thickly with vegetated with species of wide canopy. • Regular monitoring of noise level is being / will be carried out and corrective measures in concerned machinery will be adopted accordingly.
Water	**Construction Phase:** • Increase in suspended solids due to soil run-off during heavy precipitation due to loose soil at construction site. • Domestic waste water will be generated during construction activities. And stagnant water or water logging for a long time may leads to various water borne diseases & unpleasant smell in nearby area.	• Storm water drains have been already provided at site. The drains will be properly aligned in conformity with the site drainage pattern so that the alteration is kept to the minimum and flooding, or soil erosion does not occur. • Provision of separate storm water system to collect and store run–off water during rainy season and utilization of the same in the process to reduce the freshwater requirement. • Domestic Waste water generated due to construction activities is being/will be used in process/Plantation. • Construction workers will be brought from nearby villages so that domestic water is saved in many ways due to temporary requirements only. • No discharge of any kind will be done inside or outside plant premises in any water body. Thus, there are/will not be any discharge from the site which can have any impact on the water quality of the surrounding areas.

Discipline	Anticipated Impact	Mitigation Measures
		• Record of water consumption on daily basis will be maintained as per present practice.
	Operation Phase: • Total existing water requirement for the project is 8000 KLD. After the expansion project, 3800 KLD additional water will be required for the proposed expansion; which will be sourced from Mansi Wakal Dam and Udaipur STP. Therefore, no additional water Fresh water will be required for the proposed expansion project. • No ground water abstraction is being done and will not be done for the proposed expansion project. • No wastewater is being/ will be discharged outside the plant as we are maintaining Zero Liquid Discharge, no additional waste water will be generated after expansion as we will utilize internal water in expansion. • Total wastewater generated from DZS plant is 3494 KLD, after proposed expansion project total 5000 KLD waste water effluent will generate for which additional capacity of 2000 KLD ETP & RO-	• The existing plant is a Zero discharge Facility and after expansion it will continue to be a zero-discharge facility. • Industrial effluent is being / will be treated in existing ETPs (5760 KLD). • Storm water management practice will be continued as existing. • Continuous attempt is being/ will be made to optimize/reduce the use of water and to avoid wastage and leakage of water. • Waste water generated from the domestic will be treated in STP having 200 KLD capacity. • Treated water after primary treatment is being/ will be used in greenbelt & dust suppression. • For inspection, cleaning and maintenance of sewer lines, manholes of reinforced concrete construction shall be provided at every bend, junction point of change in slope or diameter and on straight sections of pipes at intervals not exceeding 30 meters. • Rainwater Harvesting System shall be incorporated. Maximum use of harvested water will be for plant use. • Trunk drains (0.5 m wide & 0.5 m depth) along the internal roads will be created. All the drains will be interlinked with higher size drain 1 m wide & 1 m depth that will be connected with 1 nos. storm water reservoir/Guard Pond. The contaminated particle matters will be deposited as slurry to bottom of reservoir. Excess water during heavy rain fall will be discharged into the natural drain.

Discipline	Anticipated Impact	Mitigation Measures
	ZLD/MVR unit will be installed to treat all 5000 KLD effluent. • The effluents, cooling water generated during operational process, if not treated properly and discharged carelessly on ground, soil or water bodies can enter into ground water through leaching. Surface water bodies are affected as the pollutants will have the tendency to increase silting due to suspended solids, taste, odour, temperature rise, DO, oil slicks etc. It will result is loss of aquatic fauna and long-term change in characteristics of water bodies present in the vicinity. The discharge will also harm the soil flora and fauna and result in reduction of fertility of soil.	
Soil	**Construction Phase:** The impact on soil will be limited to the construction site only and would be mainly due to the left-out construction material used, litter disposal & Soil stockpiling which results in soil deterioration or reduce fertility of soil if not managed properly.	• Careful design, planning and good site management would minimize wastage of materials such as concrete, mortars and cement grouts. • Construction wastes will be segregated as much as possible at plant site itself to increase the feasibility of recycling concrete and masonry as filling material and steel pieces as saleable scrap. • To reduce the soil compaction, working on the wet soil will be avoided. • Litter disposal and collection points will be established around the work sites.

Discipline	Anticipated Impact	Mitigation Measures
		• The construction spoils will be temporarily stored at designated dumpsite located inside the plant premises. • Empty packaging materials, drums, glass, tin, paper, plastic, pet bottles, wood, thermocol and other packaging materials, etc. will be disposed through local recyclers. • The existing industrial shed will be utilized for the expansion project. • Discharge of any kind of pollutant will be strictly prohibited during construction period.
	Operation Phase: • Degradation of soil quality may take place due to the settling of air borne dust, contamination due to the effluent discharge, material spillage, unscientific disposal of solid and hazardous waste, if any. • This may lead to change in physico-chemical characteristics of soil of the area.	• Adequate Air Pollution Control Measures are being and will be implemented to avoid contamination or degradation of soil. • Solid and hazardous waste is being/will be disposed of as per prevailing rules. • A horticulturist is being / will be engaged to ensure soil quality improvement in the plant area, by adequate manuring and fertilizing. No adverse impact on the soil quality of the area is anticipated. • Besides, soil samples are being / will be collected and tested at regular intervals from the nearby areas. This will help in mitigation of any harmful impact on soil due to the project activity, if any.
Biological Environment		
a. Terrestrial Ecology	Positive as greenbelt of appropriate width has been/will be developed and maintained in the Plant area	
b. Aquatic Ecology	No impact as no effluent is being / will be discharged outside the plant premises.	
Socio-economic Environment	Overall development of the area in respect of the infrastructure development, educational growth, health facilities etc.	
Source: EIA/EMP report Debari Zinc Smelter		

Environmental Monitoring Programme (EMP)

Regular environmental monitoring is proposed for expansion project area as per stipulated guidelines by State Pollution Control Board norms, Central pollution Control Board, New Delhi

and as per conditions stipulated in environmental clearance. An amount of Rs600.628 crores (capital cost) and 70crores per annum (recurring cost) have been allotted for cost towards pollution control equipment's

Objectives of the Wildlife Conservation Plan

The main objective of Wildlife Conservation Plan is to assess –

- Present status of flora/fauna and habitat of major wildlife species in the project area as well as in its impact area of 10 km buffer area (henceforth called WCP area)
- Probable impacts of project on the flora and fauna in the study area, and
- To formulate appropriate mitigative measures to prevent the degradation of habitat in and around the project area as consequence of the project.

While achieving the purpose of the beneficiation project, HZL aims to perform its duty towards the environment and the communities that support them. The current conservation plan goes in accordance with the Company's objectives of –

1. Minimizing the impact of up-scaled project activities, maintaining the current levels of pollutants within the permissible limits in the surrounding environment and conserving wildlife populations in their habitats the surrounding area.
2. Working in coordination with the Forest Department to achieve harmony through awareness in existence of wildlife and the communities in the WCP area.

Wildlife Conservation Plan

'Wildlife conservation plan' acknowledges the biodiversity in the WCP area which is in 10 km radius of the core site, called the buffer area. Together these areas are referred to as 'Wildlife Conservation Plan (WCP) area'. It encompasses the habitat observations, ecology and the floral as well as faunal diversity in the study area.

9 faunal species found in the WCP area are included under the highest order of protection - Schedule - I under the Wildlife (Protection) Act, 1972 and Wildlife (Protection) Amendment Act, 2022. These avifaunal, reptilian and mammalian species and their corresponding habitats require stringent protection and management, for which the present 'Wildlife Conservation Plan' is devised.

It was found that there are no major threats to the species at an individual level. Hence, the Conservation plan of each of the species primarily focus on –

- Habitat conservation
- Generating awareness among the industrial staff and the buffer area population regarding the biodiversity found in the WCP area, its importance, activities that threaten them and conservation actions, along with species-specific interventions.

Chapter 1

1.1 Project utility

M/s Hindustan Zinc Ltd (HZL) is part of the Vedanta conglomerate, which is recognized as one of the most successful producers of various non-ferrous metals in India. HZL is an India-based company, which is engaged in the mining and smelting of Zinc, Lead and Silver metal and Wind energy in India.The Company's operations include five Zinc-Lead mines, over four Zinc Smelters, a Lead Smelter, a Zinc-Lead Smelter, a silver refinery plant and over six captive power plants in the state of Rajasthan. In addition, the Company also has a rock-phosphate mine in Maton near Udaipur in Rajasthan and Zinc, Lead, Silver processing and refining facilities in the State of Uttarakhand. The Company has wind power plants in the States of Rajasthan, Gujarat, Karnataka, Tamil Nadu and Maharashtra. It has a metal production capacity of over one million tons per annum with its key Lead-Zinc mines in Rampura Agucha and Sindesar Khurd, and smelting complexes in Chanderiya, Debari and Dariba, all in the state of Rajasthan while Silver Refinery and Lead Zinc Units at Pantnagar.

M/s Hindustan Zinc Ltd. is one of the largest Lead-Zinc integrated producer & a Leading producer of silver with more than 60 years of experience in Mining & Smelting. Reserves & Resources of about Million Tones as on 31st March 2022 sufficient for more than 25 years of mine life. Clean Development Mechanism (CDM) projects on waste heat recovery & wind power have an annual Certified Emission Reduction potential of over 6.13 Lac TON of CO_2. As on March 31, 2023 # Gross contribution to exchequer `was 24,892 crore including dividend of ` 9,422 crore. Royalty, taxes HZL has established Sewage Treatment Plant at Udaipur under PPP model to treat 60 MLD sewage and utilize treated water in its operations. Vision to enhance the quality of life and economic. wellbeing of the communities around its operations, mainly SAKHI, MARYADA, KHUSHI campaigns, Shiksha Sambal Project, Jeevan Tarang Programme, Samadhan Programme reaching over 1.4 million plus beneficiaries and 234 villages across Rajasthan.

HZL is now proposing expansion for its existing Debari Zinc Smelter unit established in 1968 at Debari, Udaipur, Rajasthan, within the existing plant premises. This report has been prepared in reference to the Ministry's O.M. dated 11th April, 2022 regarding grant of EC under para 7(ii) of EIA Notification, 2006, amended from time to time for which EIA/EMP Report has been prepared as per Standard TOR Points for carrying out the Environmental Impact Assessment (EIA) study for "Proposed Expansion of Zinc Smelter (1,00,000 TPA to 1,40,000 TPA) within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time at Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan)" by M/s. Hindustan Zinc Limited. This expansion will be carried out in 2 phases, in 1st phase the capacity expansion will be done up to 1,20,000 TPA(20%) along with Roaster installation and in the 2nd Phase, capacity will be further increased up to 1,40,000TPA (40%).

As per EIA Notification dated 14thSept., 2006, as amended from time to time; the project falls under S. No. 3 (Material Production), Category "A", Project or Activity 3 (a)- Metallurgical Industries (ferrous & non–ferrous).

Project benefits

The proposed expansion project will provide various benefits across the nearby areas which are attributed below:

A. **Environment**
B. **Employment**
C. **Economic**
D. **Social**

The company is conscious of its obligations to society at large and will contribute in overall socio-economic development of the area in the coming years by increasing its efforts for overall development of the study area.
Benefits of the project clearly indicate environmental, social, economic, employment potential etc. are summarized below:

A. **Environmental Benefits**

Out of the total plant area 184.2 Ha, 76.28 ha (41.41 %) area has already been developed. The same will be maintained and enhanced by doing gap plantation The greenbelt & plantation around the plant results as a pollution sink with positive effective barrier between the plant and surroundings. Strengthening of greenbelt/plantation quality within the area is / will help in better harnessing of the run-off thereby helpful in potential recharging of the groundwater and also help in reducing the soil erosion. The development of greenbelt/plantation within the plant area is being helpful in capturing the fugitive emissions, attenuate the noise generated thereby maintaining the air quality and noise levels and will also improve the aesthetic beauty of the surrounding. The open space within the plan area, where tree plantation may not be possible is covered with shrubs and grass to prevent erosion of topsoil. Other open spaces within the plant area are converted to green areas in the form of lawns or flowering plants. Educational/Promotional activities is being/ will also be included as a part of CSR/CER activity to encourage the surrounding nearby/ local villagers towards the importance of trees, on their management/care.
Vegetation protects soil from erosion and reduces surface water runoff in many ways. Live plant foliage reduces the impact of rainfall and increase the absorptive capacity of the soil. Storm water is held onsite and released slowly. Groundcovers intercept and slow rainfall and their roots hold soil particles in place. Groundcovers reduce runoff velocity and filter out suspended soil particles during storms. Shrub and tree roots provide a restraining web that increases soil cohesion and stabilizes soil. Tree roots often penetrate deeply into soil blocks, increasing soil shear strength and resisting shallow mass soil movement. Roots also promote soil porosity and permeability. Evapotranspiration by plants reduces soil moisture and delays the onset of saturation and runoff.
Apart from the above, HZL has established Sewage Treatment Plant at Udaipur under PPP model to treat 60 MLD sewage and utilize treated water in its operations. Rainwater harvesting and recharge structures established by the company in and around the plant site will improve the water availability in the area.

B. **Employment Benefits (Direct and Indirect) due to the Project**

The expansion project will generate both direct & indirect employment. Existing manpower of the plant is 784 persons. Additional manpower of 65 persons will be required for the proposed expansion project. The operational workers are locals and commute daily from their residence for work therefore, no long-term housing will be required. Residential Colony has been provided for the non-local workers.

Apart from the above, various indirect employment opportunities are envisaged by way of transportation, workshops, petty contractors; shopkeepers, network of retailers throughout the state and in its marketing regions. Plant activities also result in ~400 indirect employment avenues for the people such as truck owners, drivers, repair shops, tea-stalls, lenders etc.

However, various Skill development activities and vocation training programs will be carried out in the area to develop different skill sets in the local youth and to make them employable at Debari Zinc Smelter Plant as well as other nearby industries.

Total manpower for the project is estimated around 849 persons (310 permanent and 539 Contract labour) are given in table 1.1.

Table 1.1: Employment Generation

Sr. No.	Particulars	Manpower Requirement	
		Existing	Total After Expansion
A.	**Regular**	295	310
B.	**Contractual**		
i.	Semi - Skilled	293	323
ii.	Unskilled	196	216
	Total	**489**	**539**
	Grand Total (A+B)	**784**	**849**
Source: EIA/EMP report Debari Zinc Smelter			

C. Economic Benefits

Total Exchequer to Government As on March 31, 2023 # Gross contribution to exchequer `was 24,892 crore including dividend Royalty, taxes. The expansion project will result in growth and development of the surrounding areas by increasing direct and indirect employment opportunities in the region which will not only improve the socio-economic condition but will also raise the living standard of the local population.

Special emphasis on financial and social benefits will be given to the local people. Development of social amenities will be in the form of medical facilities, education to underprivileged and creation of self-help groups. Business opportunities for the local people will be enhanced like transport of raw material in the market, maintenance & housekeeping contract work etc.

D. Social Benefits

The community has been a key stakeholder in business and environmental Concerns are a matter utmost priority for the company. The Management believes in being a catalyst in the transformation of the communities around its business operations through partnership with local communities, Government, NGO's and other stake holders. The company addressing developmental changes of health and sanitation, education, livelihood, rural infrastructure, women empowerment etc. in nearby operational areas. The prime objective of our Corporate

Social Responsibility Policy is to hasten social, economic and environmental progress. We remain focused on generating systematic and sustainable improvement for local communities surrounding our plants and project sites.

HZL has a Vision to enhance the quality of life and economic wellbeing of the communities around its operations, mainly SAKHI, MARYADA, KHUSHI campaigns, Shiksha Sambal Project, Jeevan Tarang Programme, Samadhan Programme reaching over 1.72 million plus beneficiaries and 237 villages across Rajasthan.
Hindustan Zinc Limited (HZL) has a dedicated CSR department which is led by qualified and experienced professionals. CSR is a fundamental part of HZL's targeted practices, broad objectives, and overall culture. The company has undertaken/will continue to undertake various community development activities for the social upliftment of community as under:

i. Education
ii. Health, Drinking water, Sanitation& safety
iii. Women empowerment
iv. Sustainable Livelihoods
v. Sports & culture
vi. Environment & safety
vii. Skill Development
viii. Community Infrastructure

CSR activities carried out by Hindustan Zinc Limited
HZL has contributed substantially to the overall economy and social development of the area through CSR activities. The same will be continued in future, in addition to the social developmental activities for proposed expansion project. The operation zone of the social developmental activities for the proposed expansion project will be extended to the nearby villages of plant site.
The CSR Projects have been carried out in the area to align with the Sustainable development goal covering each segment and domain of the society which includes broadly the area of Education, Women's empowerment, Health & Hygiene, Drinking water and sanitation, Sustainable Livelihood, Infrastructure Development, Environment Management & Miscellaneous development including community assets creation as given in table 1.2.

Table 1.2: Major projects carried out/Continue so far under CSR

Sr. No.	Major areas	CSR activities
1.	Health & Hygiene	Quality healthcare services at doorstep, Free medication and lab tests, health camps and awareness Referral services and linkages with government schemes benefitting community of 30 villages.
2.	Education	Aimed at providing education in Science, English and Maths (SEM), innovative learning techniques, including group learning, worksheets, learning camps, science fairs and so on in 15 schools and catering to 5500+ students. Support towards education initiatives-IIT coaching for students of HZL communities.

		Support to female students to pursue higher education at Vedanta PG Girls College.Under, the anganwadis strengthening program, supporting preschool education, health of 0-6 kids/pregnant women, stakeholder engagements and developing Nand Ghars.
3.	Sustainable Livelihood	Farmers training, Micro Irrigation program, Improved Agriculture-Horticulture, orchard development, Rainwater harvesting, Artificial Insemination, Veterinary camps and mass vaccination programme. Provide training and employment opportunities to the local unemployed youth communities.
4.	Women Empowerment	Grassroot institutions like SHG and federations for saving and credits and income generation activities, linkage with banks and credits, new microenterprises for source of income, skill development centers, collective microenterprises- pickle, pulses grading, fabric stitching, spices etc. Overall 5000+ women associated with SHGs.
5.	Infrastructure Development	Need based infrastructure like Construction of village roads, culverts, school classrooms, kitchens, boundary wall and solar streetlights, drainage, Community Hall, Bus Station, Stadium etc.
6.	Drinking water and sanitation	Developing drinking water structures like OHT and pipeline, construction of toilets, water supply through tankers during summers and Water RO as well as ATM. Development of sanitization structures, wastewater management, toilets etc. in the villages.
7.	Skill Development	Mobilizing educated youths, training under different trades like food and beverage management, microfinance, customer relationship management etc., and placement support.
Source: EIA/EMP report Debari Zinc Smelter		

1.2 Applicable acts and Regulations in the WCP area

Following Environmental laws and regulations are pertinent to the WCP area

1. The Mines and Minerals (Regulation and Development) Act, 1957, (amended 2015)
2. Wildlife (Protection) Act, 1972
3. Environment Protection Act, 1986
4. Biological Diversity Act, 2002
5. Forest (Conservation) Act, 1980
6. Wild Birds and Animals Protection Act, 1912
7. Environmental Impact Assessment Notification, 2006
8. The Water (Prevention and Control of Pollution) Act, 1974, (amended 1988)
9. The Air (Prevention and Control of Pollution) Act, 1981, (amended 1987)

10. The Mineral Concession Rules, 1960 (amended 2012)
11. The Mineral Conservation and Development Rules, 2017
12. Ash Content Notification, 1997 (amended 2015)
13. Disposal of Fly Ash Notification, 1999
14. Public Hearing Notification, 1997
15. Hazardous Wastes (Management & Handling) Rules, 1989 (amended May, 2003)
16. The Aravali Notification, 1992

1.3 Socio-economic environment of the WCP area

Socio Economic Profile of the Region

The study area comprises of 63 villages and 1 city (Udaipur) of the study area that covers a total area of 377.08 square kilometres giving approximately 120209 people residence. Following table 1.3 entails brief information about demography structure at state level, district level and WCP area.

Table 1.3: Socio-economic profile of the Rajasthan State, Udaipur District & WCP area

Sr. No.	Particular	India	Rajasthan State	Udaipur District	WCP Area
1.	Area (in sq. km.)	3287263	342239	11724	377.08
2.	Population Density/ sq. Km.	368	200	262	1571
3.	No. of Households	249454252	12711146	623531	120209
4.	Population	1210569573	68548437	3068420	577495
5.	Male	623121843	35550997	1566801	298901
6.	Female	587447730	32997440	1501619	278594
7.	Scheduled Tribes	104281034	9238534	1525289	56783
8.	Scheduled Castes	201378086	12221593	188525	58458
9.	Literacy Rate (%)	72.99%	55.83%	61.82%	75.75%
10.	Sex Ratio (Females per 1000 Males)	943	928	958	932
	Source: Census of India, 2011, https://www.census2011.co.in/census/district/455-udaipur.html, https://www.censusindia2011.com/rajasthan-population.html				

1.3.1 Demography structure

Zone wise population of study area:

Census data suggests that the study area is composed of 51.76% of male population while 48.24% of female population. Following table 1.4 entails information about basic demographic structure of villages/town lying in study area (buffer zone) as primary, secondary and outer zone.

Table 1.4: Summary of Demographic Profile of Study Area

Study Area Zone	0 - 3 km	3 - 7 km	7 - 10 km	Total
No. of villages/towns	13	28	23	**64**
No. of house holds	4186	9581	106442	**120209**

Total Population		20724	47862	508909	**577495**
SC Population		1641	4858	51959	**58458**
ST Population		5810	10336	40637	**56783**
Total Literate Population		12430	28695	396996	**438121**
Workers	**Main**	5946	14219	164829	**184994**
	Marginal	2012	3966	13221	**19119**
	Total	7958	18185	178050	**204193**
Non-Worker		12766	29677	330859	**373302**
Source: Census of India, 2011					

- Above table 1.4 identifies the presence of villages and their subsequent population divided under three zones from area (i.e., Primary, secondary and tertiary zone).
- Primary zone has 13 villages where as much as 4186 households with 20724 population are located. Mostly lying on Built-up land for their livelihood and substance.
- Secondary and tertiary zone both comprise of 28 and 23 villages having a total population of 47862 and 508909 respectively.

1.3.2 Sex Ratio

Sex ratio determine the Human Development Index (HDI) of an area thereby understanding the status of women in that region. Table 1.5 gives brief insight about the sex ratio at different zones in study area suggesting that there is a lower proportion of females than male. In India, Child sex ratio is defined as number of females born per 1000 males in age group 0 - 6 years in a human population. As per the census data, the child sex ratio in Secondary zone is 895, which is higher than Primary zone (890) and tertiary zone (868) are given in table 1.6.

Table 1.5: Sex ratio of the study area

Buffer Zone	Sex Ratio of Study area Female/1000 Male
Primary Zone (0 – 3 km)	956
Secondary Zone (3 – 7 km)	946
Tertiary Zone (7 – 10 km)	930
Study Area (0 – 10 km)	932
Source: Census of India, 2011	

Table 1.6: Child Sex ratio of the Study area

Sr. No.	Buffer Zone	Child Sex Ratio of Study area Female/ 1000 Male
1	Primary Zone (0-3 km)	890
2	Secondary zone (3-7 km)	895
3	Tertiary Zone (7-10 km)	868
4	**Study Area (0-10 km)**	**872**
Source: Census of India, 2011		

On comparing the district sex ratio statistics with other peripheral areas, there has been notified improvements however despite that (awareness on social welfare schemes by the government), this variation has been referred to restricted sources of earning. Since families in most of these villages are involved at working in informal sector (as marginal labours) fertility rate is high causing higher proportion of men and women.

1.3.3 Vulnerable Group

While developing an action plan, it is very important to identify the population who fall under the marginalized and vulnerable groups and special attention has to be given towards these groups while making action plans. Special provisions should be made for them. In the observed villages schedule caste (SC) population is 10.12% and Schedule Tribal population 9.83% and other Population 80.05% in total study area.

1.3.4 Literacy Rate

Literacy is the ability to read and write one's own name and further for knowledge and interest, write coherently, and think critically about the written word. The analysis of the literacy levels is done in the study area. The 10 km radius of study area demonstrates a literacy rate of 85.62 % as per census data 2011. The male literacy rate in the study area indicates 92.16 % whereas the female literacy rate, which is an important indicator for social change, is observed to be 78.68 % as per the census data 2011 are given in table 1.7. This needs to focus on the region and enhance further development focusing on education.

Table 1.7: Literacy Rate of the Study area

Zone	No. of Villages	Male literacy Rate	Female literacy Rate	Total Literacy Rate
Primary Zone (0 - 3 Km)	13	83.63	55.77	69.93
Secondary Zone (3 - 7 Km)	28	82.56	56.03	69.6
Tertiary Zone (7 - 10 Km)	23	93.35	81.67	87.7
Overall Study Area (0-10 km)	**64**	**92.16**	**78.68**	**85.62**
Source: Census of India, 2011				

1.3.5 Economic Structure

The economy of an area is defined by the occupational pattern and income level of the people in the area. The occupational structure of residents in the study area is studied with reference to work category. The population is divided occupation wise into three categories, viz., Total workers, Main workers and non-workers. The main workers include cultivators, agricultural labourers, those engaged in household industry and other services. The marginal workers are those engaged in some work for a period of less than 180 days during the reference year. The non-workers include those engaged in unpaid household duties like, students, retired persons, dependents, beggars, vagrants etc. besides institutional inmates or all other non-workers who do not fall under the above categories.

Table 1.8: Work force of the WCP area

Zone	No. of Villages	Total Workers	%	Main Workers	%	Marginal Workers	%	Non-Workers	%
Primary Zone (0 - 3 Km)	13	7958	38.4	5946	28.69	2012	9.71	12766	61.6
Secondary Zone (3 - 7 Km)	28	18185	37.99	14219	29.71	3966	8.29	29677	62
Tertiary Zone (7 - 10 Km)	23	178050	34.99	164829	32.39	13221	2.6	330859	65
Study Area (10 Km)	**64**	**204193**	**35.36**	**184994**	**32.03**	**19119**	**3.32**	**373302**	**64.64**
Source: Census of India, 2011									

The above table 1.8 shows that out of the total working population, the percentage of main workers is 32.03%, while 3.32% are marginal workers. Number of working populations is 35.36 % and non-working population is 64.64 % in the study area. More percentage of main workers reflects a developing economy and growth of the region.

1.3.6 Cropping pattern of the WCP area

Rajasthan has two principal crop seasons i.e. Rabi and Kharif. The Rabi crops are winter crops and are shown in the months of October and November and are harvested in the months of March and April. The principal Rabi crops are Barley, Wheat, Gram, Pulses and Oil Seeds. The major oil seeds are Rapeseed and Mustard. The Kharif crops are the crops that are grown in the summer season and are seeded in the months of June and July. These crops are harvested in the months of September and October and include bajra, pulses, jowar, maize and groundnut. The regions that are highly irrigated or receive abundant water supply are utilized for the cultivation of improved high-yielding varieties of rice. Some places of Rajasthan that has black soil nurture the growth of major cash crops like cotton. In some region's tobacco is also grown.

The plant site falls in Humid & sub-humid southern plains Agro-climatic zone of Rajasthan and major crops grown are kharif-Maize, Pulses, paddy, Sorghum & Rabi-Wheat & Gram. The details of the crops of the WCP area are given in table 1.9.

(Source:https://farmech.dac.gov.in/FarmerGuide/RJ/index1.html&https://agriculture.rajasthan.gov.in)

Table 1.9: Inventory of Agro Biodiversity of the Core & Buffer zone of study area
Habit: Tree (T), Shrub (S), Herb (H), Grass (G) and Climber (C)

Sr. No.	Scientific Name	Local name / English Name	Family	Habit	Core Zone	Buffer Zone	IUCN conservation status as on 15th Sep, 2022
1	*Arachis hypogaea**	Ground nut	Fabaceae	H	+	+	NA
2	*Argemone Mexicana**	Mexican Poppy	Papaveraceae	H	+	+	NA
3	*Bambusa arundinaceae**	Bamboo	Poaceae	H	-	+	NA
4	*Brassica oleraceae**	Cabbage	Brassicaceae	H	+	+	NA
5	*Carica papaya**	Papaya	Caricaceae	T	+	+	DD
6	*Citrus limon**	Lemon	Rutaceae	S	-	+	LC
7	*Citrus media**	Citron	Rutaceae	S	-	+	NA
8	*Clitorea ternatea**	Cowpea	Fabaceae	S	+	+	NA
9	*Colocasia esculenta**	Taro	Arecaceae	H	+	+	NA
10	*Corchorus capsularis**	White Jute	Malvaceae	H	-	+	NA
11	*Cucumis melo**	Muskmelon	Cucurbitaceae	S	+	+	NA
12	*Daucus carota**	Carrot	Apiaceae	H	+	-	LC

Sr. No.	Scientific Name	Local name / English Name	Family	Habit	Core Zone	Buffer Zone	IUCN conservation status as on 15th Sep, 2022
13	*Dendrocalamus strictus**	Calcutta Bamboo	Poaceae	H	+	+	NA
14	*Gossypium hirsutum**	Mexican Cotton	Malvaceae	S	-	+	VU
15	*Indigofera tinctoria**	True Indigo	Fabaceae	S	-	+	NA
16	*Luffa acutangula**	Wild Ridge Gourd	Cucurbitaceae	S	-	+	NA
17	*Lycopersicum esculentum**	Tomato	Solanaceae	H	+	+	NA
18	*Mangifera indica**	Mango	Anacardiaceae	T	+	+	DD
19	*Momordica charantia**	Bittergourd	Cucurbitaceae	S	+	-	NA
20	*Momordica dioica**	Wild Buttergourd	Cucurbitaceae	S	+	+	NA
21	*Musa x paradisiaca**	Banana	Musaceae	H	+	-	LC
22	*Oryza sativa**	Rice	Poaceae	H	+	+	LC

Sr. No.	Scientific Name	Local name / English Name	Family	Habit	Core Zone	Buffer Zone	IUCN conservation status as on 15th Sep, 2022
23	*Pennisetum glaucum**	Bajra/Pearl Millet	Poaceae	H	+	+	LC
24	*Pheonix sylvestris**	Date Palm	Arecaceae	T	+	+	NA
25	*Phyllanthus emblica**	Indian Gooseberry	Euphorbiaceae	T	+	-	LC
26	*Pithecellobium dulce**	Sweet Tamarind	Fabaceae	T	+	+	LC
27	*Psidium guajava**	Guava	Myrtaceae	T	+	+	LC
28	*Raphanus sativus**	Radish	Brassicaceae	H	+	-	NA
29	*Saccharum officinarum**	Sugarcane	Poaceae	H	+	+	NA
30	*Solanum melongena**	Brinjal	Solanaceae	H	+	+	NA
31	*Solanum tubersoum**	Potato	Solanaceae	H	+	-	NA
32	*Sorghum bicolor**	Jowar	Poaceae	H	+	+	LC

Sr. No.	Scientific Name	Local name / English Name	Family	Habit	Core Zone	Buffer Zone	IUCN conservation status as on 15th Sep, 2022
33	*Tamarindus indica**	Tamarind	Fabaceae	T	+	+	LC
34	*Trichosanthes cucumerina**	Snake Gourd	Cucurbitaceae	S	+	-	NA
35	*Trigonella foenumgraecum**	Fenugreek	Fabaceae	H	+	+	NA
36	*Triticum aestivum**	Wheat	Poaceae	H	+	+	DD
37	*Zea mays**	Corn	Poaceae	H	+	+	LC
(+) Shows: Presence of the species and (-) Shows: Absence of the species (*) Planted Species LC: Least Concern, NA: Not available, NT: Near Threatened, VU: Vulnerable, DD: Data Deficient							
Source: EIA/EMP report Debari Zinc Smelter							

1.3.7 Impact on WCP area and especially on the forest growth

Anticipated Impacts:

- Particulate matter emissions from stack and fugitive emissions due to transportation activity & material handling may degrade the soil quality of surrounding environment that may affect the biodiversity of surrounding environment.
- Particulate matter emission may cause migration of wild animals and birds.
- Fugitive emissions (dust) may impact the terrestrial flora. The settlement of dust on the laminar surface of plants can impede the efficiency of photo-transduction and thereby, affect the productivity of plants. In some of the plant, it may also smother the leaf surface blocking stomata, resulting in reduced transpiration.
- Increased noise level due to running of machinery may scare the wild fauna and force them to migrate to other areas.

Impact Evaluation

Impact evaluation is given in table 1.10.

Table 1.10: Impact Evaluation for Biological Resources

Impact Evaluation Element	Change in the biological resources of the area due to the proposed expansion project operation & generation of emissions.			
Potential Effect / Concern	Loss of habitat, Impact on health of biological receptors due to the emissions including fugitive dust emissions during operation activities.			
Characteristics of Impacts				
Nature	Positive	**Negative**	Neutral	
		✓		
Type	**Direct**	Indirect	Cumulative	
	✓			
Extent	Project Area	**Local**	Zonal	Regional
		✓		
Duration	Short – term	**Long- term**		
		✓		
Intensity	**Low**	Medium	High	
	✓			
Frequency	Remote (R)	Occasional (O)	Periodic (P)	**Continuous (C)**
				✓
Significance of Impact				
Significance	Insignificant	**Minor**	Moderate	Major
		✓		
(All given impacts on biological resources are within limits)				
Source: EIA/EMP report Debari Zinc Smelter				

1.3.8 Cattle population and their dependency on the forest for grazing and other forest dependency

According to 20th-livestock-census of India the cattle population of Udaipur district is 1148365 (20th livestock censes of India). Which includes 84496 Exotic cattle's and 1063869 Indigenous cattle. Out of which in exotic cattle 4285 are males and 80211 are females, In Indigenous cattle 312584 are males and 751285 are females (http://cazrienvis.nic.in/ Content/livestock20th.html)

1.4 Environmental details

1.4.1 Topography

The WCP area consist of undulating topography, which characterized different low mound Inselberg structures along with slightly undulating to plain topography. However, at several places flat topped low mounds and narrow discontinuous ridges break the monotony. On careful examination with the help of Remote sensing data collected from USGS SRTM elevation maps it can be concluded that the elevation of the study area varies from 459 m amsl to 917 m amsl resulting in ground relief of 459 m. The maximum elevation within the study area is towards the north western region while the minimum elevation is towards the

south, South-western and western direction. The general slope of the ground is towards South.

1.4.2 Geology

The entire WCP area comprises of amphibolite/hornblende schist, basic meta-volcanics, volcanic conglomerate, calcareous quartzite, carbonaceous phyllite, cherty quartzite, dolomite, dolomitic marble, feldspathic mica schist, feldspathic quartzite/meta-subgreywacke, ferruginous quartzite, granite/granite gneiss, migmatite, composite gneiss, manganiferous phyllite, dolomite, meta-conglomerate, mica schist/schist, pebbly meta-arkose, phyllite, meta-greywacke, meta-conglomerate, mica schist, quartz vein/reef, quartzite, quartzite with bands of phyllite, stromatolitic and manganiferous dolomitic marble & stromatolitic and phosphatic cherty dolomite. The eastern side of the study area is entirely composed of granite gneiss, migmatite, composite gneiss of lasaria formation mangalwar group and bhilwara supergroup. These granite gneiss, migmatite, composite gneiss is of archaean age. The major part of the western region is composed of phyllite, meta-greywacke, meta-conglomerate of sabina formation and are of palaeoproterozoic age, pebbly meta-arkose of jaisamand formation of palaeoproterozoic age etc.

The tectonic activities in this area gave rise to different lineament structure such as fault, joint/fracture, ridge parallel, drainage parallel, overturned syncline fold, synform (f1) fold and antiform (f1) fold.

1.4.3 Geomorphology of the study area

Geomorphologically the WCP area is majorly composed of Pediment & Pediplain. Moderately Dissected Hills & Valleys extends in NS direction towards the western side of the study area. Anthropogenic Terrain and Active Quarry is located on the western side of the study area. The Pediment-Pediplain Complex is located in the northern, western & south western region. Other geomorphological units are also present within the study area such as Hill, Inselberg, Residual Hill, Ridge, Highly Dissected Hills & Valleys and different waterbodies such as Lake, Pond & River.

1.4.4 Climate

Udaipur district has a sub-humid climate. There are three distinct seasons in a year. The winter season encompassing four months from November to February are mild and pleasant, with temperature ranging between 0°C (Mount Abu) to 18°C with little or no humidity. In Dec Jan months occasional cold waves bring down the temperatures significantly. March is a pleasant transition month to summer. The summer months from April to June, record average daily temperatures of around 37°C. May and June are the hottest months when temperature reaches up to 48°C. Annually, most of the rainfall is received during the monsoon season which extends from June (end of June) to September.

The annual average rainfall in the region is around 681.80 mm (average of last 30 years rainfall data from 1991-2021) varying from minimum 288 mm in 1999 to maximum 1189 mm in 2019.

1.4.5 Natural disasters

Eastern part of Udaipur lies in Zone II, while the project site as well as study area lies in Zone-II of Seismic Zoning Map of India, updated by India Metrological Department (IMD) and

National Institute of Disaster Management (NIDM). Thus, the plant area is located in an area of Moderate Risk Zone by national standards.

1.4.6 Natural drainage lines and Water bodies

The drainage pattern of the WCP area is sub dendritic to dendritic in nature with a poor drainage density which forms due to pronounced slope to the surface. The master slope of the area is from N to S. In buffer area 1st, 2nd & 3rd order of stream are present as per the Strahler classification. The major river in the WCP area is Berach River at the southern side of the core zone and flows from west to east. The Berach river meets and drains out from Udaisagar lake. The Gudela Nadi is towards the northern side of the WCP area which meets the Khemli talav situated at about 9 km from the core zone in the northern region of the WCP area. There are also different small lakes, pond and nalas / Canal within the WCP area.
Surface elevations of the surface water bodies existing within the WCP area are given in table 1.11.

Table 1.11: Surface elevations of the surface water bodies existing within the study area

Sr. No.	Water Body	Approx. Distance & Direction from Plant Site	Surface Elevation (m)
1	Udai Sagar Right Canal	~1.5 km in ESE direction from Plant site	527
2	Udaisagar	~1.5 km in SSW direction from Plant site	544
3	Berach River	~1.5 km in SE direction from Plant site	523
4	Ahar Nadi	~3.5 km in SW direction from Plant site	542
5	Vela Nala	~6.5 km in ENE direction from Plant site	512
6	Khemli Talav	~8.0 km in NNE direction from Plant site	530
7	Bagdara Talav	~8.5 km in SSW direction from Plant site	537
8	Gadela Nadi	~9.0 km in NNE direction from Plant site	514
Source: SOI Toposheet and Google Earth Imagery; EIA/EMP report Debari Zinc Smelter			

1.5 Linear infrastructure that can affect mega-fauna in the WCP area

1.5.1 Transport and Road infrastructure facilities

Five major roads pass through the WCP area such as NH-27, NH-48, SH-9, and SH 36A. Debari Plant is adjacent to NH-27 where SH-36A meets. Due to heavy traffic there are higher possibilities of roadkill of mega-faunal species during dawn and dusk time. Because of NH roads in the WCP area, carry heavy vehicular traffic including two-wheelers, three-wheelers (auto rickshaws, three wheeled tempos), Light motor vehicles (cars, jeeps), Buses and trucks and heavy motor vehicles (Tractors, dumpers, etc.). This level of traffic can be pose serious threat to the wildlife in the WCP area.

1.5.2 Railway lines/Railway stations

WCP area carries 3 Railway lines such as Debari RS (~1.5 km in NW direction from plant site), Rana Pratap Nagar RS (~7.0 in WSW direction from plant site), and Khemli RS (~9.5 in NNE direction from plant site)

1.5.3 Waterways and canals

WCP area carries 13 waterways and canals, a detailed list of waterways and canals of the WCP are given below.

- Udaisagar Lake (~1.5 km in SSW direction from Plant site)
- Berach River (~1.5 km in SE direction from Plant site)
- Udai Sagar Left Canal (~5.5 km in NE direction from Plant site)
- Udai Sagar Right Canal (~1.5 km in ESE direction from Plant site)
- Udai Sagar Middle Canal (~0.5 km in East direction from Plant site)
- Karget Canal (~2.5 km in SSE direction from Plant site)
- Dabok Pond (~3.0 km in ENE direction from Plant site)
- Ahar Nadi (~3.5 km in SW direction from Plant site)
- Vela Nala (~6.5 km in ENE direction from Plant site)
- Khemli talav (~8.0 km in NNE direction from Plant site)
- Bagdara Talav (~8.5 km in SSW direction from Plant site)
- Ganeshpura pond (~8.5 km in West direction from Plant site)
- Gadela Nadi (~9.0 km in NNE direction from Plant site)

Apart from this the study area is having many seasonal ponds, nallahs, water channels which are active during rainy season.

1.5.4 Biodiversity in WCP area

The objectives of observing ecology, habitats and biodiversity of the WCP area are -

1. To assess the nature and distribution of vegetation in and around the proposed expansion project site
2. To assess the Flora and fauna in the WCP area
3. To understand the ecology of the water bodies
4. To ascertain the migratory routes of fauna, presence of breeding grounds and sensitive habitats in the WCP area, if any.
5. To assess the presence of protected areas in the WCP area
6. To review the information from secondary sources and discuss the issues of concern with the relevant authority and stakeholders.
7. To predict impact based on primary and secondary data sources to formulate mitigation measures.

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

1. Generation of primary data by undertaking systematic ecological studies in the WCP area
2. Primary data collection for flora through random sampling method for trees, shrubs and herbs from the selected locations to know the vegetation cover qualitatively
3. To spot the fauna in the WCP area and also to identify the fauna by secondary indicators such as pugmarks, scats, faecal pellets, calls and other signs

4. For ecological information, the secondary sources such as local officials, villagers and other stakeholders were interviewed.
5. Sourcing secondary data with respect to the study area from published literature.

1.6 Description of Flora and Fauna of the WCP area

1.6.1 Flora

Inventory of floral diversity of WCP area of the Plant site Based on authenticated data from Udaipur Forest Department (North), listed in table 1.12.

Table 1.12: Floral diversity of the WCP area

Sr. No.	Family	Scientific Name	Common Name	Local Name	Origin	IUCN
TREES						
1	Mimosaceae	*Senegalia catechu*	Khair Tree	Khair	Native	LC
2	Mimosaceae	*Senegalia leucophloea*	Ronjh	Ronjh	Native	LC
3	Mimosaceae	*Senegalia nilotica*	Babool Tree	Babool	Native	LC
4	Mimosaceae	*Senegalia senegal*	Gum Arabic Tree	Kumtha	Native	LC
5	Simarubaceae	*Ailanthus excelsa*	Heaven Tree	Ardu	Native	NA
6	Combretaceae	*Anogeissus latifolia*	Axlewood	Dhawda	Native	NA
7	Meliaceae	*Azadirachta indica*	Neem Tree	Neem	Exotic	LC
8	Caesalpiniaceae	*Bauhinia variegata*	Orchid Tree	Kachnar	Native	LC
9	Bombacaceae	*Bombax ceiba*	Red Silk-Cotton Tree	Semal	Native	LC
10	Burseraceae	*Boswellia serrata*	Indian Frankincense	Saalar	Native	NA
11	Fabaceae	*Butea monosperma*	Flame of the Forest	Dhak	Native	LC
12	Caesalpiniaceae	*Cassia fistula*	Golden Shower Tree	Kermala	Native	LC
13	Moraceae	*Ficus religiosa*	Peepal Tree	Peepal	Native	LC
14	Ulmaceae	*Holoptelea integrifolia*	Indian Elm	Kanji	Native	NA
15	Anacardiaceae	*Lannea coromandelica*	Indian Ash Tree	Gurjan	Native	LC
16	Fabaceae	*Pongamia pinnata*	Karanja Tree	Karanja	Native	LC

Sr. No.	Family	Scientific Name	Common Name	Local Name	Origin	IUCN
17	Apocynanceae	*Wrightia tinctoria*	Pala Indigo	Khirni	Native	LC
SHRUBS						
18	Caesalpiniaceae	*Caesalpinia bonduc*	Gray Nicker	Kata-kranj	Native	LC
19	Poaceae	*Dendrocalamus strictus*	Calcutta Bamboo	Boss	Native	NA
HERBS						
20	Liliaceae	*Aloe barbadensis miller*	Aloe Vera	Gwar-patha	Exotic	NA
21	Solanaceae	*Datura ferox*	Long Spined Thorn apple	Datura	Exotic	NA
22	Lamiaceae	*Ocimum gratissimum*	African Basil	Van Tulsi	Native	NA
23	Rhamnaceae	*Ziziphus nummularia*	Wild Jujube	Jhadi Boar	Native	NA
GRASSES						
24	Poaceae	*Aristida adscensionis*	Sixweeks Threeawn	Lampla	Native	NA
Note: LC – Least Concern as per IUCN; NA – Not Assessed as per IUCN						
Source: Authenticated list of flora in WCP area by Udaipur Forest Department (North), Rajasthan.						

1.6.2 Fauna

Inventory of faunal diversity of WCP area of the Plant site Based on authenticated data from Udaipur Forest Department (North), listed in table 1.13.

Table 1.13: Faunal diversity of the WCP area

Sr. No.	Scientific Name	Common Name	Local Name	Family	Origin	IUCN
MAMMALS						
1	*Panthera pardus*	Baghera	Tendua	Felidae	Native	VU
2	*Felis chaus*	Jungle Cat	Jungli Billi	Felidae	Native	LC
3	*Herpestes smithi*	Ruddy Mongoose	Nevla	Herpestidae	Native	LC
4	*Canis aureus*	Jackal	Siyaar	Canidae	Native	LC
5	*Vulpes bengalensis*	Indian Fox	Lomdi	Canidae	Native	LC

Sr. No.	Scientific Name	Common Name	Local Name	Family	Origin	IUCN
6	*Hyaena hyaena*	Striped Hyaena	Jarakh	Hyaenidae	Native	NT
7	*Boselaphus tragocamelus*	Blue Bull	Neel Gai	Bovidae	Native	LC
8	*Funambulus pennant*	Five Striped Palm	Gilhari	Sciuridae	Native	LC
9	*Hyxtrix india*	Indian Crested Porurpine	Sehi	Hystricidae	Native	LC
10	*Lepus nigricollis*	Indian Hare	Khargosh	Leporidae	Native	LC
BIRDS						
11	*Pavo cristatus*	Indian Peafowl	Mor	Phasianidae	Native	LC
12	*Vanellus indicus*	Red-Wattled Lapwing	Titahari	Charadriidae	Native	LC
13	*Palaeornis eupatria*	Alexandrine parakeet	Tota	Psittacidae	Native	NT
14	*Eudynam*	Koel	Koel	Cuculidae	Exotic	LC
REPTILES						
15	*Calotes versicolor*	Common garden lizard	Girgit	Agamidae	Native	LC
16	*Vipera rapelli*	Russell's viper	Chitti	Viperidae	Exotic	LC

Note:
LC – Least Concern as per IUCN;
VU – Vulnerable as per IUCN;
NT – Near Threatened as per IUCN;
NA – Not Assessed as per IUCN

Source: Authenticated list of fauna in WCP area by Udaipur Forest Department (North), Rajasthan.

1.7 Description of forest and habitat condition, wildlife scenario of the WCP area

The forest type in WCP area is Dry deciduous rainforest along with Scrublands. It is mainly comprises of Agricultural land (39.47 %), Open Scrub land (17.38%) & Forest Land (11.11 %) and open land (9.70 %) respectively, of the total WCP area. Rest of the covers 22.34 % of the WCP area including Water Body, Seasonal River/Nala, Stony waste land, Plantation, Human Settlement, Industry area, Mine Quarry, Solar Plant, Air Patti, Road, and Railway. The buffer zone studied has no ecological sensitive area (National Park, Wildlife Sanctuary, Biosphere Reserve/ etc.).

However, 22 Reserve Forest lies within 10 km of the study area which are given as below:

- Panwari RF (Adjacent in west direction from plant site)
- RF (~1.0 km in ENE direction from plant site)

- Kantia RF (~1.25 km in North direction from plant site)
- Kamlodia RF (~2.0 km in SW direction from plant site)
- RF (~2.0 km in South direction from Plant site)
- Bara Magra RF (~1.0 km in NNW direction from plant site)
- Bhainsra RF (~3.5 km in NNW direction from plant site)
- Segria RF (~3.5 km in WNW direction from plant site)
- Hinglashia RF (~3.5 km in SW direction from plant site)
- Bordi RF (~3.5 km in WSW direction from plant site)
- Dhenkli RF (~4.5 km in NW direction from plant site)
- Gugla RF (~5.5 km in West direction from plant site).0
- Umra RF (~6.5 km in SW direction from plant site)
- Bagdara RF (~6.5 km in SSW direction from plant site)
- Santu RF (~6.5 km in SSE direction from plant site)
- Nahar Magra RF (~6.5 km in NE direction from plant site)
- Amberi RF (~8.5 km in NNW direction from plant site)
- Amarbir RF (~7.0 km in SSE direction from plant site)
- Nauva RF (~8.0 km in NNW direction from plant site)
- Hora RF (~8.5 km in SW direction from Plant site)
- Kherad RF (~8.5 km in NNW direction from plant site)
- Chirwa ki Ghati RF (~9.5 km in NNW direction from plant site)

1.7.1 Population estimation status of wildlife

The Wild Mammals population outside Protected Areas in Udaipur District is as presented in table 1.14. The animal census is carried out by Rajasthan Forest Department following the Waterhole method. A wildlife population census for the faunal diversity in WCP area is required to understand magnitude of mammal population and devise conservation action plan.

Table 1.14: Population status of Mammals in Udaipur Forest Division (North)

Sr. No.	Common Name	Local Name	Scientific Name	Year		
				2018	2019	2020
1	Leopard	Baghera	*Panthera pardus*	23	32	17
2	Jungle Cat	Junglee Billi	*Felis chaus*	76	54	33
3	Striped Hyaena	Jarakh	*Hyaena hyaena*	53	37	17
4	Nilgai	Nilgai	*Boselaphus tragocamelus*	756	641	455
5	Indian porurpine	Sehil (Sehi)	*Hystvix india*	34	49	31
6	Jackal	Siyaar/Geedar	*Canis aureus*	334	198	275
Source: https://forest.rajasthan.gov.in/content/raj/forest/en/aboutus/departmental-wings/wild-life1/public-information/wildlife-animal-census.html						

1.8 Movement of wildlife in the WCP area for the last 3 completed financial years and the current year

As per the authenticated data (Udaipur Forest Department, North Zone) and List of Flora; no endemic species of flora have been observed. Total of 17 trees, 2 shrubs, 4 herbs, and 1 species of grasses have been recorded in the WCP area based on information collected from the secondary data.

Among fauna, 10 species of mammals, 4 species of birds, and 2 species of reptiles have been recorded from WCP area based on the authenticated list. No National Park, Sanctuary, Biosphere Reserve, Migratory Corridor of wild animals exists within 10 km radius WCP area (Letter Attached as Appendix - I).

1.9 Man-animal Conflict

During the Primary social survey and based on secondary information, it is confirmed that the Nilgai is present in the WCP area. Its presence was also confirmed during the ecological assessment. Many farmers reported that Nilgai is nuisance animal for the agricultural fields. It attacks almost all types of crops in the project area. To control their nuisance farmers generally use frightening devices like guard fields manually or, make stony and thorny fencings. But these measures are short-term and do not effectively control the nuisance of Nilgai. In India, Nuisance of Nilgai is seen in many states, and Rajasthan is one of them. Nilgai prefers to feed on agricultural crops, thus causing considerable losses to the farmer and they have stopped their farming because of Nilgai said by DCF-Territorial, Udaipur (North) in Feb 18, 2014 (Johnson M. F. et al., 2018).

Apart from Nilgai, secondary sources also suggest that other animal who is involved in the Man – animal conflicts in the WCP area is the leopard. The attacks have been reported on both humans as well as livestock.

1.10 Other industries/projects in the WCP area

Details of the major Industries falling within WCP area are as given in table 1.15.

Table 1.15: List of major industry falling within the 10 km radius study area

S. N.	Name of location	Type of industry	Approx. Distance from the project boundary (km)	Direction from centre of the project site
1	Kitchen Basket manufacturing	Steelwork manufacturer	2.3 km	N
2	ABHISHEK MINERALS (INDIA) PVT LTD	Manufacturer of Calcium Carbonate Powder, Chemical Compound & Dolomite Powder	8.2 km	NNW
3	Atoz sheet metal works	Manufacturer of Storage Tank	2.35 km	N

S. N.	Name of location	Type of industry	Approx. Distance from the project boundary (km)	Direction from centre of the project site
4	BMS Industries Unit II	Chemical Manufacturer	6.0 km	N
5	Minerals manufacturer	Manufacturer of Agricultural Grade Gypsum	8.2 km	N
6	Vinayak Industrial Mineral	Industrial Minerals Manufacturer	4.8 km	NNE
7	AADHAR PRODUCTS PVT. LTD	FMCG Manufacturer	4.9 km	NNE
8	Global Colours & Chemicals ltd (Udaipur)	Paint Manufacturer	-	
9	K S Micro-Chem pvt. Ltd.	Mineral Powders & Allied Products manufacturer	4.8 km	NNE
10	Dhanlaxmi minerals	Minerals manufacturer	4.6 km	NNE
11	Unique dc motor brake	Manufacturer of Brake Motor	2.3 km	N
12	Good Dot	Food processing factory	4.60 km	NNE
13	Yuwalite	Yuwalite	5.0 km	NE
14	Group of Dangi industry	Machinery manufacturing	5.1 km	NNE
15	Kumar Mineral Industries	Minerals manufacturer	4.5 km	NNE
16	J.K. Minerals	Minerals manufacturer	4.5 km	NNE
17	Pyrotech Electronics Pvt. Ltd. Unit-4	Manufacturers of automation & control equipment	6.3 km	WSW
18	Electromagnetic Engineers	Motion Control Devices manufacturer	5.0 km	NNE
19	Pixel Plast Pvt. Ltd.	Plastic bottle manufacturer	4.5 km	NNE
20	Jetha kitchen equipment (Factory)	Industrial Kitchen Equipment Manufacturers	4.5 km	NNE

S. N.	Name of location	Type of industry	Approx. Distance from the project boundary (km)	Direction from centre of the project site
21	Hinglaj Microns	Powder manufacturer	5.0 km	NNE
22	BMS INDUSTRIES	Chemical Manufacturer	5.2 km	NNE
23	Lipi Data Systems Ltd.	Electronics manufacturer	7.7 km	WSW
24	Kalika Sinchai HDPE Pipe - JAIN ENTERPRISES	Pipe Manufacturer	7.50 km	WSW
25	Reliance Chemotex Industries Limited	Textile manufacturing	6.7 km	WSW
26	Tempsens Instruments (I) Pvt Ltd. Unit-2	Instrument Manufacturer	6.5 km	WSW
27	Choksi Heraeus Private Limited	General manufacturing	6.6 km	WSW
28	Vaishnav Food Product	Food processing factory	6.4 km	WSW
29	Patel Enterprises	Manufacturing disposal glass and cups	0.12 km	NNW
30	Murlivala pvt.ltd.	Food Processing Company	4.5 km	NNE
Source: Google Earth Imagery; EIA/EMP Report; Field Survey				

1.11 Experts in Wildlife Conservation Plan

Details of experts involved in the preparation of WCP are present in table 1.16.

Table 1.16: List of experts involved in the preparation of WCP

S. N.	Name	Designation	Role in Project
1	Mr. Ashok Jain	Managing Director	Financial Advisor
2	Dr. Ninad Raut	Lead, Ecology and Biodiversity	Project Coordinator and Forestry expert
3	Mr. Akshay Nachane	Co-lead, Ecology and Biodiversity	Biodiversity Expert
4	Mr. Adwait Jadhav	Manager - Biodiversity	Fauna Expert
5	Mr. Prathamesh Shirsat	Senior Analyst - Biodiversity	Fauna Expert
6	Mr. Dhaval Waghela	Analyst - Biodiversity	Flora Expert

7	Ms. Kshitija Parkar	Junior Analyst - Biodiversity	Technical Assistant

Field visit and data collection methodology

Baseline data was collected for the study area by monitoring and surveying of various environmental components/parameters in the core as well as buffer zone during the study period i.e., Summer Season (March, 2022 to May, 2022); details of which are given in table 1.17.

Table 1.17: Baseline Data Collection (Summer Season: March, 2022 to May, 2022)

Sr. No.	Environmental Component	Primary data				Secondary data
		Parameters	Frequency	Monitoring / Sampling Locations	Methodology	
1	Micro-Meteorology	Wind speed (Hourly), Wind direction, Dry bulb, Temperature, Wet bulb, Temperature, Relative humidity, Rainfall, Solar radiation, Cloud cover, Environmental Lapse Rate	Hourly Continuous	1 (Plant site)	Automatic Weather monitoring station	IS 5182 Part 1-20 Site specific primary Data collected at site. IMD book (Climatological normals 1981-2010), Past year Rainfall data for Udaipur. Solar GIS
2	AAQ	PM10, PM2.5, SO2, NOx, CO, HC, ,Zn and pb	(24 hourly), twice a week	8	Sampling: CPCB Guidelines/NAAQS/ IS 5182 and Instrument Manual Analysis: CPCB Guidelines / IS 5182	Existing project baseline data.

Sr. No.	Environmental Component	Primary data				Secondary data
		Parameters	Frequency	Monitoring / Sampling Locations	Methodology	
3	Noise	Equivalent noise levels in Leq in dB (A)	Once in a season (day & night time)	8	Sampling: IS 9989 (Analysis: CPCB Guidelines/IS 9989)	-
4a	**Surface Water**	Parameters as per IS 10500 - 2012	Once in a season	8	Sampling: CPCB Guideline & APHA 22nd edition 2012 (Analysis: IS 10500-2012/ IS 3025/APHA 22nd edition 2012)	BIS Standards
4b	**Ground Water**	Parameters as per IS 10500 - 2012	Once in a season	8		-

Sr. No.	Environmental Component	Primary data				Secondary data
		Parameters	Frequency	Monitoring / Sampling Locations	Methodology	
5	Traffic Study	Type of vehicle	-	NH-27	Manual by observation	IRC guidelines for capacity of Urban Roads in Plain areas 106:1990
6	Land Environment					
6a	**Soil**	Parameters As per IS 2720/USDA	Once in a season	8	Analysis: As per IS 2720/USDA	Indian Agricultural Research Institute Handbook

Sr. No.	Environmental Component	Primary data				Secondary data
		Parameters	Frequency	Monitoring / Sampling Locations	Methodology	
6b	**Land use/Landscape** Location code, Total project area, Topography, Drainage (natural), Cultivated, forest, plantations, water bodies, roads and settlements	Land use/Land cover	Once in a season	10 km radius study area	Primary and secondary data collection using field survey and authenticated credentials. Processing using DIP technique and preparation of LULC using ERDAS Imagine 9.2.	Satellite image from NRSC, Hyderabad. Survey of India Toposheet
7	Biological Environment	Flora and fauna	Once in a season	Study area	Quadrate sampling method/ random sampling	Forest working plan and Local Information and forest.rajasthan.gov.in

Sr. No.	Environmental Component	Primary data				Secondary data
		Parameters	Frequency	Monitoring / Sampling Locations	Methodology	
7a	**Aquatic** Primary productivity, Aquatic weeds, Enumeration of Phyto plankton, zoo plankton and benthos Fisheries, Diversity indices, Trophic levels, Rare and endangered Species, Marine Parks/ Sanctuaries/ closed areas /coastal regulation zone (CRZ)	Flora and fauna	Once in a season	Study area	Samples to collect from upstream and downstream of Discharge point, nearby tributaries at downstream, and Also from dug wells close to activity site. For forest studies, direction of wind should be considered while selecting forests.	Government offices, NGOs, published literature

Sr. No.	Environmental Component	Primary data				Secondary data
		Parameters	Frequency	Monitoring / Sampling Locations	Methodology	
7b	**Terrestrial** (Vegetation-species list, economic importance, forest produce, medicinal value, Importance value index (IVI) of trees, Fauna, Avi fauna, Rare and endangered species, Wildlife Sanctuaries / National park / Biosphere reserve, Tiger/Elephant Reserve, Migratory routes)	Flora and fauna	Once in a season	Study area	Samples to collect from upstream and downstream of Discharge point, nearby tributaries at downstream, and Also from dug wells close to activity site. For forest studies, direction of wind should be considered while selecting forests.	Government offices, NGOs, published literature

Sr. No.	Environmental Component	Primary data				Secondary data
		Parameters	Frequency	Monitoring / Sampling Locations	Methodology	
8	**Socio- Economic Environment**	Demographic Structure, Infrastructure resource base, Economic resource base, Health status: Morbidity pattern, Cultural and aesthetic attributes Education	Once in a season	Study area	**Economic Parameter** Random Sampling of the villages. Survey Conduction, Through Questionnaire approach. Group Discussions.	Demographic Data: Census data, 2011. · List of prevailing diseases from Public Health Centre · List of villages where public health Centre are set up · List of schools · Map of taluka. · Bharat Maps GIS · Bharat Maps
Source: EIA/EMP report Debari Zinc Smelter						

1.12 Literature review

1.12.1 Impact of project activities on Biodiversity

Mining and smelting are important economic activities. However, mining-related industries are also some of the largest sources of environmental pollution from heavy metals. A large amount of lead, zinc, and related elements, such as cadmium, have been released into the environment due to mineral processing activities and have impacted water resources, soils, vegetables, and crops. Biological studies have isolated the effects of a variety of pollutants like SO2, NOx, fluorides etc. on vegetation. Considerable scientific evidence exists to demonstrate the causal relationship between poor air quality and deteriorating plant growth (Seneca and Taussig, 1974). In some areas, this pollution is hazardous to human health (Zhang, X., et al. 2012). Due to the potential health risks such elements pose to humans, considerable interest and concern has focused on the impact of trace elements associated with smelter activities upon residential and agricultural soils. As a consequence, it is important to determine the extent of the contaminated area and the concentration of these elements that might be potential hazards (Fernandez-Turiel, J. et al. 2001).

Water bodies close to lead/zinc mining industries have a high risk of pollution from wastewater associated with mining (ore-dressing) and smelting. Most pollutants are stored in or absorbed into sediments, which may act as a secondary source of environmental pollution (Zhang, X., et al. 2012).

Soil is easily polluted by lead/zinc mining and smelting activities. Research has demonstrated that soils and plants adjacent to mining areas are heavily polluted with Pb, Cd and, to a lesser extent, Zn and Cu. Compared to natural soils, polluted soils have fewer nutrients and reduced microbial diversity, which inhibits plant growth (Zhang, X., et al. 2012).

Smelter wastelands containing high amounts of zinc, lead, cadmium, and arsenic constitute a major problem worldwide. Serious hazards for ecosystem functioning are related to a lack of vegetative cover, causing fugitive dust fluxes, runoff and leaching of metals, affecting post-industrial ecosystems, often in heavily populated areas (Sylwia Siebielec, et al. 2018). Lead and zinc at high levels compromise the health of wildlife and their habitat (Liu, Chin-Chia et al. 2019) & (Journal of wildlife diseases, 56).

In one research, species dominated a community decreased with increasing pollution near Zinc smelter (Irena, M., et al. 2009).

1.12.2 Relevant research on WCP area

A 'Biodiversity Conservation Plan' focuses on the flora and fauna found in the area in 10 km radius of Debari Zinc Smelter. Ecological field surveys were conducted in one seasons, where information on floral, faunal and socio-ecological scenario was collected. Information about the observed species such as scientific name, local name, IUCN status and importance in their habitats and to humans is presented in the BAP report. Based on this information, a biodiversity map was made, which denoted the locations of important sightings and biodiversity rich areas. Analysis of threats to the biodiversity from the mining activities and pollutants released from mining operations was carried out. The consequences of impacts can be short term and long term, direct and indirect, reversible and irreversible. Ecosystem services benchmarking was done to determine improvements in company's operations.

1.13 Geographical information of WCP area

Geographical information regarding the Topography, geology, water and drainage patterns, linear infrastructure in the WCP area are included in Chapter 1. Study area map showing Land use Hydrology, and Built-up structure map are presented in Chapter 7.

Chapter 2

2.1 General impact of the project on the environment and other factors

Zinc Smelter Debari is a Hydrometallurgical zinc smelter. The project activities will have physical and biological impact on environment such as parameter like Air will be impacted due to project activities such as during Pre-construction phase (site cleaning and burning of all waste collected), during Construction phase (Civil work, Heavy equipment operations, disposal of construction, Generation of Sewage, transportation of construction and material), and during Operation phase (Raw material transportation/ storage/ handling, Emission from operation of metallurgic process, storage/ Handling/ transport of products and by products, waste management).

- The main sources of dust emission are the movement of equipment at site, levelling, grading, earthwork and foundation works.
- Fugitive dust emissions from vehicles and equipment to be deployed during the construction phase is also likely to result in marginal increase in the levels of SO_2, NO_x, PM, CO and un-burnt hydrocarbons.
- Loading and unloading activities will also contribute in deterioration of air quality.

Noise/ Vibration will be generated due to project activities such as during Pre-construction phase (Site cleaning), during Construction phase (Civil work/ building structures, Heavy equipment operations, and transportation of construction material), and during operational phase (Raw material transportation/ storage/ handling, storage/ Handling/ transport of products and by products, waste management).

Land use, Topography, Geology will be impacted due to project activities such as during Pre-construction phase (Site cleaning), during construction phase (Civil work/ building structures, heavy equipment operation, Disposal of construction material) and during Operation phase (Raw material transportation/ storage/ handling, storage/ Handling/ transport of products and by products, abstraction of water, and waste management). The present land use of the plant site is industrial; expansion will be done within the existing plant premises; therefore, there will be no permanent change in land use, only intensity will increase due to expansion project.

Surface water and ground water will be impacted due to project activities such as during Construction phase (Civil work/ building structures, influx of construction workers), and during Operation phase (Raw material transportation / storage/ handling, Emission from operation of metallurgic process, Effluent from operation of metallurgic process, storage/ Handling/ transport of products and by products, abstraction of water, and waste management).

Soil will be impacted due to project activities such as during Pre-construction phase (Site cleaning, Burning of all waste collected), during Construction phase (Civil work/ building structures, heavy equipment operation, Disposal of construction material and solid waste from labours, Generation of sewage, influx of construction workers), and during operation phase (Raw material transportation / storage/ handling, Emission from operation of

metallurgic process, Effluent from operation of metallurgic process, storage/ Handling/ transport of products and by products, and waste management).
In Biological parameters, Flora and fauna will be impacted due to project activities such as (Site cleaning, burning of all waste collected), during Construction phase (Civil work/ building structures, and Disposal of construction material), and during Operation phase (Emission from operation of metallurgic process, Effluent from operation of metallurgic process, and waste management).

Anticipated impacts on various parameters

The anticipated environmental impacts of the proposed Expansion within the existing Debari Zinc Smelter project would be mainly due to the construction and operational activities. The environmental parameters likely to be affected are related to many factors, viz. physical, social, economic, agriculture and aesthetic.
The industrial operations can disturb the environment in various ways, such as change in air, noise level; water and soil quality of that particular area. While for the purpose of development and economic up-liftman of people, there is need for establishment of industries, but these have to be environmentally friendly. Therefore, it is essential to assess the impacts of expansion project on different environmental and socio-economic parameters; so that, abatement measures could be planned in advance to minimize/reduce, mitigate, offset or compensate for adverse impacts; and to enhance positive impacts wherever practicable.

2.1.1 Impact on Topography and Land use pattern

There will not be any significant impact / change in topography and land use pattern of the area due to expansion project.

- The total area of Debari Zinc Smelter is 184.2 ha. and is under the possession of M/s. Hindustan Zinc Ltd. and the proposed expansion will be carried out within the existing premises of Debari Zinc Smelter.
- Topography of the site is generally more or less flat with minor undulations in some area. During construction phase, some level of cutting and filling will need to be done to maintain an even topography within the plant area. No change is envisaged.
- The present land use of the plant site is industrial; expansion will be done within the existing plant premises; therefore, there will be no permanent change in land use, only intensity will increase due to expansion project.
- Out of the total plant area i.e.184.2 ha; 76.28ha (41.41 %) area has already been developed under greenbelt/plantation. The same will be maintained and enhanced by doing gap plantation.

2.1.2 Impact on Air quality

- **Construction Phase**

  Increase in dust (Particulate Matter) and NO_x concentration due to Levelling activity and Heavy vehicular movement.

  - The main sources of dust emission are the movement of equipment at site, levelling, grading, earthwork and foundation works.

- Fugitive dust emissions from vehicles and equipment to be deployed during the construction phase is also likely to result in marginal increase in the levels of SO_2, NO_x, PM, CO and un-burnt hydrocarbons.
- Loading and unloading activities will also contribute in deterioration of air quality.

The impact due to construction activities is mainly the health effects such as respiratory diseases However, the impacts will be for short duration and of minor nature. This will be confined within the plant boundary and is expected to be negligible outside the plant boundary. The impact will, however, be reversible, marginal and temporary in nature.

➢ **Operation Phase**

The major air pollutants due to expansion in DZS are the PM (Zinc melting furnaces: 50 mg/Nm3, oil fired Boilers: 600 mg/Nm^3 and DG Sets: 75 mg/Nm^3), SO_2 (Sulphuric acid Plant II and III: 950 mg/Nm^3 and oil fired boiler: 600 mg/Nm^3), Acid Mist (Sulphuric acid Plant II and III: 50 mg/Nm^3), NO_x (oil fired boilers: 300 mg/Nm^3, DG Sets: 710 mg/Nm^3), NMHC (DG Sets: 100mg/Nm^3) & CO (DG Sets: 150mg/Nm^3).

The operational phase of the proposed expansion project comprises of various activities and the same will impact the air quality due to:

A. Fugitive emissions
B. Stack emissions

A. Fugitive emission

Fugitive dust may be defined as "any solid particulate matter that becomes airborne by natural or man-made activities, excluding particulate matter emitted from an exhaust stack.

Factors that influence emissions

Factors affecting emissions include the following:

- Moisture content of the material
- Type of material processed
- Type of equipment
- Operating practices employed

Fugitive emissions in plant are due to various process and non-process related activities which are given below:

❖ Process related activities
  ✓ Material Handling and Transfer
    - Loading and unloading operation of raw material and finished product
    - Material Transfer Points
  ✓ Material Storage

❖ Non-process related activities
  ✓ Vehicular Traffic
    - Movement of raw material and finished product by trucks / trailer from main gate to designated place inside the plant and vice-versa.

- Movement of personnel vehicles

B. Stack emission

In plant site, the major emission from stack is Particulate Matter (PM) emissions. In addition, gaseous pollutants (SO_2, NO_x, and CO) are also emitted from the stacks and vehicular emissions.

DG Sets

- Emissions from DG set are /will be dispersed through the stack;
- Adequate stack height has been maintained for the two existing DG sets, same will be followed for the proposed DG sets.

Hence, the overall quality of the ambient air will be maintained within the limit prescribed by CPCB / RSPCB after the commencement of the expansion of Zinc Smelter plant.

2.1.3 Impact on Noise environment

- **Construction Phase**

Increase in noise level due to construction equipment may cause irritation, disturbance in sleep, hearing problems etc.

- During construction phase, noise will be generated due to following activities / processes:
  - Movement /operation of transport and construction vehicles / equipment.
  - Transportation of equipment, materials and people.
  - Other important activities involved in construction stage such as drill, hammering, Cement mixing, heavy vehicle transportation, welding, excavation, Cut & fill during construction of expansion project. Earth work will be done for the construction purpose for installation of one new Roaster (3,00,000 TPA) , establishing new Leaching & Purification, Zinc Cell house plant with one new DG Sets (1.2 MW) and other allied facilities
  - Piling work during laying down of foundation for infrastructure.
- The noise generated will be high due to construction activities, high noise levels can cause irritation and gradual hearing loss to construction labourer's if high levels of noise exposure are continuously experienced. Sudden exposure can cause irritation in ear drums and sudden loss in hearing whereas long term exposure will result in gradual ENT problems. Though the noise generation during construction phase will be temporary and will be limited to the project site but workers who are directly exposed to it can have problems related to it.

- **Operation Phase**

- The expansion project will result in increase in noise levels within the plant area, which will be generated from the operation of machineries and equipment such as Roasting Plant, Casting plant and D.G. Set etc.; and from vehicular movements for transportation of construction material and other ancillary activities.

- The noise generated may cause a significant impact on workers and surrounding residents and if exceeds the permissible levels for a continuous period of time, this may lead to loss of attention/concentration resulting in accidents also reducing the efficiency of working staff.
- However, noise level at the plant boundary is being/will be maintained below 75 dB (A) in day time and below 70 dB (A) in night time but near to the machineries i.e. DG sets is comparatively high which is likely to have impact on the ear drums of the persons working in high noise area.

2.1.4 Impact on Water quality

- **Construction Phase**

Water requirement at construction phase will be mainly for construction of civil works, dust suppression and drinking purpose. Water requirement at construction phase of proposed expansion activities at plant site will be fulfilled from the existing source. Impact on water quality during construction phase will be mainly due to sewage generated from the workstation of construction workers. For the construction workers temporary sanitation facility will be provided (Portable STP) for the disposal of sewage generated. As the construction work mainly include mechanical fabrication there will be less requirement of water for construction work. So, the impact on water during construction phase will be minimal. The overall impact on water environment during construction phase due to proposed expansion project is likely to be temporary, short term and insignificant.

Domestic wastewater being treated STP and by completion of expansion project it will be discharged into the sewage treatment plant.

The treated water will be reused for gardening purpose within the plant premises. There will not be any discharge from the site during the construction stage which can have any impact on the water quality of the surrounding area. The following anticipated impacts on water quality could occur during construction phase:

- Increase in suspended solids due to soil run-off during heavy precipitation due to loose soil at construction site.
- Domestic waste water will be generated during construction activities and same will be treated in ST. Stagnant water or water logging for a long time may leads to various water borne diseases & unpleasant smell in nearby area.

- **Operation Phase**

- Total existing water requirement for the project is 8000 KLD. After the expansion project, 3800 KLD additional water will be required for the proposed expansion; which will be sourced from Udaipur STP. Therefore, no additional water Fresh water will be required for the proposed expansion project.
- Water requirements will be met from Udai Sagar and Manasi Wakal Dam and 45 MLD STP installed to treat the sewage generated from Udaipur city.
- No ground water abstraction is being done and will not be done for the proposed expansion project.
- No wastewater is being/ will be discharged outside the plant as we are maintaining Zero Liquid Discharge, no additional waste water will be generated after expansion as we will utilize internal water in expansion.

- Total wastewater generated from DZS plant after expansion is 4994 KLD, out of which 4500 KLD is being treated in RO-ZLD unit and remaining 494 KLD is being used in the process after treatment in ETP.
- Total effluent generation after expansion will be 4994 KLD. For which, debottlenecking to improve the efficiency of existing ETP is envisaged and additional capacity of 2000 KLD ETP & RO-ZLD unit will be installed to treat the effluent.
- The effluents, cooling water generated during operational process, if not treated properly and discharged carelessly on ground, soil or water bodies can enter into ground water through leaching. Surface water bodies are affected as the pollutants will have the tendency to increase silting due to suspended solids, taste, odour, temperature rise, DO, oil slicks etc. It will result is loss of aquatic fauna and long-term change in characteristics of water bodies present in the vicinity. The discharge will also harm the soil flora and fauna and result in reduction of fertility of soil.

2.1.5 Impact on Soil quality

➢ **Construction Phase**

- During construction activity, the impact on soil will be limited to the construction site only and would be mainly due to the left-out of construction material used resulting in soil deterioration.
- If construction material will be disposed off on land, then it can modify the soil quality to various extent and top soil will get affected. Due to the accumulation of cement, used for construction purpose, on the top soil results in the lack of oxygen and hence, reducing the soil porosity, which will result in loss of fertility.
- Compaction is a common problem during the construction activity due to the movement of large number of heavy machineries over the soil.
- There will be deteriorating soil quality and decrease in vegetation abundance. It will result in pH, alkalinity, and heavy metal content modifications and can affect the vegetation growth of that area.

➢ **Operation Phase**

- Degradation of soil quality may take place due to the settling of air borne dust, contamination due to the effluent discharge, material spillage, unscientific disposal of solid and hazardous waste, if any.
- This may lead to change in physio-chemical characteristics of soil of the area.

2.1.6 Impact on Biological environment

There is no National Park, Sanctuary, Biosphere Reserve, Migratory Corridor of wild animals exists within 10 km radius study area

However; 22 Reserve Forests lies within 10 km of the study area which are mentioned in Section 1.7 of Chapter 1.

➢ **Impacts**

- Particulate matter emissions from stack and fugitive emissions due to transportation activity & material handling may degrade the soil quality of

surrounding environment that may affect the biodiversity of surrounding environment.

- Particulate matter emission may cause migration of wild animals and birds.
- Fugitive emissions (dust) may impact the terrestrial flora. The settlement of dust on the laminar surface of plants can impede the efficiency of photo-transduction and thereby, affect the productivity of plants. In some of the plant, it may also smother the leaf surface blocking stomata, resulting in reduced transpiration.
- Increased noise level due to running of machinery may scare the wild fauna and force them to migrate to other areas.

2.2 Pollutants from the project and their effect on environment

Pollutants released from the mine and their effects on biological environment of the WCP area is presented in table 2.1.

Table 2.1: Pollutants from the project and their impact on biological environment

S. N.	Parameters	Pollutants	Effect
1	**Air**	$PM_{2.5}$, PM_{10} SO_2, NO_x, Acid Mist, CO, NMHC, Hg and its compound.	There will be minor threat to the gaseous pollutants of the ambient air quality; however, concentration of particulate matter and SO2 is a subject of concern - though not immediate.
2	**Surface water**	suspended solids; Domestic waste water; stagnant water; effluents	• Leads to various water borne diseases & unpleasant smell in nearby area. • If not treated properly, as the pollutants will have the tendency to increase silting due to suspended solids, taste, odour, temperature rise, DO, oil slicks etc. It will result is loss of aquatic fauna and long-term change in characteristics of water bodies present in the vicinity. The discharge will also harm the soil flora and fauna and result in reduction of fertility of soil.
3	**Soil**	left-out of construction material	During construction activity, the impact on soil will be limited to the construction site only
		Settling of air borne dust; effluent discharge; material spillage; unscientific disposal of solid and	This may lead to change in physico-chemical characteristics of soil of the area

S. N.	Parameters	Pollutants	Effect
		hazardous waste	
4	**Biological Environment:** Flora and Fauna	Above said air pollutants	**Flora:** Crops – Detrimental effects include reduction in total chlorophyll, ascorbic acid and carotenoids contents, thus affecting rate of photosynthesis and overall physiology, resulting in stunted growth and reduction in yield. Similar effects are seen in native vegetation. **Fauna:** Alterations in the tracheal epithelium
Source: EIA/EMP report of the Debari Zinc Smelter			

2.3 Quantification of degradation of environmental parameters due to project activities

Environmental parameters such as soil, water, air and noise levels are tested in the WCP area. Various sampling points were selected strategically for analysing each parameter.
Presence of multiple pollutants was detected and analysed for each of soil, water and air. The pollutants that have scientifically proven impact on the flora and fauna have been included in the present report.

2.3.1 Soil

The soil samples were collected from 08 different specified locations within the study area from the project site. Standard procedures were followed for the sampling and analysis of physio-chemical parameters.. Details of Location of soil sampling stations along with the direction are given in table – 2.2 and soil analysis results are given in table 2.3.

Table 2.2: Locations of Soil and Ground water sampling stations

Sr. No.	Sampling station	Approx. aerial distance from Plant Site	Direction
SWGS1	Plant site	-	-
SWGS2	Near Bichhri	~0.25 km	East
SWGS3	Mandesari	~9.0 km	East
SWGS4	Debari	~1.0 km	NE
SWGS5	Udaipur (Pratap nagar near Gugla RF)	~6.0 km	West
SWGS6	Lakarwas	~4.0 km	South
SWGS7	Gowla	~0.5 km	North
SWGS8	Dabok	~4.5 km	ENE
Source: EIA/EMP report of the Debari Zinc Smelter			

The 8 soil samples in the WCP area were analysed for 25 parameters. The components that have significant impact on the flora and fauna are presented in table 2.3.

Table 2.3: Soil Analysis Results (Study Period: Summer Season between March, 2022 to May, 2022)

S. N.	Parameters	Unit	Sampling Locations							
			Plant Site	Village-Bichhari	Village-Mandesar	Village-Debari	Village-Lakadwas	Udaipur Pratap Nagar	Village Gowla	Village-Debok
1	pH (at 25°C) (1:2.5 soil water sus.)	-	7.61	7.56	7.34	7.56	7.38	7.32	7.68	7.22
2	Conductivity (1:2 soil water sus)	mS/cm	0.57	0.46	0.47	0.55	0.52	0.78	0.58	0.45
3	Soil Texture	-	Sandy clay	Sandy clay	Clay Loam	Sandy clay	Sandy clay	Clay Loam	Sandy Clay Loam	Clay Loam
4	Colour	-	Light Brown	Reddish Brown	Light Brown	Light Brown	Dark Brown	Light Brown	Light Brown	Dark Brown
5	Water Holding Capacity	%	42.6	43.4	49.6	41.39	45.9	50.37	46.19	49.4
6	Bulk Density	gm/cc	1.39	1.36	1.48	1.49	1.39	1.42	1.37	1.33
7	Chloride	mg/kg	269.62	265	289	248.25	474	196.08	276.84	373
8	Calcium	mg/kg	3426.54	1943	2350	3017	2951	2886	3562	2647
9	Sodium	mg/kg	285.55	193	261	335.23	328	504.87	156.31	180
10	Potassium	kg/hec	764.51	544	533	532.51	533	1491.02	513.26	533
11	Magnesium as Mg	mg/kg	614.5	315	398	546.2	470	504.2	589.61	418
12	Organic Matter	%	1.06	1.09	0.91	0.78	0.97	1.11	0.89	1.02
13	Available Nitrogen as N	kg/hec	160.25	301	299	312.64	333	298.4	308.2	279
14	Available Phosphorus	kg/hec	48.62	42.6	56.3	98.64	48.6	62.9	76.51	87.6
15	Zinc as Zn	mg/kg	19.54	30	44.1	47.25	33.7	40.93	34.26	51.2
16	Manganese as Mn	mg/kg	195.62	149.9	157.7	173.07	177.23	231.64	167.52	245.36
17	Lead as Pb	mg/kg	16.57	9.03	25.4	19.97	16.5	15.03	23.16	22.4
18	Copper as Cu	mg/kg	22.25	10.9	16.35	25.33	11.6	11.63	44.43	22.7
19	Organic Carbon	%	0.61	0.63	0.53	0.45	0.56	0.64	0.52	0.59
20	SAR Value	-	1.24	1.07	1.31	1.48	1.48	1.38	1.11	0.86
21	Sand	%	51	47	26	52	49	25	64	29
22	Silt	%	13	14	44	9	13	41	14	42
23	Clay	%	36	39	30	39	38	34	22	29
24	Porosity	%	50.63	51.53	50.81	53.24	52.78	53.57	53.98	49.7
25	Salanity	ppt	0.41	0.35	0.32	0.40	0.43	0.62	0.40	0.28

Source: EIA/EMP report of the Debari Zinc Smelter

The soil samples were Reddish, Light and Dark Brown in colour indicating well drained soil samples. The textures of soil samples were Clay loam to Sandy Clay loam. The soil texture are desirable for agriculture.

All soil samples have Neutral to slightly alkaline nature, having pH range from 7.22 to 7.68.

Water holding capacity (41.39 % to 50.37 %) and bulk density (1.29 to 1.43 g/cc) were ideal for the crops. Physical quality of soil samples is good for the plantation.

All the major nutrients were present, namely organic matter (0.78 % to 1.11 %) optimum, nitrogen (160.25 to 333 kg/ha) better to sufficient, phosphorus (42.6 to 98.64 kg/ha) medium to more than sufficient and potassium (513.26 to 1491.02 kg/ha) more than sufficient. This indicates that soil fertility is good with nitrogen, phosphorus in average quantity in some soil samples in the study area.

Other nutrients were present in the soil samples, namely calcium (1943 to 3062 mg/kg), magnesium (315 to 614.5 mg/kg), zinc (19.54 to 51.2 mg/kg). SAR value was also calculated for the study and it was found in the range of 0.86 to 1.48.

The texture of the soil samples majorly consists of Sandy Clay to Sandy Clay loam which favors good drainage, fertility of the soil and it has ability to retain moisture and nutrients to the soil. The samples have an optimum content of organic matter which is suitable for the Plant growth. As observed the essential nutrients within the soil of the sampled villages, Nitrogen content was observed to be present in the better to sufficient quantity, whereas the values for phosphorus were found to be medium to more than sufficient & potassium is more than sufficient. The soil sample of the plant site shows a comparatively neutral to slightly alkaline pH in nature and consist majorly Sandy loam Salinity electrical conductivity is also found to be present average.

From the results, it can be concluded that the quality of the soil within the study area is suitable for plantation and greenbelt.

2.3.2 Ground water

The quality of ground water was studied by collecting 8 water samples from the available water resources around the project site. Details of ground water sampling locations and their distance and directions are given in table 2.2 and Analytical methods prescribed by APHA & approved Indian Standard methods were used for carrying out ground water quality monitoring.

The results of water sampling analysis are presented in table 2.4

Table 2.4: Ground Water Quality Analysis Results

Study Period: Summer Season (March, 2022 to May, 2022)

S. N.	Parameters	Unit	Plant Site	Village-Bikhheri	Village-Nandesar	Debari	Udaipur	Village-Lakadwas	Village-Gowla	Dabok	Specification as per IS 10500-2012	
											Requirement Acceptable Limit	Permissible Limit in the Absence of Alternate Source
1	pH (at 25°C)	-	7.42	7.46	7.52	7.85	7.55	7.52	7.74	7.67	6.5-8.5	No Relaxation
2	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Total Hardness as $CaCO_3$	mg/l	301.9	336.6	549.4	792.01	415.8	623.7	594.65	470.27	200	600
5	Calcium as Ca	mg/l	87.13	97.25	142.5	188.12	114.8	182.24	138.63	122.73	75	200
6	Alkalinity as $CaCO_3$	mg/l	261.2	280.2	318.2	418	327.7	331.6	399	380	200	600
7	Chloride as Cl	mg/l	164.9	114.9	312.4	442.3	112.4	323.6	303.2	147.8	250	1000
8	Magnesium as Mg	mg/l	20.55	22.8	47.11	78.40	31.42	41.07	60.45	39.87	30	100
9	Total Dissolved Solids	mg/l	702	636	1056	1498	713	1122	1123	809	500	2000
10	Sulphate as SO_4	mg/l	95.41	92.07	134.7	201.3	123.6	123.9	146.5	123.6	200	400
11	Fluoride as F	mg/l	0.83	0.94	1.13	1.28	1.19	1.22	0.98	1.08	1	1.5

S. N.	Parameters	Unit	Plant Site	Village-Bichhari	Village-Mandesar	Debari	Udaipur	Village-Lalaad nas	Village-Gowla	Dabok	Specification as per IS 10500-2012	
											Requirement Acceptable Limit	Permissible Limit in the Absence of Alter-nate Source
12	Nitrate as NO_3-N	mg/l	15.04	22.04	19.64	33.06	26.22	29.05	27.85	19.05	45	NO Relaxation
13	Iron as Fe	mg/l	0.63	0.32	0.29	0.48	0.44	0.36	0.29	0.46	1	NO Relaxation
14	Sodium as Na	mg/l	78	48	106	156	43.4	124.5	120	58	–	–
15	Potassium as K	mg/l	3.4	2.9	4.6	6.9	5.6	3.2	2.3	2.8	–	–
16	Conducti-vity	µS/cm	1131	972	1665	2412	1183	1722	1596	1189	–	–
Note: * is Agreeable and # is No Relaxation												
Source: EIA/EMP report of the Debari Zinc Smelter												

Remarks: BDL - Below Detectable Limit, DL - Detection Level

Note: *Apart from the above, various parameters viz. Colour (DL 5.0 Hazen Unit), Turbidity (DL 1.0 NTU), Cyanide as CN (DL 0.02 mg/l), Aluminum as Al (DL 0.03 mg/l), Phenolic Compounds (DL 0.001 mg/l), Anionic Detergents as MBAS (DL 0.02 mg/l), Hexa Chromium as Cr+6 (DL 0.03 mg/l), Chromium as Cr (DL 0.002 mg/l), Zinc as Zn (DL 0.10 mg/l), Copper as Cu (DL0.02 mg/l), Manganese as Mn (DL 0.10 mg/l), Cadmium as Cd (DL 0.002 mg/l), Lead as Pb (DL 0.008 mg/l), Arsenic as As (DL 0.002 mg/l), Mercury as Hg (DL 0.001 mg/l), Phosphate as PO4 (DL 0.02 mg/l), Nickel (DL 0.005 mg/l), Total Suspended Solids (DL 1.0 mg/l), Boron(0.20 mg/l) were analyzed in the water samples but the same were not detected*

The physico-chemical analysis of groundwater samples was compared with Drinking Water Standard (IS:10500-2012). The pH of the groundwater samples ranged from 7.42 to 7.85 which is within the permissible limit. As per the drinking water standards, pH has an optimum range of 6.5 to 8.5, therefore, the study area has a pH ranging with the prescribed limits; thus, the samples are fit for drinking purpose. The odour and taste were found agreeable at all sampling locations.

The observed values of parameter varies from: Total dissolved solids (636 to 1498 mg/l), total hardness (301.9 to 792.0 mg/l) and total alkalinity (261.2 to 418.0 mg/l). Village Debari and village Lakadwas has hard water and needs treatment before consumption or any other domestic activities. Hard water cause accumulation of deposits in appliances and pipes can cause blockage and in appliances, it can cause loss of energy efficiency and decrease its life span. The concentration of chloride was found to be (112.4 to 442.3 mg/l) and sulphate was (92.07 to 201.3 mg/l), Nitrate (15.04 to 33.06 mg/l), Calcium (87.13 to 188.12 mg/l), Magnesium (20.55 to 78.40 mg/l). The conductivity (972 to 2412 µS/cm). The Fluoride concentration (0.83 to 1.28 mg/l) was within permissible range for all villages. Based on the conductivity values, the groundwater samples are good for irrigation purpose. Iron was found (0.29 mg/l to 0.63mg/l). The sodium concentration (43.4 to 124.5 mg/l) and potassium concentration (2.3 to 6.9 mg/l). Thus, it can be concluded from the sampling results for groundwater that all the samples were observed to be within the permissible limits and complies to the drinking water standard (IS:10500-2012) except Village Village Debari and Village Lakadwas where Total Hardness are out of the prescribed limit. The adequate mitigation measure proposed in this regard have been given in Chapter 4 of this EIA / EMP Report.

2.3.3 Surface water

Surface water samples were collected from 08 water bodies in the study area and analyzed to know the surface water quality of the area. Surface water location details are given in table 2.5 and results are given in & table 2.6.

Table 2.5: Locations of surface water sampling stations

Sr. No.	Sampling Stations	Approx. aerial distance from Plant Site	Direction
SW1	Udaisagar	~1.5 km	SSW
SW2	Ahar Nadi	~ 3.5 km	SW
SW3	Berach River	~1.5 km	SE
SW4	Bagdara Talav	~ 8.5 km	SSW
Source: EIA/EMP report of the Debari Zinc Smelter			

Table 2.6: Surface Water Analysis Results

No.	Parameters	Unit	Udiasagar	Ahar River	Berach River	Bagdara Talav
1	pH (at 25°C)	--	7.44	7.62	7.58	7.77
2	Odour	--	10	Agreeable	Agreeable	Agreeable
3	Turbidity	NTU	14	10	4	7
4	Total Hardness as $CaCO_3$	mg/l	341.59	371.26	391.11	584.14
5	Calcium as Ca	mg/l	63.35	69.33	81.22	120.75
6	Alkalinity as $CaCO_3$	mg/l	280.28	313.52	323.04	356.25
7	Chloride as Cl	mg/l	369.89	384.36	339.81	362.37
8	Magnesium as Mg	mg/l	44.6	48.18	45.8	68.74
9	Total Dissolved Solids	mg/l	996	1136	1012	1116
10	Sulphate as SO_4	mg/l	92.8	119.21	101.39	121.6
11	Fluoride as F	mg/l	0.69	0.81	0.87	1.05

12	Nitrate as NO_3	mg/l	4.82	5.87	6.9	8.54
13	Iron as Fe	mg/l	0.39	0.19	0.45	0.42
14	Phosphate as Po_4	mg/l	0.34	0.23	0.09	0.25
15	Total Suspended Solid	mg/l	24.1	18.6	8.9	12.3
16	Biochemical Oxygen Demand	mg/l	16.3	18	7.6	11
17	Chemical Oxygen Demand	mg/l	46.9	63.3	24	36
18	Sodium as Na	mg/l	176	193	164	122
19	Potassium as K	mg/l	2.7	2.9	3.2	3.4
20	Conductivity	µs/cm	1639	1823	1626	1719
21	Dissolve Oxygen	mg/l	6.3	6.1	7.2	6.9

BDL – Below Detection Limit, DL- Detection Limited

Note: *Surface water Analysis*

Surface water quality was also analyzed for Colour (1.0 Hazen Unit), Turbidity (1.0 NTU), Residual free Chlorine (0.2 mg/l), Cyanide as CN (0.02 mg/l), Aluminium as Al (0.03 mg/l), Boron(0.2 mg/l), Phenolic Compounds (DL 0.001 mg/l), Anionic Detergents as MBAS (DL 0.02 mg/l), Hexa Chromium as Cr+6 (DL 0.03 mg/l) , Zinc as Zn (DL 0.0005 mg/l), Copper as Cu(DL 0.02 mg/l), Manganese as Mn (DL 0.01 mg/l), Lead as Pb(DL 0.008 mg/l) , Selenium as Se (DL 0.005 mg/l), Arsenic as As (DL 0.002 mg/l), Mercury as Hg (DL 0.001 mg/l) , and Nickel (DL 0.001 mg/l) but not detected.

The above-mentioned chemical analysis of surface water samples reveals that there is a variation in the chemical composition of water samples from nearby water bodies. The other water bodies viz. Vela Nala, Khemli Talav, Gadela Nadi and Udaisagar Right Canal etc. were found dry during baseline monitoring.

The turbidity of water samples were found (4.0 to 14.0 NTU) and the odour was found agreeable at three sampling locations.

The value ranges of various parameters such as pH (7.44 to 7.77), Total Hardness (341.59 mg/l to 584.14 mg/l) indicating hard water, Total Dissolved Solids (996.0 mg/l to 1136.0 mg/l), Alkalinity (280.28 mg/l to 356.25 mg/l), and conductivity (1626.0 µs/cm to 1823.0 µs/cm) is satisfactory due to presence of ions in the water body, Sulphate (92.80 mg/l to 121.60 mg/l), nitrates (4.82 mg/l to 8.54 mg/l), Calcium (63.35 mg/l to 120.75 mg/l), Magnesium (44.60 mg/l to 68.74 mg/l), sodium (122 mg/l to 193 mg/l), potassium (2.7 mg/l to 3.4 mg/l), COD (24 mg/l to 63.3 mg/l), TSS (8.9 mg/l to 24.1 mg/l), fluoride (0.69 mg/l to 1.05 mg/l), Fe (0.19 to 0.45 mg/l), chloride (339.81 mg/l to 384.36 mg/l), Phosphate (0.09 mg/l to 0.34 mg/l), DO (6.1 mg/l to 7.2 mg/l), BOD (7.6 mg/l to 18 mg/l).

As per the CPCB standards, the water quality parameters DO and pH for all sampling sites are within permissible limit of Class A whose designed best use is "Drinking water source without conventional treatment but after disinfection" making it suitable for aquatic life; but due to the higher values of BOD the surface water quality is mildly polluted so it cannot be directly used or consumed as a source of drinking water. The same can be utilized after proper treatment. Details regarding Impact assessment and mitigation measure have been given in Chapter 4 of this EIA/EMP Report.

2.3.4 Air

The Ambient air were monitored from 08 different Ambient Air Quality (AAQ) monitoring stations within the study area from the project site. Standard test procedures were followed for the monitoring and findings. Details of Location of AAQ monitoring stations along with the direction are given in table – 2.6 and AAQ monitoring results are given in table 2.7

Table 2.7: Composite Locations of Ambient Air Quality Monitoring Stations
Study Period: Summer Season (March, 2022 to May, 2022)

Station code	Sampling Location	Approx. Aerial Distance & direction	Selection Criteria
AAQ1	Plant site	Core zone	Core zone
AAQ2	Near Bichhri Village	~0.25 km in E direction	Downwind of pre-dominant wind direction
AAQ3	Mandesar Village	~9.0 km in E direction	Downwind of pre-dominant wind direction Near Airport
AAQ4	Panwari RF	~0.5 km in W direction	Upwind of pre-dominant wind direction Near RF NearNH27
AAQ5	Debari Village	~1.0 km in NE direction	Upwind of 2nd pre-dominant wind direction NearNH27
AAQ6	Udaipur (Pratap nagar near Gugla RF)	~6.0 km in W direction	Mostly habitation area Near RF
AAQ7	Village Lakarwas	~4.5 km in S direction	Crosswind of dominant wing direction Near Udaisagar
AAQ8	Village Gowla	~0.5 km in N direction	Crosswind of dominant wing direction Near NH 27
Source: EIA/EMP report of the Debari Zinc Smelter			

The air pollutants was monitored and the results obtained are summarized in table 2.8

Table - 2.8: Ambient Air Quality Monitoring Results

S.N.	Sampling Location	Parameters												Lead (µg/m3)
		$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		Nitrogen Oxide (NO_2) (µg/m³)		Sulphur Dioxide (SO_2) (µg/m³)		Carbon Monoxide (CO) (mg/m³)		Zinc (Zn) (µg/m3)	Hydro carbon (ppm)	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.			
1	Plant site	42.6	33.8	81.7	67.5	26.3	16.9	15.3	8.2	0.98	0.7	3.02	1.9	0.26
2	Near Village Bichhri	38.9	30.1	77.5	63.8	23.5	14	13.4	7.6	0.75	0.62	1.88	BDL	0.11
3	Village Mandesar	36.5	28.9	74.1	60.5	21.4	13.1	13.8	7.8	0.79	0.6	BDL	BDL	0.05
4	Near Village Panwari RF Area	38.7	26.5	69.4	58.9	19.7	12.2	12.3	6.9	0.67	BDL	BDL	BDL	BDL
5	Village Debari	45.2	35.8	83	65.6	24.3	14.8	14.8	6.7	0.84	0.66	1.16	BDL	BDL
6	Udaipur (Pratap nagar near Gugla RF)	51.3	42.3	88.1	72.2	28.2	19.2	16.6	8.8	1.12	0.7	1.28	2.2	0.39
7	Village Lakarwas	38.8	31.2	70.8	62.6	20.5	12.7	11.9	7	0.66	BDL	BDL	BDL	BDL
8	Village Gowla	40.1	35.6	73.9	61.3	22.8	13.8	12.7	6.6	0.73	BDL	BDL	BDL	BDL
Detection Limit										0.5		1	1	1
NAAQS*		60		100		80		80		4		-	-	1

NAAQS- National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009

Remark - Detection limits for Zinc – 0.5(µg/m3) and Total Hydrocarbon -1.0 mg/m3, Lead-0.02(µg/m3)

Ambient Air Quality Monitoring reveals that the concentrations of PM2.5 and PM10 for all the 8 AAQM stations were in range of 26.5 to 51.3 µg /m3 and 58.9 to 88.1 µg /m3 respectively and were found to be within the prescribed limits.
As far as the gaseous pollutants SO2 and NO2 are concerned, the prescribed CPCB limit of 80 µg /m3 has never surpassed at any station. The concentrations of SO2 and NO2 were found to be in range of 6.6 to 16.6 µg /m3 and 12.2 to 28.2 µg/m3 respectively. The concentration of CO was found to be in range of BDL to 1.12 mg/m3. The concentration Zinc (Zn) ranges between BDL (DL: 1 µg/m3) to 3.02 µg/m3, the concentrations of Total Hydrocarbon were BDL (DL: 1.0 mg/m3) to 2.2 mg/m3 and the concentrations of lead was BDL to 0.39 µg/m3. The prime contributors for the air pollutants within the 10 km study area include industrial and human activities such as construction and vehicular movement, etc. The maximum concentration of most of the parameters was found in Udaipur which may be due to vehicular movement, densely populated area and minimum at Near Panwari RF which may be due to domestic activities and geological barrier from the plant by Panwari RF. All the parameters at the monitoring locations were found well within the prescribed NAAQ standards. But it is expected, due to the proposed expansion project, there will be increase in the pollutant concentration in the nearby villages, primarily in the villages falling in the downwind direction, but adequate mitigation measure will be adopted to mitigate the additional air pollution load. Detailed mitigation measures to be adopted by Hindustan Zinc Limited to control the air emissions are given in Chapter- 4 & 10 of this EIA/EMP report.

2.3.5 Noise

Source of Noise

There are several sources of noise in the 10 km radius of the study area, which contributes to the local noise level of the area. Ambient noise sources in the vicinity of the plant site include noise from plant operation, traffic on road, human activities in villages and agricultural fields.

Sampling Schedule

The sampling was done during day time & night time once in the study period.
Locations / stations selected for noise level monitoring are given in table 2.9.

Table 2.9: Locations of Ambient Noise Level Monitoring Stations

Sr. No.	Monitoring stations	Tentative distance (from plant lease boundary) & direction (from centre point)	Selection Criteria
ANL1	Plant site	Core zone	• Core zone
ANL2	Near Bichhri	~0.25 km in East direction	• Downwind of pre-dominant wind direction
ANL3	Village Debari	~1.0 km in NE direction	• Upwind of 2nd pre-dominant wind direction • NearNH27
ANL4	Village Gowla	~0.5 km in N direction	• Crosswind of dominant wing direction • Near NH 27

Sr. No.	Monitoring stations	Tentative distance (from plant lease boundary) & direction (from centre point)	Selection Criteria
ANL5	Habitation between plant site and Panwari RF	~0.2 km in West direction	• Upwind of pre-dominant wind direction • Near RF
ANL6	Ghata Wala Mataji Temple	~1.0 km in WNW direction	• Near NH27
ANL7	Diggi	~0.8 km in SSE direction	• Crosswind of dominant wing direction
ANL8	Village Sihara	~2.7 km in ESE direction	• Crosswind of 2nd dominant wing direction
Source: EIA/EMP report of the Debari Zinc Smelter			

Ambient noise levels monitored at different locations (as mentioned in table 2.9) during the study period are given in table 2.10.

Table 2.10: Ambient Noise Level Monitoring Results

Study Period: Summer Season (March, 2022 to May, 2022)

S. N.	Monitoring Locations	Noise Level Leq. dB (A)			
		Day Time (6:00 am to 10:00 pm)	Prescribed limit	Night Time (10:00 pm to 6:00 am)	Prescribed limit
1	Plant Site	66.4	75	56.4	70
2	Near Village Bichhri	52.6	55	42.1	45
3	Village Debari	53.5	55	43.8	45
4	Village Gowla	52.9	55	42.7	45
5	Habitation between Plant site and Panwari RF	51.2	55	42.0	45
6	Ghatawala Mataji Temple	53.7	55	42.3	45
7	Village Diggi	52.1	55	42.5	45
8	Village Sihara	51.9	55	41.7	45
Source: EIA/EMP report of the Debari Zinc Smelter					

Ambient noise levels were measured at 08 locations in and around the plant site during the day and night time. Noise level varies from 51.5 to 66.4 Leq dB (A) during day time and from 41.7 to 56.4 Leq dB (A) during night time.

The noise is mainly caused due to nearby anthropogenic activities and transportation. Noise pollution is the major problem in the urban areas but the small towns and the nearby villages all along the road side are also the victim of the noise problems.

The highest value of noise level as monitored in day time and in night time were observed at Plant Site due to plant activities and the minimum noise levels were observed at habitation between plant site and Panwari RF during day time and night time as there is less habitation and there is no other major source of noise pollution in proximity of this area.

From the above study and discussions, it can be concluded that noise levels in the study area are well within the prescribed limits as prescribed by the Noise Pollution (Regulation and Control) Rules, 2000.

Minor increase in noise levels near to the plant site will be seen due to the proposed expansion project.

2.4 Nature of threats to the flora and fauna

There will be no significant impact of proposed expansion project on flora & fauna as proper mitigation measures like development of greenbelt, installation of APCE etc. will be taken by the company.

Anticipated Impacts

- Particulate matter emissions from stack and fugitive emissions due to transportation activity & material handling may degrade the soil quality of surrounding environment that may affect the biodiversity of surrounding environment.
- Particulate matter emission may cause migration of wild animals and birds.
- Fugitive emissions (dust) may impact the terrestrial flora. The settlement of dust on the laminar surface of plants can impede the efficiency of photo-transduction and thereby, affect the productivity of plants. In some of the plant, it may also smother the leaf surface blocking stomata, resulting in reduced transpiration.
- Increased noise level due to running of machinery may scare the wild fauna and force them to migrate to other areas.

Impact on biological environment due to increased human intervention and vehicular traffic in the WCP area

The expansion project will attract human population for increased demand for manpower. Increased human intervention may have effects like clearing of land to establish temporary housing, increased dependency on trees for firewood for the migrated population, disturbance of wildlife due to human inhabitation in their territories, etc.

Increased vehicular traffic will lead to rise in air pollution due to dust and vehicular emissions, affecting physical environment of the WCP area and resultantly, the flora and fauna.

Regular monitoring of these changes will allow quantification of the environmental damage post-expansion.

2.5 Probable increase in vehicular traffic and its impacts

The traffic survey monitoring was done in March 2022 to predict the future traffic growth and the load on the plant road and surroundings due to the expansion project.

Table 2.11: Locations of Traffic Survey Conducted for the Project

S. N.	Traffic Survey Location	Geographical Coordinates	Type of Carriageway	Distance & direction from the plant site
1	NH 27	24°36'29"N 73° 48'53"E	6 Lane (Divided)	~0.45 km in WNW direction
Source: EIA/EMP report of the Debari Zinc Smelter				

Measurements of Traffic density were made continuously for 24 hours by visual observation and counting of vehicles under four categories, viz., heavy motor vehicles, light motor

vehicles, two/four wheelers and others. Total numbers of vehicles per hour under the four categories were determined. The details of the traffic volume count have been provided in table 2.12.

Table 2.12: Traffic Volume Count

S. N.	Vehicle Type	No. of vehicles/day
		Adjacent to Plant site NH-27
1	Motor Cycle / Scooter	3689
2	Passenger Car/ Van/ Auto Rickshaw	8330
3	Tractor	30
4	Buses/Trucks	10822
5	Trailer Truck	315
6	Cycles / Cycle Rickshaw	119
Total		**23305**
Source: EIA/EMP report of the Debari Zinc Smelter		

Traffic Projection & Impact due to Transportation:

Due to the proposed expansion project, there will be addition of Heavy and Light motor vehicles in the existing traffic.

The LOS value is "Very Good" for NH - 27. The LOS will remain same as "B" after the proposed expansion project. Thus, it can be concluded that the present road network is good enough to bear the increased traffic load. However, internal and nearby roads will be maintained as and when needed to facilitate transportation.

Besides this, M/s. Hindustan Zinc Ltd. is being / will take all appropriate measures to reduce the impact of transportation and to minimize the traffic flow to the best possible extent resulting in low level of dust, noise and gaseous emissions

Anticipated Impacts

- Increase in the Road traffic density may result in deteriorating the ambient air quality.
- Rapid Movement of heavy duty vehicles may cause in increase noise level.
- No direct impact is envisaged on the flora and fauna of the vicinity area due to noise/ or the vibrations, slight impact could be observed on the nearby biodiversity.
- Increased traffic volume may increase the probability of accidental incidences in the area.
- Increased traffic may cause accidental incidences and public health problems.

2.6 Impact on Ecology and Biodiversity

2.6.1 Impact of Soil, Air, Water and Noise pollution on Flora

As per analysis of these environmental parameters, it was found that the presence of toxicants and heavy metals was within permissible limits. Hence, currently minimum impact is predicted of these components on floral diversity in the WCP area.

2.6.2 Impact of Soil, Air, Water and Noise pollution on Fauna

Soil pollution affects the plants. Presence of heavy metals and other pollutants enter the food chain through these primary producers, which are consumed by the herbivores. The

pollutants accumulate in the bodies of these herbivores, passing on the carnivores and scavengers feeding on them. This phenomenon of 'Bioaccumulation' affects the entire ecosystem. Some pollutants can be fatal for the animals.
Survey of soil samples from the 8 locations in the study area showed presence of heavy metals and other pollutants in harmless quantities. Assurance of maintenance of these levels of pollution will ensure minimal impact on the faunal diversity in the WCP area.

Impact of air pollution on faunal diversity
Air pollution levels are within permissible limits. Hence, minimal impact is expected on the faunal diversity in the study area.

Impact of water pollution on faunal diversity
Water sampling in the study area revealed permissible amounts of pollutants. Hence, minimal impact is expected on the faunal diversity in the study area.

Impact of noise pollution on faunal diversity
Restricting of the noise levels up to 75 dB will aid reducing the impacts of noise.

Impact on habitats – Water body
The existing plant is a Zero discharge Facility and after expansion it will continue to be a zero-discharge facility. Therefore no water bodies in existing 10 km radius are impacted due to project activity on aquatic water body.

Impact on habitats – Terrestrial
There will not be any significant impact / change in topography and land use pattern of the area due to expansion project. The present land use of the plant site is industrial; expansion will be done within the existing plant premises; therefore, there will be no permanent change in land use, only intensity will increase due to expansion project. Positive as greenbelt of appropriate width has been/will be developed and maintained in the Plant area.

2.7 Impact due to extensive clearing or modification of vegetation

It is noteworthy that no forest land will be required for the expansion purpose. Therefore, there will no environmental loss due to conversion of forest land to non-forest (industrial) land. Therefore, it is very clear that there will be no negative environmental impact due to the proposed project expansion at Debari Village of Girwa Tehsil in Udaipur District (Rajasthan). Only minimal impact during site clearing and site clearing waste during preparation and levelling phase will be generated such as waste vegetation, surface soil, shrubs, stumps and rubbish from site due to levelling which may result in soil and water contamination.

2.8 Impact on displacement/movement of fauna

There is a data deficit on records of migration routes or movements of faunal diversity in WCP area. From the available data, some conclusions regarding faunal displacement of animals in the study area can be derived. The expansion project will lead to increase in vehicular traffic will affect the terrestrial fauna, causing increase in road-kills. Hence, minimal disturbance is expected to the displacement/ movement of faunal diversity of WCP.

Chapter 3

3.1 Objectives of management to address the issue of wildlife Conservation

Sustainable development is the principle goal of HZL. HZL strives to reduce its environmental footprint and meet community expectations to support sustainable development. Most of the risks to sustainability are related to environment.

HZL holds following goals with respect to environment and wildlife conservation –

(HSE policy)

1. Ensure Zero Harm to personnel and environment.
2. Identify and evaluate HSE risks for all activities and take actions to eliminate/ mitigate risks and hazards.
3. Conserve natural resources and eliminate waste through reduction, recycling and reuse methods, which are environment-friendly and energy-efficient.

(Biodiversity policy)

4. Creating awareness to prevent, where possible, minimize and mitigate biodiversity risks throughout HZL's businesses. The lands under HZL's operations are managed and used in a manner that allows biodiversity conservation, which is integrated with business needs throughout the project lifecycle, including decommissioning, closure and rehabilitation.
5. Compliance with and exceed where possible, the local, regional and national legislative requirements on land management and biodiversity conservation and applicable international conventions in all jurisdictions in which it operates.
6. Identification and assessment of biodiversity status, value and its impacts, due to resettlement, loss of cultural heritage, loss of protected land and endangered species before the start and over the project lifecycle.
7. Consideration of the impacts on ecosystem services in business decisions.
8. Working towards the conservation of threatened/ rare and endemic species and high priority conservation areas, and supporting local, national and global conservation initiatives.
9. Provision of information and raising awareness among the employees and other stakeholders to enhance knowledge and understanding of biodiversity and conservation issues, where applicable.

3.2 Strategies to mitigate and minimize adverse impacts of project activities

The measures, some in practice and some proposed, to mitigate the effects of mining and beneficiation project are given in table 3.1.

Table 3.1: Overview of anticipated impacts of the project and mitigation measures

Discipline	Anticipated Impact	Mitigation Measures
Air	**Construction Phase:** Increase in dust (Particulate Matter) and NO_x concentration due to Leveling activity and Heavy vehicular movement.	• Water spraying on roads and construction site will prevent fugitive dust. • Extensive dust extraction network is provided. • Proper maintenance of vehicle and construction equipment will help in controlling the emissions. • Construction equipment having PUC Certificate will be deployed during the activity to restrict exhaust emission. • Vehicles having construction materials will be covered with tarpaulin. • Proper training of the drivers so as to ensure adherence to speed limit. • A separate storage area will be demarcated for construction material to confine the dust dispersion. • Covered storage facilities will be provided. • Proper PPEs will be provided to workers to avoid accumulation of dust in respiratory tracts and prevent air borne diseases. • Proper greenbelt development and plantation inside and outside the plant premises.
	Operation Phase: The major air pollutants emitted from the DZS include PM, SO2, Acid Mist, NOx.	• Additional Tail Gas Treatment (TGT) is proposed to minimize SO2 emissions from 1.5 to 1.0 Kg /MT of Sulphuric Acid production in 2nd roaster and proposed roaster. • The PM emission will be reduced by replacement of existing bag filter bags with upgraded/ PTFE coated bags, which will bring down PM emission. • Extensive dust extraction network consisting of Venturi Scrubbers and Bag Filters are provided. • Gas wash tower and Thiessen Disintegrator are provided to capture Furnace Gas. • Continuous monitoring system for SO2. • Spraying of water is being continuously carried out at the various location viz., Belt conveyors, etc., to suppress the dust particles.

Discipline	Anticipated Impact	Mitigation Measures
		• Ventilation system followed by bag filters, are provided in the metal tapping area to control work zone emissions. • Ash handling unit & disposal area and unloading point area are provided with water sprinklers to arrest the dust and fugitive sources of dust. • In order to minimize fugitive emissions Zn concentrate containing 8-10% moisture is being handled; • All existing Stacks are connected to CPCB & RSPCB Server. • Mobile vacuum dust sweeping system on industrial roads and vacuum dust cleaning system for plant area exist at smelter to control airborne dust due to the vehicles movement. Regular road washing is being done on internal roads. • Vehicular emissions are maintained as per standard. • 41.41 % of the area is covered with greenbelt /plantation at site.
Noise	**Construction Phase:** Noise increase due to construction equipment may cause disturbance, inconvenience, loss of concentration, hearing problems, etc.	• Selection of low noise generating machinery/equipment and eequipment's will be kept in good condition to keep the noise level within 90 dB (A). • Acoustic enclosures for machines & equipment, providing PPEs (Ear plugs/ Ear defenders) to persons working just close to machines, lubrication & maintenance of machineries/equipment's/ Vehicles. • Greenbelt for attenuation of noise propagation and Periodical noise monitoring is being/ will be carried out with enclosures & barriers.
	Operation Phase: • The expansion project will result in increase in noise levels within the plant area, which will be generated from the operation of machineries and equipment such as	For the proposed expansion project, installation of equipment/ machinery will be with low generation of noise as per design and also, will be housed in a closed system. Therefore, noise level of the surrounding area will not increase significantly.

Discipline	Anticipated Impact	Mitigation Measures
	Roasting Plant, Casting plant and D.G. Set etc.; and from vehicular movements for transportation of construction material and other ancillary activities. • The noise generated may cause a significant impact on workers and surrounding residents and if exceeds the permissible levels for a continuous period of time, this may lead to loss of attention/concentration resulting in accidents also reducing the efficiency of working staff.	Following noise abatement measures will also be taken: • Machine operators and Persons working just close to machine are being/will be provided with PPE viz. Ear plugs/Ear muffs etc. • Proper maintenance, oiling and greasing of machines at regular intervals is being/will be done to reduce generation of noise. • D.G. sets are being/will be provided with acoustic enclosures to control the noise level within the prescribed limit. • Greenbelt along the plant boundary has been developed. The same will enhanced w.r.t area & density. The plant boundary is thickly with vegetated with species of wide canopy. • Regular monitoring of noise level is being/will be carried out and corrective measures in concerned machinery will be adopted accordingly.
Water	**Construction Phase:** • Increase in suspended solids due to soil run-off during heavy precipitation due to loose soil at construction site. • Domestic waste water will be generated during construction activities. And stagnant water or water logging for a long time may leads to various water borne diseases & unpleasant smell in nearby area.	• Storm water drains have been already provided at site. The drains will be properly aligned in conformity with the site drainage pattern so that the alteration is kept to the minimum and flooding or soil erosion does not occur. • Provision of separate storm water system to collect and store run–off water during rainy season and utilization of the same in the process to reduce the freshwater requirement. • Domestic Wastewater generated due to construction activities is being/will be used in process/Plantation after treatment in STP • Construction workers will be brought from nearby villages so that domestic water is saved in many ways due to temporary requirements only. • No discharge of any kind will be done inside or outside plant premises in any water body. Thus, there are/will not be any

Discipline	Anticipated Impact	Mitigation Measures
		discharge from the site which can have any impact on the water quality of the surrounding areas. • Record of water consumption on daily basis will be maintained as per present practice.
	Operation Phase: • Total existing water requirement for the project is 8000 KLD. After the expansion project, 3800 KLD additional water will be required for the proposed expansion; which will be sourced from Mansi Wakal Dam and Udaipur STP. Therefore, no additional water Fresh water will be required for the proposed expansion project. • No ground water abstraction is being done and will not be done for the proposed expansion project. • No wastewater is being/ will be discharged outside the plant as we are maintaining Zero Liquid Discharge, no additional wastewater will be generated after expansion as we will utilize internal water in expansion. • Total wastewater generated from DZS plant is 3494 KLD, after proposed expansion project total 5000 KLD wastewater effluent will generate for which additional capacity of 2000 KLD RO-ZLD/MVR unit will be installed to treat all 5000 KLD effluent. • The effluents, cooling water	• The existing plant is a Zero discharge Facility and after expansion it will continue to be a zero-discharge facility. • Industrial effluent is being/will be treated in existing ETPs (5760 KLD). • Storm water management practice will be continued as existing. • Continuous attempt is being/will be made to optimize/reduce the use of water and to avoid wastage and leakage of water. • Waste water generated from the domestic activities like from canteen, Toilet, Rest room & canteen will be treated in STP having 200 KLD capacity. • Treated water after primary treatment is being/will be used in greenbelt & dust suppression. • For inspection, cleaning and maintenance of sewer lines, manholes of reinforced concrete construction shall be provided at every bend, junction point of change in slope or diameter and on straight sections of pipes at intervals not exceeding 30 meters. • Rainwater Harvesting System shall be incorporated. Maximum use of harvested water will be for plant use. • Trunk drains (0.5 m wide & 0.5 m depth) along the internal roads will be created. All the drains will be interlinked with higher size drain 1 m wide & 1 m depth that will relate to 1 nos. storm water reservoir/Guard Pond. The contaminated particle matters will be deposited as slurry to bottom of reservoir. Excess water during heavy rain fall will be discharged into the natural drain.

Discipline	Anticipated Impact	Mitigation Measures
	generated during operational process, if not treated properly and discharged carelessly on ground, soil or water bodies can enter into ground water through leaching. Surface water bodies are affected as the pollutants will have the tendency to increase silting due to suspended solids, taste, odour, temperature rise, DO, oil slicks etc. It will result is loss of aquatic fauna and long-term change in characteristics of water bodies present in the vicinity. The discharge will also harm the soil flora and fauna and result in reduction of fertility of soil.	
Soil	**Construction Phase:** The impact on soil will be limited to the construction site only and would be mainly due to the left-out construction material used, litter disposal & Soil stockpiling which results in soil deterioration or reduce fertility of soil if not managed properly.	• Careful design, planning and good site management would minimize wastage of materials such as concrete, mortars and cement grouts. • Construction waste will be segregated as much as possible at plant site itself to increase the feasibility of recycling concrete and masonry as filling material and steel pieces as saleable scrap. • To reduce soil compaction, working on the wet soil will be avoided. • Litter disposal and collection points will be established around the work sites. • The construction spoils will be temporarily stored at the designated dumpsite located inside the plant premises. • Empty packaging materials, drums, glass, tin, paper, plastic, pet bottles, wood, thermocol and other packaging materials, etc. will be disposed of through local recyclers.

Discipline	Anticipated Impact	Mitigation Measures
		• The existing industrial shed will be utilized for the expansion project. • Discharge of any kind of pollutant will be strictly prohibited during construction period.
	Operation Phase: • Degradation of soil quality may take place due to the settling of air borne dust, contamination due to the effluent discharge, material spillage, unscientific disposal of solid and hazardous waste, if any. • This may lead to change in physico-chemical characteristics of soil of the area.	• Adequate Air Pollution Control Measures are being and will be implemented to avoid contamination or degradation of soil. • Solid and hazardous waste is being/will be disposed of as per prevailing rules. • A horticulturist is being/will be engaged to ensure soil quality improvement in the plant area, by adequate manuring and fertilizing. No adverse impact on the soil quality of the area is anticipated. • Besides, soil samples are being/will be collected and tested at regular intervals from the nearby areas. This will help in mitigation of any harmful impact on soil due to the project activity, if any.
Biological Environment		
c. Terrestrial Ecology	Positive as greenbelt of appropriate width has been/will be developed and maintained in the Plant area	
d. Aquatic Ecology	No impact as no effluent is being/will be discharged outside the plant premises.	
Socio-economic Environment	Overall development of the area in respect of the infrastructure development, educational growth, health facilities etc.	
Source: EIA/EMP report Debari Zinc Smelter		

Chapter 4

The WCP area shows considerate floral and faunal diversity, presented in Table 1.12 and Table 1.13, respectively.

According to authenticated list of flora by the Udaipur Forest Department (North), all plant species found in the Debari Zinc Smelter area and their 10 km Buffer area are not included in the WPA schedules or recorded in the threatened categories by the IUCN. However, plants form the basis of biodiversity in an area, providing habitat and food to all of the biodiversity. Hence, conservation of existing floral diversity and enhancement of vegetation cover by undertaking new plantations is essential.

According to authenticate data of the Udaipur Forest Department (North), Rajasthan. A total of 10 species of mammals, 4 species of avifauna, and 2 species of reptiles are recorded from WCP area. Out of this 7 species of mammals, 1 species of avifauna and 1 species of reptile are included in schedule - I of the Wildlife (Protection) Amendment Act, 2022.

Thus, for the benefit of existing biodiversity and enhancement of the same.

Kindly, refer Chapter 6 of Table 6.3 for Conservation measures need to be implement in the core area and their finances.

The following interventions can be implemented within the project area (Core area):

1. Maintenance of the existing natural habitats in the core area and increasing the green cover is beneficial for sustaining and enhancing biodiversity.
2. Formulating a system for carrying out rescue operations with the help of the Forest Department is advisable.
3. Speed limit signs and information signages installed at the project site will further save the faunal diversity found in the core area.
4. Awareness programs for the staff members regarding the presence, threats and need measures for conservation of the local Biodiversity are essential.
5. Greenbelt development programme –
   a. To attenuate noise levels generated from the plant
   b. To improve the aesthetics of the plant area
   c. To trap the vehicular emissions and fugitive dust emissions
   d. To maintain and improve biodiversity
   e. To prevent soil erosion and to protect the natural vegetation

Out of the total plant area i.e.184.2 ha; 76.28 ha (41.41 %) area has already been developed under greenbelt/plantation. Total plantation will be increased by 40,700 trees in next 3 financial years i.e. 15000 trees in the year of 2024-25-, 15000 trees in the year of 2025-26 and 10700 tress in the year of 2026-27 in close vicinity of plant area.

Furthermore, refer Chapter 6 of table 6.3 for Conservation measures need to be implement in the core area and their finances.

Chapter 5

Biodiversity survey was carried out in the core and buffer area, which provided in mentioned list of floral and faunal species. Some of those species are of conservation significance and hence are included in the 'Schedule – I' (Species of highest importance) in the Wildlife (Protection) Act, 1972 and Wildlife (Protection) Amendment Act, 2022. These faunal species require attention for their crucial role in their ecosystem, low population, sensitivity to changing habitat and climate or endemic distribution.

Kindly, refer Chapter 6 of Table 6.4 for Conservation measures need to be implement in the buffer area and their finances.

The Table 5.1 enlists the faunal species found in the core or buffer areas that are included under the Schedule – I of Wildlife (Protection) Amendment Act, 2022.

Table 5.1: Schedule – I species of the WCP area

S. N.	Common Name	Family	Local Name	Scientific Name	IUCN	WPA
Mammal						
1	Leopard	Felidae	Baghera, Tendua	*Panthera pardus*	VU	I
2	Indian Fox	Canidae	Lomadi	*Vulpes bengalensis*	LC	I
3	Golden Jackal	Canidae	Siyaar	*Canis aureus*	LC	I
4	Jungle Cat	Felidae	Jungli Billi	*Felis chaus*	LC	I
5	Ruddy Mongoose	Herpestidae	Nevla	*Herpestes smithii*	LC	I
6	Striped Hyena	Hyaenidae	Jarakh	*Hyaena hyaena*	NT	I
7	Indian Crested Porcupine	Hystricidae	Sehi	*Hystrix indica*	LC	I
Reptile						
8	Russell's Viper	Viperidae	Chitti	*Daboia russelii*	LC	I
Bird						
9	Indian Peafowl	Phasianidae	Mor, Dheladi	*Pavo cristatus*	LC	I
Source: Authenticated list of Udaipur Forest Department (North), Rajasthan; WPA, 2022.						

The conservation of these species is not possible in isolation. Their habitat as a whole need to be conserved with respect to the food chain, shelter, vegetation, and water to maintain a self-sustaining population of these species.

Wildlife Conservation Plan (WCP) has been prepared for the conservation of Schedule – I species under the Wildlife (Protection) Amendment Act - 2022, found in the WCP area. According to the authenticated data from Forest Department (FD) these schedule – I species (Table 5.1) were found in the Udaipur Forest Division (North) area in which the WCP area comes.

5.1 Indian Leopard

5.1.1. Systematic position

Kingdom: Animalia
Phylum: Chordata
Class: Mammalia
Order: Carnivora
Family: Felidae
Genus: *Panthera*
Species: *Panthera pardus*

The Indian leopard (*Panthera pardus fusca*) is a subspecies of genus *Panther*, which is widely distributed on the Indian subcontinent. The species of the *Panthera pardus fusca* is found in the WCP area of the buffer zone of the Debari Zinc Smelter project.

Indian Leopard is listed in the Schedule – I of Wildlife (Protection) Amendment Act, 2022 and it is listed in the Vulnerable Category of IUCN – International Union for Conservation of Nature- VU in the 'Red List' Leopards are also listed in Appendix – I of CITES (Convention on International Trade in Endangered Species of wild fauna and wild flora), 1973.

5.1.2. Description

In 1794, Friedrich Albrecht Anton Meyer wrote the first description of *Felis fusca*, in which he gave account of a panther-like cat from Bengal of about 85.5 cm (33.7 in), with strong legs and a long well-formed tail, head as big as a panther's, broad muzzle, short ears and small, yellowish grey eyes, light grey ocular bulbs; black at first sight, but on closer examination dark brown with circular darker colored spots, tinged pale red underneath. – *Panthera pardus fusca*, Male Indian leopards grow to between 4 Ft. 2 in (127 cm) and 4 Ft. 8 in (142 cm) in body size with a 2 Ft. 6 in (76 cm) to 3 Ft. (91 cm) long tail and weigh between 110 and 170 lb. (50 and 77 kg). Females are smaller, growing to between 3 Ft. 5 in (104 cm) and 3 Ft. 10 in (117 cm) in body size with a 2 Ft. 6 in (76 cm) to 2 Ft. 10.5 in (87.6 cm) long tail, and weigh between 64 and 75 lb. (29 and 34 kg). Sexually dimorphic, males are larger and heavier than females. The coat has spots and rosettes on pale yellow to yellowish brown or golden background, except for the melanistic forms; spots fade toward the white underbelly and the insides and lower parts of the legs. Rosettes are most prominent on the back, flanks and hindquarters. The pattern of the rosettes is unique to each individual. Juveniles have woolly fur, and appear dark due to the densely arranged spots. The white-tipped tail is 60–100 centimeters (24–39 in) long, white underneath, and displays rosettes except toward the end, where the spots form incomplete bands. The rosettes are larger in Asian populations and their yellow coat tends to be paler and cream colored in desert populations, more gray in colder climates, and of a darker golden hue in rainforest habitats.

5.1.3. Ecology and Behavior

Leopards are elusive, solitary, and largely nocturnal. They are known for their ability in climbing, and have been observed resting on tree branches during the day, dragging their kills up trees and hanging them there, and descending from trees headfirst. They are powerful swimmers, although are not as disposed to swimming as some other big cats, such as the tiger. They are very agile, and can run at over 58 kilometers per hour (36 mph), leap over 6 m (20 ft.) horizontally, and jump up to 3 m (9.8 ft.) vertically. They produce a number of

vocalizations, including grunts, roars, growls, meows, and purrs. Leopards are versatile, opportunistic hunters, and have a very broad diet. The diet of Indian leopards includes spotted deer, sambar deer, nilgai, wild boar, common langur, hares and Indian peafowl. Though they are smaller than most other members of the genus *Panthera*, they are able to take large prey due to their masasive skulls and powerful jaw muscles.

5.1.4. Distribution in the WCP area

According to the authenticated data from Udaipur Forest Department (North), The Indian Leopard is found in the WCP area of the buffer zone of the Debari Zinc Smelter project.

5.1.5. Reproduction and Growth

Depending on the region, leopards may mate all year round. The estrous cycle lasts about 46 days and the female usually is in heat for 6 –7 days. Gestation lasts for 90 to 105 days. Cubs are usually born in a litter of 2–4 cubs. Mortality of cubs is estimated at 41–50% during the first year. Females give birth in a cave, crevice among boulders, hollow tree, or thicket to make a den. Cubs are born with closed eyes, which open four to nine days after birth. The fur of the young tends to be longer and thicker than that of adults. Their pelage is also grayer in colour with less defined spots. Around three months of age, the young begin to follow the mother on hunts. At one year of age, leopard young can probably fend for themselves, but remain with the mother for 18 – 24 months. The average typical life span of a leopard is between 12 and 17 years.

5.1.6. Conservation Action Plan for Indian Leopard (*Panthera pardus fusca*)

Indian Leopard is listed in the Schedule – I of Wildlife (Protection) Amendment Act, 2022 and it is listed in the Vulnerable Category of IUCN – International Union for Conservation of Nature- VU in the 'Red List' because population of leopard have declined following habitat loss and due to fragmentation, poaching for illegal trade for skins and body parts and persecution due to man-animal conflict situations.

Leopards are also listed in Appendix –I of CITES (Convention on International Trade in Endangered Species of wild fauna and wild flora), 1973 due to extensive trade of leopard skins and its products.

A direct and indirect approach is required to provide effective conservation, which is recommended as under:

- Protection and improvement of habitat, it can give good shelter to the animal.
- Availability of water throughout the year will be maintained by artificial water holes and ponds deepening wherever required.
- By conducting awareness programs at community and school level to create awareness of the ecological role and also through organizing competition during "Wildlife Week" and "Van Mohotsav" celebration.
- Putting of sign boards with animal photographs/ slogan along road sides, public places, schools etc. to increase awareness about wildlife conservation.
- Some provision of rewards to informers for the control of poaching and illegal trade in wildlife.
- Carrying out census and research projects to know the potential threats and population status of the species.

- Provision of veterinary care and cages for injured or sick deformed species.
- Another way to conserve protected species is to create society dedicated to ecological ethics. All the conservation measures can be implemented with the help of and in consultation of the forest department.
- Vehicular traffic and its speed limit should be minimized to check the chance of accident of animal along the state highway and damaged to precious habitat by people to start movement towards areas.

5.2 Indian Fox

5.2.1 Systematic position

Kingdom: Animalia
Phylum: Chordata
Class: Mammalia
Order: Carnivora
Family: Canidae
Genus: *Vulpes*
Species: *Vulpes bengalensis*

The species of the Indian Fox is found in the WCP area of the buffer zone of the Debari. Indian Fox is listed in the Schedule – I of Wildlife (Protection) Amendment Act, 2022 and it is listed in the Least Concern Category of IUCN – International Union for Conservation of Nature-LC in the 'Red List'.

5.2.2. Description

Indian Fox is native to the Indian subcontinent, including India, Nepal and Pakistan and is widespread throughout its range. These foxes are found in the Himalayan foothills to the tip of the Indian peninsula. Bengal foxes generally prefer foothills and non-forested regions such as open grassland, thorny scrub, semi-desert and arid environments. They can also be found in agricultural fields, as they are not generally fearful of humans. Indian foxes inhabit burrows built approximately two to three feet below ground surface.

Indian foxes are medium sized foxes. They have elongated muzzles and small patches of black hair on the upper portion of the muzzle. The most prominent feature of Indian foxes is a large bushy tail. Their ears are large for their size and are possible an adaptation to thermoregulation in their hot, arid habitats.

5.2.3. Ecology and Behavior

Indian foxes are tame and generally not fearful of humans, making them vulnerable to hunting. In response to human presence, Indian fox populations alter their active periods from daytime to crepuscular and nocturnal habits. In mild temperatures and cloudy weather, daytime hunting also occurs. Hunting is a solitary behaviour in these foxes. The basic social unit is one breeding pair but larger aggregations may occur when grown pups remain in their natal area. Female Indian foxes have been witnessed sharing dens during lactation and four adult foxes have been seen emerging from the same den.

The common vocalization of Indian foxes is a chattering cry that plays a major role in advertising territory. These foxes also growl, whimper, whine and "growl-bark." During the breeding season, males vocalize extensively during the early morning hours, at dusk, and at

night. Scat and scent marking are also used to indicate territories and areas that have been recently hunted.

Indian Fox is an omnivorous, opportunistic species that feeds mainly on insects, birds and their eggs, small rodents, reptiles, and fruits. While the primary diet of adults is insects, the fecal matter of pups is composed primarily of rodent hair. Less common prey items include ground lizards, rat snakes, hedgehogs, and Indian hares. They feed on fruits of ber, neem, mango, and banyan.

5.2.4. Distribution in the WCP area

According to the authenticated data from Udaipur Forest Department (North), The Indian Fox is found in the WCP area of the buffer zone of the Debari Zinc Smelter project.

5.2.5. Reproduction and Growth

Indian foxes are believed to live in long-term monogamous pairs, but this supposition is based on little evidence. During the breeding season, males vocalize intensely during the night and at dusk and dawn. Indian foxes remain near dens during the period from February to June, when they are raising pups. They breed from December to January with an average litter size of two. Birth occur from January to March. The breeding season is announced by re-excavation of old dens or the digging of new dens. Indian foxes have also been known to appropriate gerbil burrows and show significant site fidelity, with dens being used year after year. Because of their low population densities, little is known about the lifespan of Indian foxes in the wild. The most significant cause of mortality is persecution by humans, as well as natural predation, roadkills, and human caused habitat degradation. Populations of Indian foxes fluctuate naturally with prey availability.

5.2.6. Conservation Action Plan for Indian Fox (*Vulpes bengalensis*)

The Indian Fox (*Vulpes bengalensis*) is classified as Least Concern on the IUCN Red List of Threatened Species and it is given the utmost protection by inclusion in Schedule – I of the Wildlife (Protection) Amendment Act, 2022.

A direct and indirect approach is required to provide effective conservation, which is recommended as under:

- Protection and improvement of habitat, it can give good shelter to the animal.
- Availability of water throughout the year will be maintained by artificial water holes and ponds deepening wherever required.
- By conducting awareness programs at community and school level to create awareness of the ecological role and also through organizing competition during "Wildlife Week" and "Van Mohotsav" celebration.
- Putting of sign boards with animal photographs/ slogan along road sides, public places, schools etc. to increase awareness about wildlife conservation.
- Some provision of rewards to informers for the control of poaching and illegal trade in wildlife.
- Carrying out census and research projects to know the potential threats and population status of the species.
- Provision of veterinary care and cages for injured or sick deformed species.

- Another way to conserve protected species is to create society dedicated to ecological ethics. All the conservation measures can be implemented with the help of and in consultation of the forest department.
- Vehicular traffic and its speed limit should be minimized to check the chance of accident of animal along the state highway and damaged to precious habitat by people to start movement towards area.

5.3 Golden Jackal

5.3.1 Systematic position

Kingdom: Animalia
Phylum: Chordata
Class: Mammalia
Order: Carnivora
Family: Canidae
Genus: *Canis*
Species: *Canis aureus*

The species of the Golden Jackal is found in the WCP area of the buffer zone of the Debari. Golden Jackal is listed in the Schedule – I of Wildlife (Protection) Amendment Act, 2022 and it is listed in the Least Concern Category of IUCN – International Union for Conservation of Nature- LC in the 'Red List'.

5.3.2. Description

The golden jackal is the most northerly of jackal species, and also the most widely distributed. It overlaps biotopes only with the black-backed jackal in East African savannas. Golden jackals prefer dry open country, arid short grasslands and steppe landscapes.

The body length of the golden jackal is 70 to 85 cm., with a tail length of about 25 cm. Its standing height is approximately 40 cm. The fur is generally coarse and not very long. Its coat is usually yellow to pale gold and brown-tipped, but the color can vary with season and region. On the Serengeti Plain in Northern Tanzania, golden jackals are brown-tipped yellow in the rainy season (December-January), changing to pale gold in the dry season (September-October).

5.3.3. Ecology and Behavior

The basic social unit of the golden jackal is a mated pair or a mated pair and its young. Golden jackal pairs forage and rest together. All of their behavior is highly synchronized. Cooperative hunting is important to the jackals. Pairs are three times more likely to be successful than individuals in hunting. Members of the same family also cooperate in sharing larger food items and transport food in their stomachs for later regurgitation to pups or to a lactating mother. Hunting families hold territories of two to three square kilometers throughout the year, portions of which are marked with urine, either by the male or the female jackal, to ward off intruders.

Both male and female members of a golden jackal pair have important roles in maintaining their territory and in raising the young. When one parent dies, it is unlikely that the rest of the family will survive. However, most jackal families have helpers. These helper associations are probably responsible for reports of large packs hunting together. Within the family, helpers are subordinate to parents.

The female golden jackal initiates all den changes. Though the males are predominantly monogamous, females reserve their aggression for female intruders, preventing the sharing of the male and his paternal investment.
Golden jackals are strictly nocturnal in areas inhabited by humans, but may be partly diurnal elsewhere. They dig caverns for shelter, or use crevices in rocks, or caverns that were dug by other animals. Golden jackals live in pairs and are friendly to one another, scratching their partners all over their bodies. However, if strange jackals meet each other, most of the behavior expresses subordination, superiority, or eagerness to attack.

5.3.4. Distribution in the WCP area

According to the authenticated data from Udaipur Forest Department (North), The Golden Jackal is found in the WCP area of the buffer zone of the Debari Zinc Smelter project.

5.3.5. Reproduction and Growth

Golden jackals live in mated pairs and are strictly monogamous. In most jackal families, there are one or two adult members called "helpers." Helpers are jackals who stay with the parents for a year after reaching sexual maturity, without breeding, to help take care of the next litter. Births take place throughout the year in tropical Asia. They have been observed to produce pups for at least eight years. The gestation period is 63 days. Young are born in a den within the parents' marked territory. Litters can contain one to nine pups, but two to four is the usual number. Weight at birth is 200-250 grams. Pups' eyes open after about ten days. The pups are nursed for about eight weeks, and then weaned. The young are fed by regurgitation and begin to take some solid food at about three months. Both parents provide food and protection. Sexual maturity comes at eleven months.

5.3.6. Conservation Action Plan for Golden Jackal (*Canis aureus*)

The Golden Jackal (Canis aureus) is classified as Least Concern on the IUCN Red List of Threatened Species and it is given the utmost protection by inclusion in Schedule – I of the Wildlife (Protection) Amendment Act, 2022.
A direct and indirect approach is required to provide effective conservation, which is recommended as under:

- Protection and improvement of habitat, it can give good shelter to the animal.
- Availability of water throughout the year will be maintained by artificial water holes and ponds deepening wherever required.
- By conducting awareness programs at community and school level to create awareness of the ecological role and also through organizing competition during "Wildlife Week" and "Van Mohotsav" celebration.
- Putting of sign boards with animal photographs/ slogan along road sides, public places, schools etc. to increase awareness about wildlife conservation.
- Some provision of rewards to informers for the control of poaching and illegal trade in wildlife.
- Carrying out census and research projects to know the potential threats and population status of the species.
- Provision of veterinary care and cages for injured or sick deformed species.

- Another way to conserve protected species is to create society dedicated to ecological ethics. All the conservation measures can be implemented with the help of and in consultation of the forest department.
- Vehicular traffic and its speed limit should be minimized to check the chance of accident of animal along the state highway and damaged to precious habitat by people to start movement towards area.

5.4 Jungle Cat

5.4.1 Systematic position

Kingdom: Animalia
Phylum: Chordata
Class: Mammalia
Order: Carnivora
Family: Felidae
Genus: *Felis*
Species: *Felis chaus*

The species of the Jungle Cat is found in the WCP area of the buffer zone of the Debari. Jungle Cat is listed in the Schedule – I of Wildlife (Protection) Amendment Act, 2022 and it is listed in the Least Concern Category of IUCN – International Union for Conservation of Nature- LC in the 'Red List'.

5.4.2. Description

Jungle cats have a wide ranging distribution that extends from Egypt, Israel, Jordan, northern Saudi Arabia, Syria, Iraq, Iran, to the shores of the Caspian Sea and the Volga River delta, east through Turkmenistan, Uzbekistan, Tadzhikistan, Kazakhstan and to western Xingjian, Afghanistan, Pakistan, Nepal, India, Sri Lanka, Myanmar, Laos, Thailand, Cambodia, Vietnam, and southwestern China.

Jungle cats range in size from 70 to 120 cm long and 35 to 38 cm tall. Adult males are larger and heavier than adult females. Throughout their range, significant variation in mass occurs. Jungle cats have long, slim faces with white lines above and below their bright yellow eyes with a dark spot just below each eye near the nose. They have long rounded ears, with a distinctive tuft of hair at the tips. Jungle cats have relatively short tails, about 1/3 of their total body length, which have several dark rings along its length and a black tip. Their coat colour varies from a reddish or sandy brown to tawny grey. Black jungle cats are regularly seen in south-eastern Pakistan and India. Kittens may be striped and spotted, however, these markings typically fade with age and are only retained on the fore and hind limbs.

5.4.3. Ecology and Behavior

Jungle cats have home ranges of 45 to 180 km^2, which they likely maintain via indirect means such as scent marking. Except for breeding season, jungle cats live solitary lives. They are most active at night but are not strictly nocturnal. They are more often seen at dusk and travel approximately 5 to 6 km per night. They typically rest in dense cover during the day but often sunbathe on cold winter days. Unlike most cat species, jungle cats have an affinity for water and are proficient swimmers that will dive into water to catch fish with their mouths.

Jungle cats are solitary animals outside of mating season; however, family groups (male, female, and cubs) are not uncommon. Vocal communication consists of meowing, chirping,

purring, gurgling, growling, hissing, and barking. Jungle cats also communicate via scent marking and cheek rubbing. Like most felids, they use urine to scent mark their territory, which may help individuals avoid unwanted confrontation. Jungle cats primarily prey on animals that weigh less than 1 kg and commonly consume rodents, lizards, snakes, frogs, birds, hare, fish, insects, livestock, and even fruit during the winter. Rodents are its primary prey item.

5.4.4. Distribution in the WCP area

According to the authenticated data from Udaipur Forest Department (North), The Golden Jackal is found in the WCP area of the buffer zone of the Debari Zinc Smelter project.

5.4.5. Reproduction and Growth

Jungle cat mating season is marked by the shrieks and fighting of male cats. Vocalization rates of males and females increases prior to copulation. Intense mew calls are used by both genders to attract potential mates. They also scent mark territorial boundaries, which may help them find and locate potential mates. Male and female jungle cats may have multiple different mates throughout their lives. Jungle cats breed twice a year and produce litters of 3 to 6 kittens. Breeding season varies regionally and gestation lasts between 63 and 66 days. Jungle cats are independent by 8 to 9 months of age and reach sexual maturity at 11 to 18 months of age. In captivity, jungle cats live an average of 15 years, but have been known to live up to 20 years. Lifespan in the wild ranges from 12 to 14 years.

5.4.6. Conservation Action Plan for Jungle Cat (*Felis chaus*)

The Jungle Cat (*Felis chaus*) is classified as Least Concern on the IUCN Red List of Threatened Species and it is given the utmost protection by inclusion in Schedule – I of the Wildlife (Protection) Amendment Act, 2022.

A direct and indirect approach is required to provide effective conservation, which is recommended as under:

- Protection and improvement of habitat, it can give good shelter to the animal.
- Availability of water throughout the year will be maintained by artificial water holes and ponds deepening wherever required.
- By conducting awareness programs at community and school level to create awareness of the ecological role and through organizing competition during "Wildlife Week" and "Van Mohotsav" celebration.
- Putting of sign boards with animal photographs/ slogan along roadsides, public places, schools etc. to increase awareness about wildlife conservation.
- Some provision of rewards to informers for the control of poaching and illegal trade in wildlife.
- Carrying out census and research projects to know the potential threats and population status of the species.
- Provision of veterinary care and cages for injured or sick deformed species.
- Another way to conserve protected species is to create a society dedicated to ecological ethics. All the conservation measures can be implemented with the help of and in consultation of the forest department.

- Vehicular traffic and its speed limit should be minimized to check the chance of accident of animal along the state highway and damaged to precious habitat by people to start movement towards area.

5.5 Ruddy Mongoose

5.5.1 Systematic position
Kingdom: Animalia
Phylum: Chordata
Class: Mammalia
Order: Carnivora
Family: Herpestidae
Genus: *Herpestes*
Species: *Herpestes smithii*

The species of the Ruddy Mongoose is found in the WCP area of the buffer zone of the Debari. Ruddy Mongoose is listed in the Schedule – I of Wildlife (Protection) Amendment Act, 2022 and it is listed in the Least Concern Category of IUCN – International Union for Conservation of Nature- LC in the 'Red List'.

5.6.2. Description

The Ruddy Mongoose is a species of mongoose found in hill forests of peninsular India and Sri Lanka. This mongoose along with the striped-necked mongoose are the only mongoose species endemic to India and Sri Lanka. The Ruddy mongoose's fur is brownish and coarse, long in hindquarters, but short in other parts of the body. Its head to body length is 40–45 cm (16–18 in) with a 36 cm (14 in) long tail. Males are larger and heavier than females with a weight of 2.2 kg (4.9 lb); females weigh about 1.2 kg (2.6 lb). Tail constitutes about 75-90 % of body length. It is distinguished by the Indian grey mongoose by its slightly larger size and jet black-tipped tail.

5.6.3. Ecology and Behavior

The Ruddy Mongoose is mainly a forest living animal in contrast to the grey and small Indian mongooses and prefers more secluded areas. They have also been recorded from secluded paddy fields and in comparatively open fields. Like other mongooses, it hunts by day and by night. It usually carries its black tipped tail tip curved upward which is visible from a distance. Like other mongooses, it hunts by day and by night, and feeds on birds, rat snakes, land monitors, rodents and snails. Generally, a solitary animal, rarely can be seen in pairs during mating season. However, mother and pup family groups consisting about five animals have been observed. It is found in thick jungles, forest edges near paddy fields and tea estates. However, withdraw quickly in a crevice or underneath a rock shelf during human confrontation. When cornered, they fight fearlessly with loud and shrill cries.

5.6.4. Distribution in the WCP area

According to the authenticated data from Udaipur Forest Department (North), The Ruddy Mongoose is found in the WCP area of the buffer zone of the Debari Zinc Smelter project.

5.6.5. Reproduction and Growth

Ruddy Mongoose reproduction differs greatly between species since it is frequently a reflection of their social organization. Solitary mongooses only congregate to spawn at regular

periods, generally once a year. The newborn pups may be raised by one or both parents. Large colonies, on the other hand, usually include a dominant member of the pack who has practically exclusive breeding rights to multiple females, or a single male-female dominating couple.

After mating, the female will give birth a few months later. She may have a litter of one to six pups at a time. Mongoose puppies grow up rapidly. The puppies will be reliant on their parents for several months after they have been weaned. A puppy's maturation might take anywhere from six months to two years.

Pups are brought into the colony at a young age in more sociable mongoose species. Several individuals will stay behind while foraging to safeguard the young. In some colonies, a pup may select a certain adult to give consistent nourishment and care. Individuals may even build lasting relationships with family and other colony or pack members.

5.6.6. Conservation Action Plan for Ruddy Mongoose (*Herpestes smithii*)

The Ruddy Mongoose (*Herpestes smithii*) is classified as Least Concern on the IUCN Red List of Threatened Species and it is given the utmost protection by inclusion in Schedule – I of the Wildlife (Protection) Amendment Act, 2022.

A direct and indirect approach is required to provide effective conservation, which is recommended as under:

- Protection and improvement of habitat, it can give good shelter to the animal.
- Availability of water throughout the year will be maintained by artificial water holes and ponds deepening wherever required.
- By conducting awareness programs at community and school level to create awareness of the ecological role and through organizing competition during "Wildlife Week" and "Van Mohotsav" celebration.
- Putting of sign boards with animal photographs/ slogan along roadsides, public places, schools etc. to increase awareness about wildlife conservation.
- Some provision of rewards to informers for the control of poaching and illegal trade in wildlife.
- Carrying out census and research projects to know the potential threats and population status of the species.
- Provision of veterinary care and cages for injured or sick deformed species.
- Another way to conserve protected species is to create a society dedicated to ecological ethics. All the conservation measures can be implemented with the help of and in consultation of the forest department.
- Vehicular traffic and its speed limit should be minimized to check the chance of accident of animal along the state highway and damaged to precious habitat by people to start movement towards area.

5.6 Striped Hyena

5.6.1 Systematic position

Kingdom: Animalia
Phylum: Chordata
Class: Mammalia
Order: Carnivora
Family: Hyaenidae
Genus: *Hyaena*
Species: *Hyaena hyaena*

The species of the Striped Hyena is found in the WCP area of the buffer zone of the Debari. Striped Hyena is listed in the Schedule – I of Wildlife (Protection) Amendment Act, 2022 and it is listed in the Near Threatened Category of IUCN – International Union for Conservation of Nature- NT in the 'Red List'.

5.6.2. Description

The Striped Hyena lives in arid, mountainous regions with scrub woodland. It dens in rocky hills, ravines, and crevices. It also inhabits open savannah areas with dense grassland in some regions. Height is 65-80 cm and the average length of the striped hyena from head to tail is one meter. Males and females do not differ in average height or length, but males do tend to be slightly heavier. They are a long-haired hyena with large, pointed ears. The striped hyena can erect the long hair on its mane and appear 38% bigger, which it does when it feels threatened. They are grey to straw-coloured with a black muzzle and black stripes on their head, torso, and legs.

5.6.3. Ecology and Behavior

The Striped Hyena is generally considered solitary but has some social organization. It forages individually and is rarely seen in groups. It does, however, associate in small family groups at the den. Immature family members will help feed younger siblings by bringing food back to the den. Vocal communication is not highly developed. Territoriality is not a prominent feature in striped hyena behaviour but does exist to some extent. Dens are often used merely for short periods of time, and therefore rarely need to be defended. The striped hyena is predominantly a scavenger; its diet consisting mainly of carrion and human refuse. It scavenges large and medium-sized mammals, even eating bones from carcasses if the meat has been picked off. It supplements its diet with fruit, insects, and occasionally by killing small animals like hare, rodents, reptiles, and birds.

5.6.4. Distribution in the WCP area

According to the authenticated data from Udaipur Forest Department (North), The Striped Hyena is found in the WCP area of the buffer zone of the Debari Zinc Smelter project.

5.6.5. Reproduction and Growth

Breeding is non-seasonal, beginning at two to three years. One to six cubs are born per litter, after an 88-92-day gestation. No detailed studies of sexual behavior in the striped hyena have been published. Based on observations in captivity, estrus lasts one day, with the female mating several times at 15–25-minute intervals throughout the day. The mother brings food

to the den for her cubs after they are one month old but continues to nurse for approximately 12 months.

5.6.6. Conservation Action Plan for Striped Hyena (*Hyaena hyaena*)

The Striped Hyaena (*Hyaena hyaena*) is classified as Near Threatened on the IUCN Red List of Threatened Species and it is given the utmost protection by inclusion in Schedule – I of the Wildlife (Protection) Amendment Act, 2022.

A direct and indirect approach is required to provide effective conservation, which is recommended as under:

- Protection and improvement of habitat, it can give good shelter to the animal.
- Availability of water throughout the year will be maintained by artificial water holes and ponds deepening wherever required.
- By conducting awareness programs at community and school level to create awareness of the ecological role and through organizing competition during "Wildlife Week" and "Van Mohotsav" celebration.
- Putting of sign boards with animal photographs/ slogan along roadsides, public places, schools etc. to increase awareness about wildlife conservation.
- Some provision of rewards to informers for the control of poaching and illegal trade in wildlife.
- Carrying out census and research projects to know the potential threats and population status of the species.
- Provision of veterinary care and cages for injured or sick deformed species.
- Another way to conserve protected species is to create a society dedicated to ecological ethics. All the conservation measures can be implemented with the help of and in consultation of the forest department.
- Vehicular traffic and its speed limit should be minimized to check the chance of accident of animal along the state highway and damaged to precious habitat by people to start movement towards area.

5.7 Indian Crested Porcupine

5.5.1. Systematic position

Kingdom - Animalia
Phylum - Chordata
Class - Mammalia
Order - Rodentia
Family - Hystricidae
Genus – *Hystrix*
Species - *Hystrix indica*

The Indian Crested Porcupine (*Hystrix indica*) is under the genus *Hystrix*, which is native to Southern Asia and Middle East. The *Hystrix indica* species is found in the WCP area of the buffer zone of the Debari Zinc Smelter project.

Indian Crested Porcupine is listed in the Schedule – I of Wildlife (Protection) Amendment Act, 2022 and it is listed in the Least Concern Category of IUCN – International Union for Conservation of Nature- LC in the 'Red List'.

5.5.2. Description

Indian crested porcupine is one of largest rodents in Asia. They are nocturnal and burrowing and the hairs have been modified into spine-like structures called quills which are used in defense against their enemies. The vision of porcupine is poor whereas the auditory and olfactory perception is well developed which helps them to forage at nighttime (Woods, 1973). All kinds of vegetables, fruits, grains and roots of trees are the main food source of the porcupines, and they were also found to feed on the bark of several trees.

5.5.3. Ecology and Behavior

Indian crested porcupine when threatened, alarmed, or irritated, it erects its spines and rattles their hollow tails quills. Its body length ranges around 30-35 inches, weighing 12-20 kg and spines length around 6-8 inches. Indian crested porcupine is nocturnal, generalist species, burrow dwelling rodents. Indian crested porcupine favors rocky or hilly areas and adapted to survive in any climatic conditions. Burrows is not obligatory to shelter; they lie up in thick scrub near cultivation and in the Terai, they commonly shelter in the tall grass in the crop season. Indian crested porcupine has prevalent distribution and often considered a pest by farmers and gardeners in the west part of Rajasthan. Indian crested porcupine is significant to an ecosystem as it disperses vegetative propagules of plants.

5.5.4. Distribution in the WCP area

According to the authenticated data from Udaipur Forest Department (North), The Indian Crested Porcupine is found in the WCP area of the buffer zone of the Debari Zinc Smelter project.

5.5.5. Reproduction and Growth

Indian crested porcupines mate in February and March. Gestation lasts an average of 240 days. A female gives birth to one brood of two to four offspring per year. Young are born with open eyes and are covered in short, soft quills that harden within a few hours after birth. Young are fully weaned 13–19 weeks after birth but remain in the den with parents and siblings until sexual maturity around 2 years of age.

5.4.6. Conservation Action Plan for Indian Crested Porcupine (*Hystrix indica*)

In India, it is given the utmost protection by inclusion in Schedule – I of the Wildlife (Protection) Amendment Act, 2022.

A direct and indirect approach is required to provide effective conservation, which is recommended as under:

- Protection and improvement of habitat, it can give good shelter to the animal.
- Availability of water throughout the year will be maintained by artificial water holes and ponds deepening wherever required.
- By conducting awareness programs at community and school level to create awareness of the ecological role and through organizing competition during "Wildlife Week" and "Van Mohotsav" celebration.
- Putting of sign boards with animal photographs/ slogan along roadsides, public places, schools etc. to increase awareness about wildlife conservation.
- Some provision of rewards to informers for the control of poaching and illegal trade in wildlife.

- Carrying out census and research projects to know the potential threats and population status of the species.
- Provision of veterinary care and cages for injured or sick deformed species.
- Another way to conserve protected species is to create society dedicated to ecological ethics. All the conservation measures can be implemented with the help of and in consultation of the forest department.
- Vehicular traffic and its speed limit should be minimized to check the chance of accident of animal along the state highway and damaged to precious habitat by people to start movement towards areas.

5.8 Russell's Viper

5.8.1 Systematic position

Kingdom: Animalia
Phylum: Chordata
Class: Reptilia
Order: Squamata
Family: Viperidae
Genus: *Daboia*
Species: *Daboia russelii*

The species of the Russell's Viper is found in the WCP area of the buffer zone of the Debari. Russell's Viper is listed in the Schedule – I of Wildlife (Protection) Amendment Act, 2022 and it is listed in the Near Threatened Category of IUCN – International Union for Conservation of Nature- LC in the 'Red List'.

5.8.2. Description

Russell's Viper (*Daboia russelii*) is a venomous snake in the family Viperidae native to the Indian subcontinent. This is one of the most bite and death causing venomous snake in Indian subcontinent and the member of Big Four of India. It can be easily identified by checking oval shaped hollow or solid spots in three rows in dorsal body and highly keeled non-shiny scales. However even with specific body patterns layman sometime assume it to be juvenile of Python.

5.8.3. Ecology and Behavior

Russell's Viper is terrestrial and active primarily as a nocturnal forager. However, during cool weather, it alters its behaviour and becomes more active during the day. Adults are reported to be slow and sluggish unless pushed beyond a certain limit, after which they can become very aggressive. Juveniles, though, are generally more nervous. When threatened, they form a series of S-loops, raise the first third of the body, and produce a hiss that is supposedly louder than that of any other snake. When striking from this position, they can exert so much force that even a large individual can lift most of its body off the ground in the process. These snakes are strong and may react violently to being picked up. The bite may be a snap, or they may hang on for many seconds.

5.8.4. Distribution in the WCP area

According to the authenticated data from Udaipur Forest Department (North), The Russell's Viper is found in the WCP area of the buffer zone of the Debari Zinc Smelter project.

5.8.5. Reproduction and Growth

Russell's viper is ovoviviparous. Mating generally occurs early in the year, although pregnant females may be found at any time. The gestation period is more than six months. Young are produced from May to November, but mostly in June and July. It is a prolific breeder. Litters of 20–40 are common, although fewer offspring may occur, as few as one. The reported maximum is 75 in a single litter. At birth, juveniles are 215–260 mm (8.5–10.2 in) in total length. The minimum total length for a gravid female is about 100 cm (39 in). It seems that sexual maturity is achieved in 2–3 years. In one case, it took a specimen nearly 4.5 hours to give birth to 11 young.

5.8.6. Conservation Action Plan for Russell's Viper (*Daboia russelii*)

The Russell's Viper (*Daboia russelii*) is classified as Least Concern on the IUCN Red List of Threatened Species and it is given the utmost protection by inclusion in Schedule – I of the Wildlife (Protection) Amendment Act, 2022.

A direct and indirect approach is required to provide effective conservation, which is recommended as under:

- Protection and improvement of habitat, it can give good shelter to the animal.
- Availability of water throughout the year will be maintained by artificial water holes and ponds deepening wherever required.
- By conducting awareness programs at community and school level to create awareness of the ecological role and through organizing competition during "Wildlife Week" and "Van Mohotsav" celebration.
- Putting of sign boards with animal photographs/ slogan along roadsides, public places, schools etc. to increase awareness about wildlife conservation.
- Some provision of rewards to informers for the control of poaching and illegal trade in wildlife.
- Carrying out census and research projects to know the potential threats and population status of the species.
- Provision of veterinary care and cages for injured or sick deformed species.
- Another way to conserve protected species is to create society dedicated to ecological ethics. All the conservation measures can be implemented with the help of and in consultation of the forest department.
- Vehicular traffic and its speed limit should be minimized to check the chance of accident of animal along the state highway and damaged to precious habitat by people to start movement towards area.

5.9 Indian Peafowl

5.9.1 Systematic position

Kingdom: Animalia
Phylum: Chordata
Class: Aves
Order: Galliformes
Family: Phasianidae
Sub family: Phasianinae
Genus: *Pavo*
Species: *Pavo cristatus*

Indian Peafowl (*Pavo cristatus*) is listed in the Schedule – I of Wildlife (Protection) Amendment Act, 2022 and it is listed in the Least Concern category of IUCN – International Union for Conservation of Nature - LC in the 'Red List'.

5.9.2 Description

Peafowl has a splendid glossy green long tail feathers that may be more than 60 percent of the birds total body length. These features have blue, golden green- and copper-colored ocelli (eyes). The long tail feathers are used for courtship displays. The feathers are arched into magnificent fan shaped form across the back of the bird and almost touching the ground on both sides. Females do have graceful tail feathers. They have fan like crest with whitish face and throat, chestnut brown crown and hind neck, metallic green upper breast and mantle, white belly and brown back rump and tail. Their primaries feathers are dark brown.

5.9.3. Ecology and Behavior

Peafowl forages on the ground in small groups, known as musters, that usually have 1 male and 3 to 5 females. After the breeding season, the flock tends to be made up only of females and young. They are found outside in the open early in the mornings and tend to stay in cover during the heat of the day. They are fond of dustbathing and at dusk, groups walking in single file to waterhole. When disturbed, they usually escape by running and rarely take flight.
Peafowl produces loud calls, especially in the breeding season. They may call at night when alarmed and neighboring birds may call in a relay like series. Nearly seven different call variants have been identified in the peacocks apart from six alarm calls that are commonly produced by both sexes. Peafowl roosts in groups during the night on tall trees but sometimes make use of rocks, buildings or pylons. Birds arrive at dusk and call frequently, taking their position on the roost trees. Due to this habit of congregating at the roost, many population studies are made at these sites.

5.9.4. Distribution in the WCP Area

According to the authenticated data from Udaipur Forest Department (North), The Indian Peafowl is found in the WCP area of the buffer zone of the Debari Zinc Smelter project.

5.9.5. Reproduction and Growth

Indian Peafowl reaches sexual maturity at the age of 2 to 3 years. The breeding period is dependent on monsoon, peak time being in June. The breeding female makes a nest on ground with leaves, sticks and other debris and lays 4-8 eggs. Parental care is provided only

by the female. The eggs take about 28 days to hatch. The clutch leaves the nest soon after hatching and follows the mother for foraging.

5.9.6. Conservation Action Plan for Conservation of Indian Peafowl (*Pavo cristatus*)

The Indian Peafowl (*Pavo cristatus*) is a large pheasant declared as the National Bird of India in 1963 duo its flagship position in mythology and its widespread distribution. In India, it is given the utmost protection by inclusion in Schedule – I of Wildlife (Protection) Amendment Act, 2022.

A direct and indirect approach is required to provide effective conservation, which is recommended as under:

- Increasing the tree cover in the area to provide shelter and roosting of Peafowl. This can be achieved by planting tree groves in the area. Some local species such as Neem, Siris, Peepal, Shesham etc. can be planted.
- By conducting awareness programs at community and school level and through organizing competition during "Wildlife Week" and "Van Mohotsav" celebration.
- Some provision of rewards to informers for the control of poaching and illegal trade in wildlife.
- Carrying out census and research projects to know the potential threats and population status of the species.
- Provision of veterinary care and cages for injured or sick deformed species.
- Another way to conserve protected species is to create a society dedicated to ecological ethics. All the conservation measures can be implemented with the help of and in consultation of the forest department.
- Vehicular traffic and its speed limit should be minimized to check the chance of accident of animal along the state highway and damaged to precious habitat by people to start movement towards areas.

Chapter 6

According to the SOP for the Wildlife Conservation Plan, the cost allotted for the Wildlife conservation is as per the formulae –

Formula 1: 1 % of the total project cost

Or

Formula 2: 0.50 Lacs per hectare of core area (project area) + Rs. 5 lacs for the buffer area for each schedule – I species

The financial outlay of the WCP will be the maximum of the costs derived by above formulae.

Table 6.1: Possible costings for WCP

Project cost (in Crores)	Cost per Formula 1 (in Crores)	Cost per Formula 2 (in Crores)
2500	25	1.055

Owing to the facts –

1. A sufficient cost has been allotted for the wildlife conservation by Debari Zinc Smelter
2. Debari Zinc smelter project area being only 184.2 Ha.,

Formula **1 (Cost 25 Crores or 2500 Lakhs)** has been implemented for the wildlife conservation plan of Debari Zinc Smelter. Accordingly, the total costing of wildlife conservation interventions to be implemented in the core and buffer zones of the WCP area is presented in Table 6.2.

Table 6.2: Total cost of implementation of the Wildlife Conservation Plan in the WCP area

S.N.	SOP	% of total outlay of WCP	Cost as per % outlay (Rs. In Lakhs) of Total WCP cost	Heads	Core area (Rs. In Lakhs) Next 10 Year	Buffer area (Rs. In Lakhs) Next 10 Year	Recurring Cost (Rs. In Lakhs)	Total cost (Rs. In Lakhs)
1	Habitat improvement, mitigation measures (food, water, shelter, movement, etc.) and measures to reduce/minimize the human animal conflict	50%	1250.00	Habitat Improvement – Plantation of suitable plant species & weed eradication in buffer zone under	200.00	200.00	0.00	**400.00**

				Silvopastoral Plantation Programme (SPP)				
				Development of Water Holes/ Lake Construction of Water Tank	0.00	150.00	0.00	**150.00**
				Construction of parapet/boundary wall in Locality to avoid Human Animal conflict OR to avoid fall of wild animal in abandoned Well/Ponds etc.	300.00	100.00	0.00	**400.00**
				Fencing of habitat sites	100.00	200.00	0.00	**300.00**
2	Awareness and extension (Forest staff will also be invited for various activities to ensure participation)	10%	250.00	Increase awareness among local population on the importance and methods of conservation of Schedule - I species by holding group meetings/awareness programs in schools/display of banners/Study through External/posters in different villages to	62.50	150.00	37.50	**250.00**

				avoid human-wildlife conflict by HZL and Forest Departments				
3	Support to Forest department for monitoring, rescue and rehabilitation of Wildlife (Veterinary care, animal health, rescue - tools and equipment's etc.)	10%	250.00	Development of Rescue Centre along with Rescue Facilities and Mobile Rescue Van	0.00	125.00	0.00	**125.00**
				Support forest department for the maintenance of plantation sites and plantation in gaps and supply of water for water holes.	0.00	45.00	30.00	**75.00**
				Operation and Maintenance of Rescue centre	0.00	37.50	12.50	**50.00**
4	Contribution towards conservation of wildlife in PAs (to be deposited in RPACS)	10%	250.00	Watch and ward of habitat - plantation area	0.00	250.00	0.00	**250.00**

5	Administrative cost for processing inspections, etc. (to be deposited in RPACS)	10%	250.00	Deployment of Village Forest Protection and Management Committee (VFPMC) members to track and report (5 members @ Rs. 5000 of incentive per month)	0.00	150.00	100.00	**250.00**
6	Miscellaneous including Eco-development	10%	250.00	Comprehensive ecological and Biodiversity monitoring by HZL once in every 3 years	37.50	162.50	50.00	**250.00**
Total			**2500.00**		**700.00**	**1570.00**	**230.00**	**2500.00**

Conservation measures to be implemented in the core area and their finances are elaborated in Table 6.3.

Table 6.3: Cost of implementation of WCP in the Core area

Sr. No.	Heads	Budget allocated for Core Zone in Lacs
1	Habitat Improvement – Plantation of suitable plant species & weed eradication in buffer zone under Silvopastoral Plantation Programme (SPP)	200.00
2	Construction of parapet/boundary wall in Locality to avoid Human Animal conflict OR to avoid fall of wild animal in abandoned Well/Ponds etc.	300.00
3	Fencing of habitat sites	100.00
4	Increase awareness among local population on the importance and methods of conservation of Schedule - I species by holding group meetings/awareness programs in schools/display of banners/Study through External/posters in different villages to avoid human-wildlife conflict by HZL and Forest Departments	62.50
5	Comprehensive ecological and Biodiversity monitoring by HZL once in every 3 years	37.50
Total		**700.00**

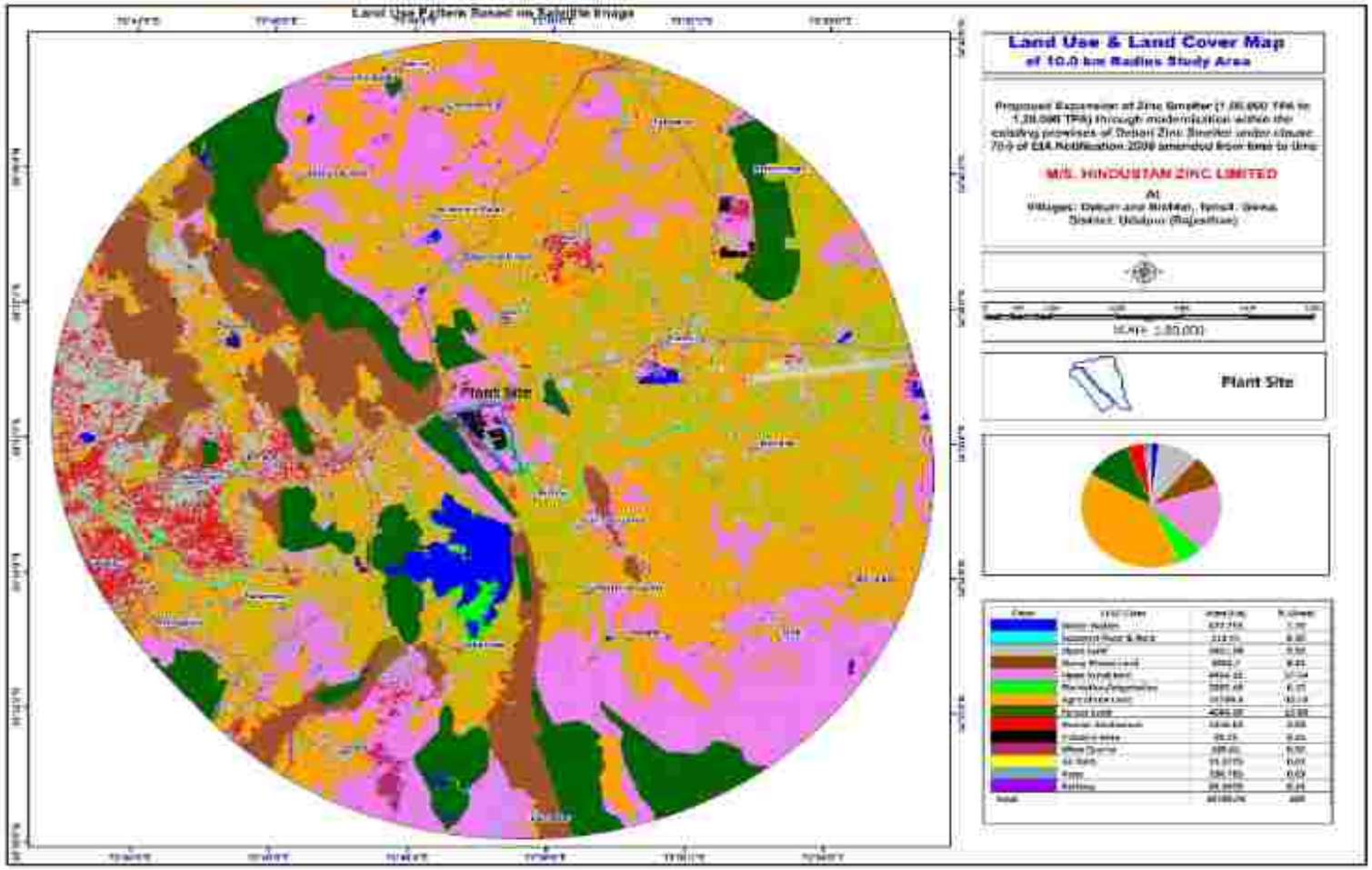
Conservation measures to be implemented in the buffer area and their finances are presented in Table 6.4.

Table 6.4: Cost of implementation of WCP in the Buffer area

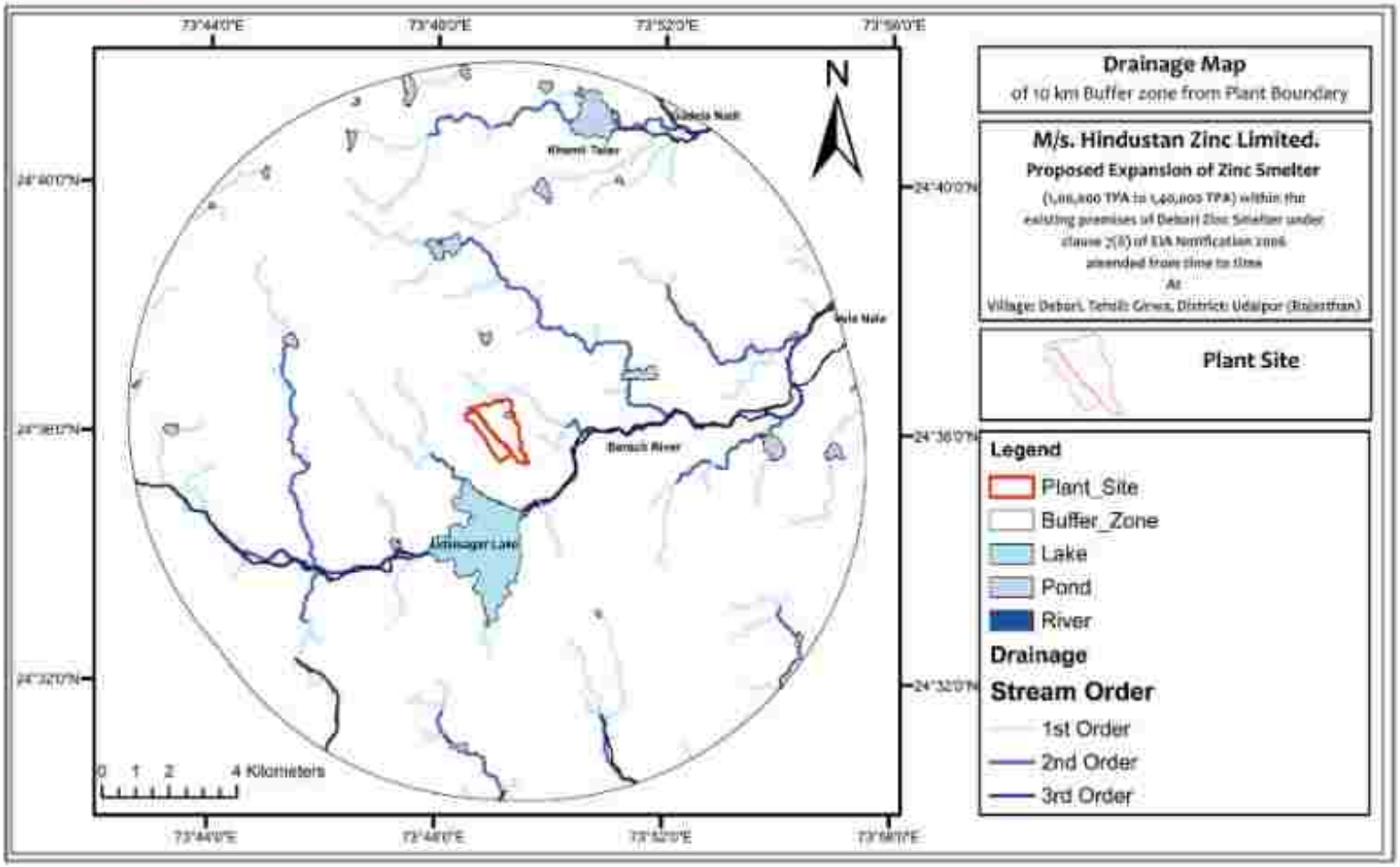
Sr. No.	Head	Budget allocated for Buffer Zone in Lacs
1	Habitat Improvement – Plantation of suitable plant species & weed eradication in buffer zone under Silvopastoral Plantation Programme (SPP)	200.00
2	Development of Water Holes/ Lake Construction of Water Tank	150.00
3	Construction of parapet/boundary wall in Locality to avoid Human Animal conflict OR to avoid fall of wild animal in abandoned Well/Ponds etc.	100.00
4	Fencing of habitat sites	200.00
5	Increase awareness among local population on the importance and methods of conservation of Schedule - I species by holding group meetings/awareness programs in schools/display of banners/Study through External/posters in different villages to avoid human-wildlife conflict by HZL and Forest Departments	150.00
6	Development of Rescue Centre along with Rescue Facilities and Mobile Rescue Van	125.00
7	Support forest department for the maintenance of plantation sites and plantation in gaps and supply of water for water holes.	45.00
8	Operation and Maintenance of Rescue centre	37.50
9	Watch and ward of habitat - plantation area	250.00
10	Deployment of Village Forest Protection and Management Committee (VFPMC) members to track and report (5 members @ Rs. 5000 of incentive per month)	150.00
11	Comprehensive ecological and Biodiversity monitoring by HZL once in every 3 years	162.50
	Total	**1570.00**

Chapter 7

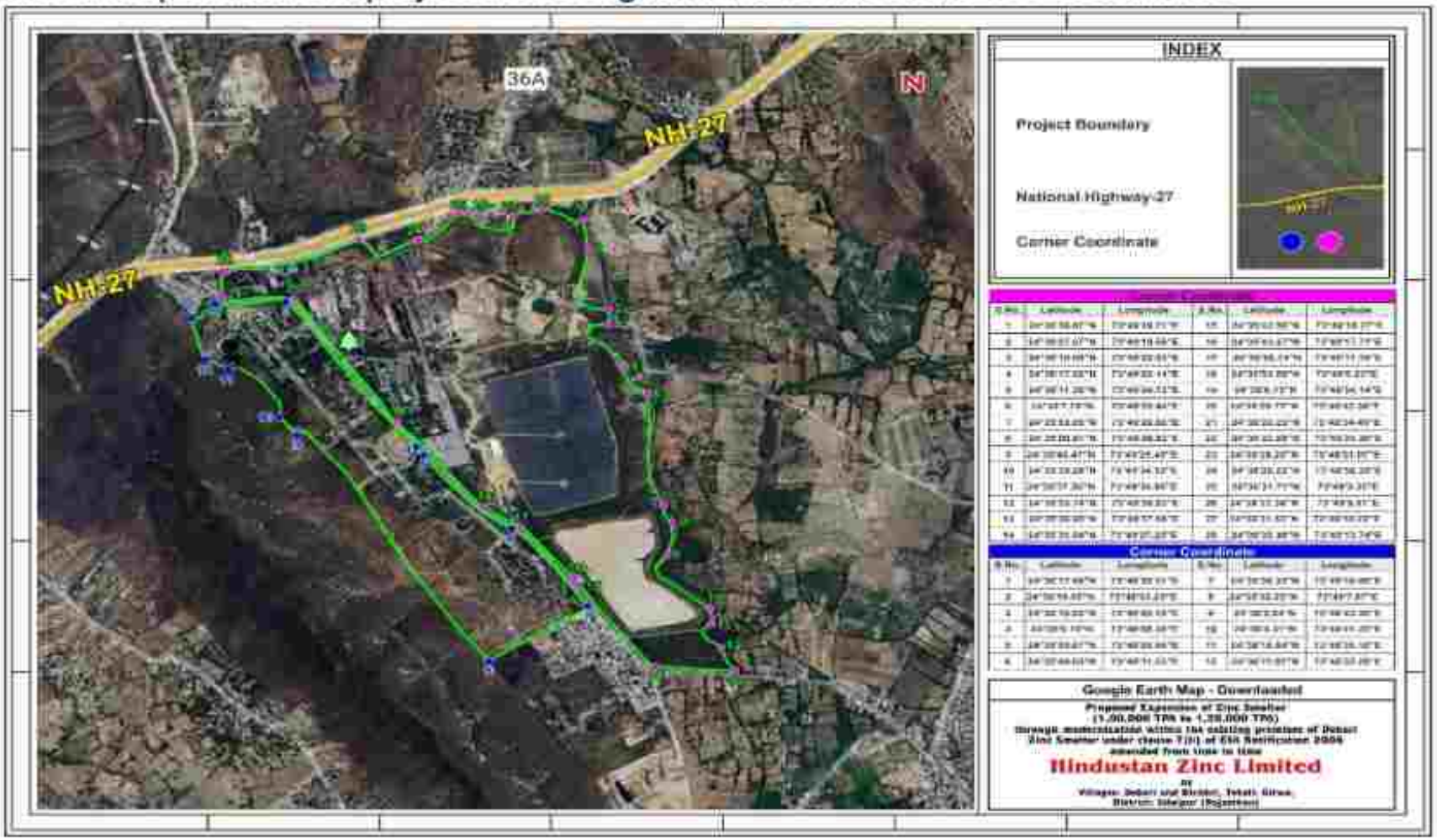
7.1. Land use plan – existing and proposed



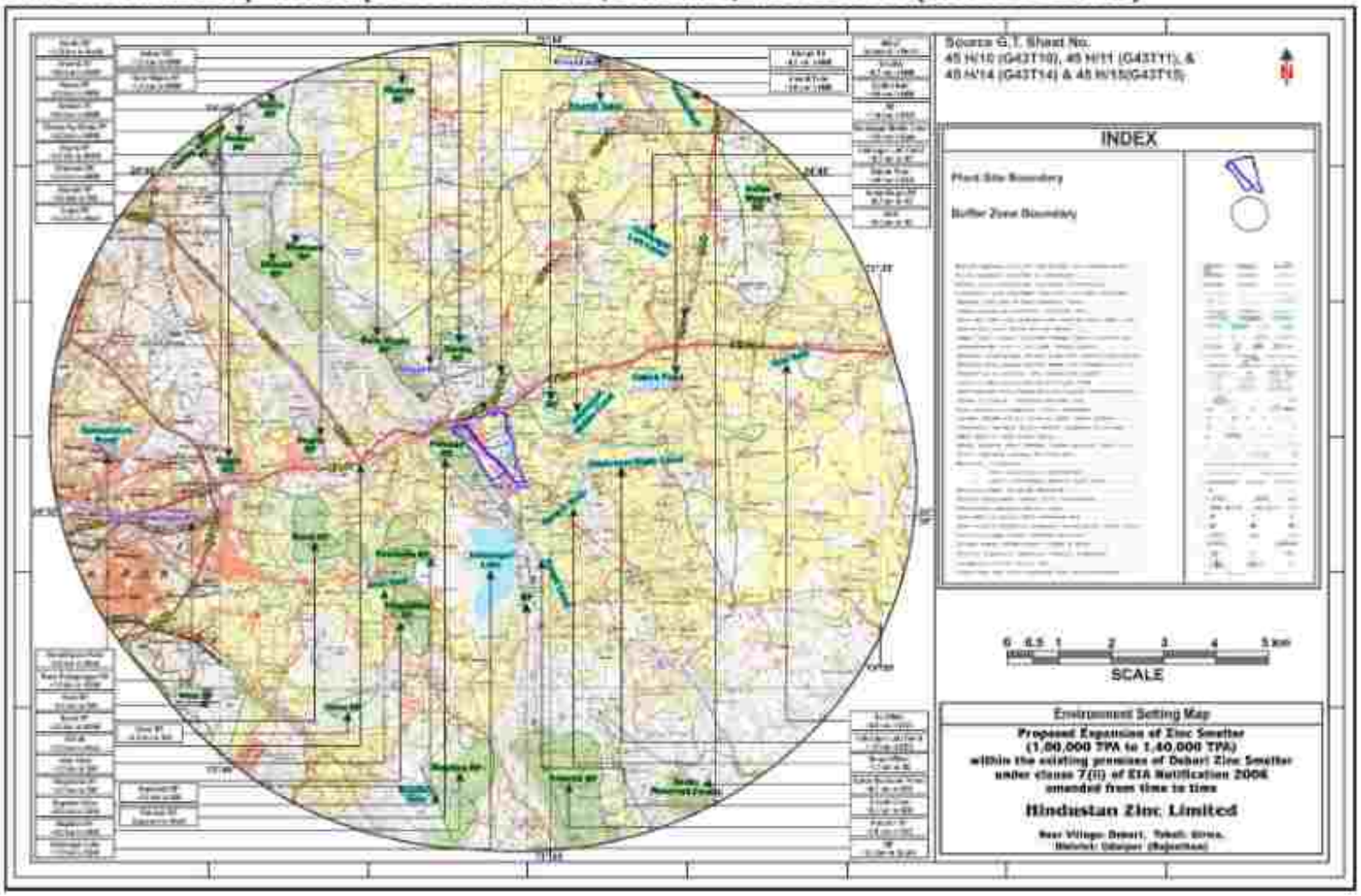
7.2 Drainage map of the WCP area



7.3 Built-up structure in project area along with the details of the Geo-coordinates



7.4 Location map w.r.t. protected areas, wildlife, and forest (1:50000 scale)



Appendix

I. Copy of NOC of forest Land of the study area

कार्यालय उप वन संरक्षक, वन्यजीव उदयपुर

बड़ी रोड देवाली, पोस्ट बॉक्स न. 161, फोन 0294-2453686
Email ID -dcfwl.udpr.forest@rajasthan.gov.in

क्रमांक: एफ 9( ) सर्व/उवसं/वजी/2022-23/ 1635 दिनांक: 21/03/2023

निमित्त

एस.बी.यू. निदेशक,
जिंक स्मेल्टर देबारी,
उदयपुर

विषय: राष्ट्रीय उद्यान/वन्यजीव अभयारण्य की सीमा से 10 किमी. परिधि के बाहर होने या नहीं होने के आश्य का प्रमाण पत्र के संबंध में।

संदर्भ: आपका पत्रांक 08 दिनांक 06.02.2023 एवं सहायक वन संरक्षक, वन्यजीव राजसमन्द का पत्रांक 26 दिनांक 14.02.2023 एवं सहायक वन संरक्षक, वन्यजीव जयसमन्द का पत्रांक 21 दिनांक 14.02.2023 के क्रम में।

प्रकोष्ठ

उपरोक्त विषयान्तर्गत प्रासंगिक पत्र के क्रम में लेख है कि एस.बी.यू. निदेशक, जिंक स्मेल्टर देबारी, अपनी यूनिट देबारी जिंक स्मेल्टर, निकट ग्राम देबारी, तहसील गिर्वा, जिला उदयपुर के संबंध में राष्ट्रीय उद्यान/वन्यजीव अभयारण्य की सीमा से 10 किमी की परिधी में होने या नहीं होने का आश्य प्रमाण पत्र चाहा गया है। जिसके क्रम में सहायक वन संरक्षक, वन्यजीव राजसमन्द एवं जयसमन्द के द्वारा उक्त आवेदित क्षेत्र के जी.पी.एस. विडिन की जांच कर इस कार्यालय को अवगत कराया गया कि उक्त आवेदित क्षेत्र इस वनमण्डल के अभयारण्यों की सीमा से निम्नानुसार है:-

क्र.सं.	विषय	सूचना		
1.	आवेदित क्षेत्र के सीमा स्तम्भों का विवरण	Filar No.	Latitude	Longitude
		1	24 36 23.631	73 48 33.975
		2	24 36 25.814	73 48 52.531
		3	24 36 30.832	73 48 18.559
		4	24 36 18.957	73 49 21.857
		5	24 36 07.659	73 49 26.754
		6	24 35 44.729	73 49 27.644
		7	24 35 30.895	73 49 37.690
		8	24 35 39.133	73 49 19.179
		9	24 35 32.340	73 49 06.954
		10	24 36 01.946	73 48 43.198
		11	24 36 17.342	73 48 30.063
2.	राजसमन्द वन्यजीव अभयारण्य की सीमा से दूरी	18.420 किलोमीटर		
3.	राजसमन्द वन्यजीव अभयारण्य के ईको सेन्सिटिव जोन की सीमा से दूरी	13.706 किलोमीटर		
4.	जयसमन्द वन्यजीव अभयारण्य की सीमा से दूरी	39.420 किलोमीटर		
5.	जयसमन्द वन्यजीव अभयारण्य के ईको सेन्सिटिव जोन की सीमा से दूरी	23.619 किलोमीटर		
6.	कुलवाड़ी की नाल, वन्यजीव अभयारण्य की सीमा से दूरी।	53.850 किलोमीटर		
7.	कुलवाड़ी की नाल, वन्यजीव अभयारण्य के ईको सेन्सिटिव जोन की सीमा से दूरी।	43.880 किलोमीटर		

नोट : कुलवाड़ी की नाल, वन्यजीव अभयारण्य एवं इनके ईको सेन्सिटिव जोन की दूरी अधिसूचित सीमा के अनुसार है।

भवदीय

(अजय मित्तलीक)
उप वन संरक्षक,
वन्यजीव, उदयपुर

क्रमांक: एफ 9( )सर्व/उवसं/वजी/उदय/2022-23/ दिनांक:
प्रतिलिपि निम्नांकित की सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित है:-
1. प्रधान मुख्य वन संरक्षक एवं मुख्य वन्यजीव प्रतिपालक, राजस्थान, जयपुर
2. मुख्य वन संरक्षक, वन्यजीव उदयपुर

(अजय मित्तलीक)
उप वन संरक्षक,
वन्यजीव, उदयपुर

Survey-9/Letter 2019-21/Doc-WLClearance letter 560

II. Copy of Authenticated list of Flora and Fauna in the study area from DCF, Udaipur Forest Division (North)

कार्यालय उप वन संरक्षक, उदयपुर (उत्तर)

राजकीय मुद्रणालय के पास, गुलाब बाग रोड़, उदयपुर–313001

email: dcf.udprn.forest@rajasthan.gov.in Tel. no. & Fax no. 0294-2421962

क्रमांकः एफ( )सर्वे/उवसं–उत्तर/2022–23/936 दिनांकः 27/03/2023

Hindustan Zinc Limited,
Zinc Smelter, Debari,
Dist. Udaipur. 313024.

विषयः– Request for providing list of Flora and Fauna within 10 km. radius of Zinc Smelter Debari, th. Girwa, Dist. Udaipur, Rajasthan.

प्रसंगः– आपके कम में आपके पत्र 09 दिनांक 06.02.2023 के कम में।

महोदय,

उपरोक्त विषयान्तर्गत प्रासंगिक पत्र के कम में लेख है कि आप कार्यालय के द्वारा हिन्दुस्तान जिंक स्मेल्टर कि 10 कि.मी. परिधि में आने वाले फ्लोरा एवं फाउना की सुचना चाही गई है।

जिस कम में आवेदित हिन्दुस्तान जिंक स्मेल्टर का क्षेत्रीय वन अधिकारी उदयपुर पुर्व द्वारा वनपाल नाका देबारी से प्राप्त रिपोर्ट में 10 कि.मी. परिधि में आने वाले फ्लोरा एवं फाउना की सुचना आवश्यक कार्यवाही हेतु संलग्न है।

भवदीय,

(सुभाग शशी)
उप वन संरक्षक,
उदयपुर (उत्तर)

क्रमांकः एफ( )सर्वे/उवसं–उत्तर/2022–23/ दिनांकः
प्रतिलिपिः क्षेत्रीय वन अधिकारी, उदयपुर पुर्व को को सूचनार्थ प्रेषित है।

उप वन संरक्षक,
उदयपुर (उत्तर)

हिन्दुस्तान जिंक स्मेल्टर कि 10 कि.मी. परिधि में आने वाले फ्लोरा एवं फाउना की सुची

फ्लोरा एवं फाउना की सुची

(अ) वृक्ष(Trees)			
कोड संख्या	अन्तर्राष्ट्रीय (लेटीन) नाम	स्थानीय नाम	कुल
2	*Acacia catechu* (L.f) willd.	खैर ,खेड़	*Mimosaceae*
4	*Acacia leucophloea* (Roxb.) Willd.	रोझ ,अकेशिया	*Mimosaceae*
5	*Acacia nilotica* (Linn.) Willd.	बोरिया ,बबुल	*Mimosaceae*
6	*Acacia senegal* (Linn.) Willd	खुमटा	*Mimosaceae*
9	*Ailanthus excelsa* Roxb.	मडाडू ,धवा	*Simaroubaceae*
10	*Anogeissus latifolia* (Roxb.ex DC.) Wall.	धावडा	*Combretaceae*
18	*Azadirachta indica* A.Juss	नीम	*Meliaceae*
20	*Bauhinia variegata* Linn.	कचनार	*Caesalpiniaceae*
21	*Bombax ceiba* Linn.	सेमल ,सेमला	*Bombacaceae*
22	*Boswellia serrata* Roxb.ex Colleb.	सालर	*Burseraceae*
24	*Butea monosperma* (Lamk.) Taub.	खाखरा ,पलास ,ढाक ,केसु	*Fabaceae*
27	*Cassia fistula* Linn.	अमलतास ,अरगवध ,कनियल	*Caesalpiniaceae*
44	*Ficus religiosa* Linn.	पीपल	*Moraceae*
66	*Holoptelea integrifolia* (Roxb.) Planch.	खपरी ,कंकडी ,अन्दखरी ,पुरैल	*Ulmaceae*
81	*Lannea coromandelica* (Houtt.) Merrill	गोदल ,गुदीय	*Anacardiaceae*
77	*Pongamia pinnata* (Linn.) Pierre	करंज ,कानजी	*Fabaceae*
87	*Wrightia tinctoria* (Roxb.) R.Br.	किनी , कुरी ,दिन,खनी	*Apocynaceae*

(आ) छोटे वृक्ष, क्षुप(Small trees,shrubs)			
कोड संख्या	अन्तर्राष्ट्रीय (लेटीन) नाम	स्थानीय नाम	कुल
7	*Caesalpinia bonduc* (L.) Roxb.	कटकरेज ,आकोन्दा , कटोकेल	*Caesalpiniaceae*
30	*Dendrocalamus strictus* (Roxb.) Nees	बेंस	*Poaceae*

1

उपवन संरक्षक
उदयपुर (राजस्थान)

(इ) छोटी झाड़िया एवं शाक(Under shurbs and Herbs)

कोड संख्या	अन्तर्राष्ट्रीय (लेटीन) नाम	स्थानीय नाम	कुल
7	*Aloe vera* (L.) Burm.f.	ग्वारपाठा	*Liliaceae*
24	*Datura ferox* Linn.	धतूरा	*Solanaceae*
54	*Ocimum gratissimum* Linn.	वन तुलसी	*Lamiaceae*
74	*Zizyphus mummularia* (Burm. f.) Wight & Arn	धणधीर झाड़ी बैर	*Rhamnaceae*

(उ) घास (Grasses)

कोड संख्या	अन्तर्राष्ट्रीय (लेटीन) नाम	स्थानीय नाम	कुल
2	*Aristida adscensionis* Linn.	लंगला	*Poaceae*

वन्य जीवों की सूची

(क)–क्षेत्र में पाये जाने वाले वन्य जीवों सूची

कोड संख्या	स्थानिय नाम	अंग्रेजी नाम	लेटिन नाम
2	बघेरा,तेन्दुआ	Baghera	*Panthera pardus*
3	जंगली बिल्ली	Jungle cat	*Felis chaus*
5	नेवला	ruddy mongoose	*Herpestes smithi*
6	सियार	Jackal	*Canis aureus*
7	लोमड़ी	Indian fox	*Vulpes bengalensis*
8	जरख	Striped hyaena	*Hyaena hyaena*
13	नील गाय	Blue bull	*Boselaphus tragocamelus*
17	गिलहरी	five striped palm	*Funambulus pennant*
21	सेही	Indian porcupine	*Hystrix indica*
22	खरगोस	Indian hare	*Lepus nigricollis*

2

उपवन संरक्षक
उदयपुर (उत्तर)

(ख)–क्षैत्र में पाये जाने वाले पक्षियों की सूची

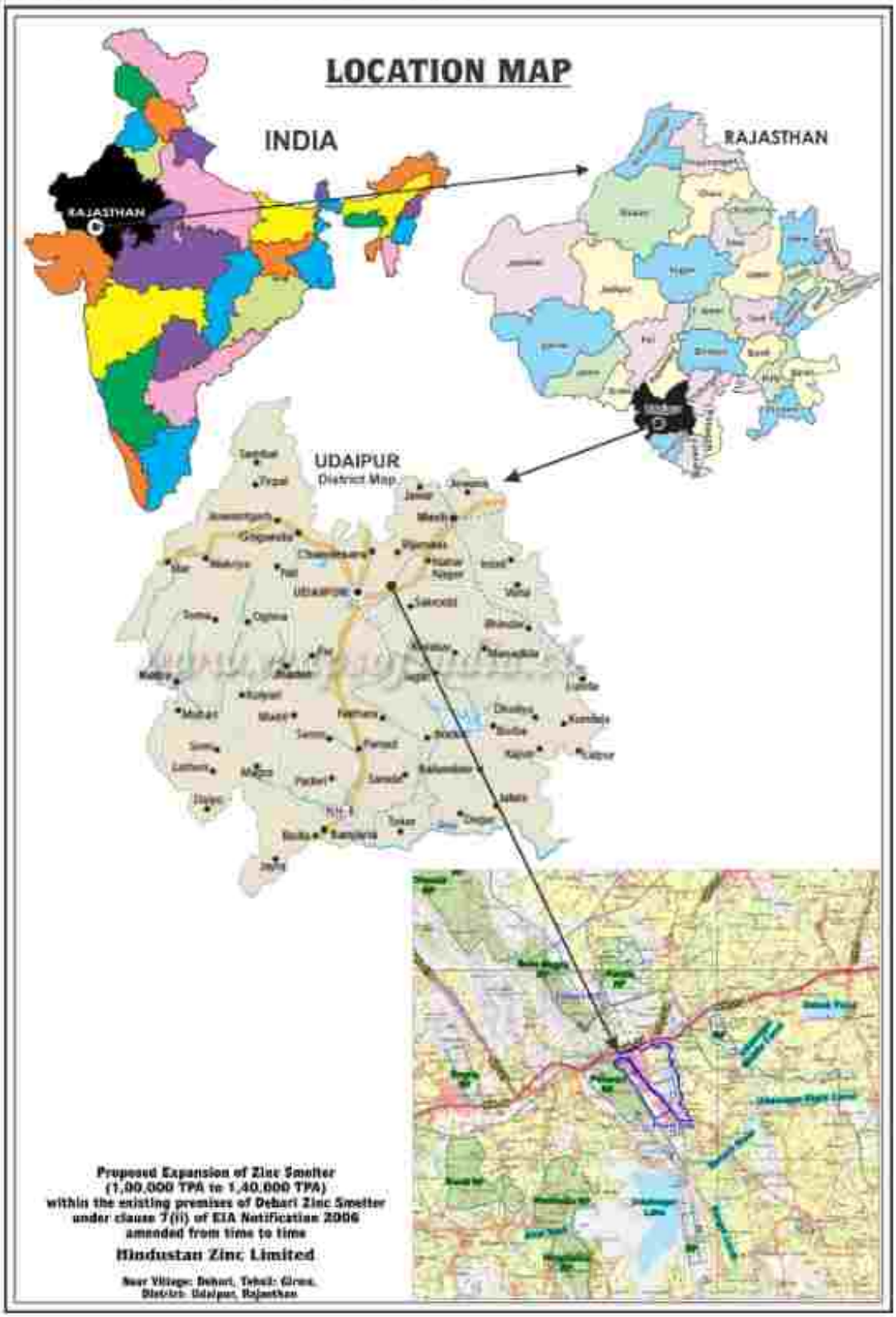
कोड संख्या	हिन्दी स्थानीय नाम	कॉमन अंग्रेजी नाम	लेटिन नाम
30	मोर(नर),मोरनी(मादा)	Indian peafowl	*Pavo cristatus*
37	टिटहरी	Red-wattled lapwing	*Vanellus indicus*
64	तोता	Rose-ringed parakeet	*Psittacula eupatria*
68	कोयल	Koel	*Eudynamis*

(ग) क्षैत्र में पाये जाने वाले सरीश्रृप (Reptiles) की सूची

कोड संख्या	हिन्दी नाम	कॉमन अंग्रेजी नाम	लेटिन नाम
8	गिरगिट	Common garden lizard	*Calotes versicolor*
19	गिरी	Russell's viper	*Vipera russelli*

उपवन संरक्षक
उदयपुर (उत्तर)

III. Location map of the study area



IV. Green Belt Development Plan Map

vedanta
transforming for good

HINDUSTAN ZINC
Zinc & Silver of India

HZL/DZS/ENV/EXP/2024-25/04

Date:05.11.2024

To,
Member Secretary,
Ministry of Environment, forest & Climate Change
Industry-I
New Delhi.

Subject: EAC advised Industry-1 to sector to obtain comments from the FC Division of MoEF&CC for this case of Proposed Expansion Of Zinc Smelter (1,00,000 TPA To 1,20,000 TPA) through Modernization within the existing premises of Debari Zinc Smelter under clause 7(II) of EIA Notification 2006 amended from time to time At Near Village: Debari and Bichhri; Tehsil: Girwa; District: Udaipur (Rajasthan)

Reference: Proposal No. IA/RJ/IND1/488353/2024 dated 19.07.2024.
MOM of EAC meeting (Industry-I) held on 16.10.2024 Agenda no. 67.14

Respected Sir,

With reference to the above cited subject, we would like to submit the following for your kind perusal:

- Initially, the Honorable Governor of the State of Rajasthan **granted lease of 427 Acres (172.79 Ha) in 1962 for 99 years** under the provisions of the Rajasthan Industrial Areas Allotment Rules, 1959, framed under Section 100 of the Rajasthan Land Revenue Act, 1956, which includes 98.74 hectares (244.01 Acres) vide lease dated 29.01.1962 (**Annexure A**), 13.02 hectares (32.18 Acres) vide lease dated 26.03.1962 (**Annexure B**) and 61.03 hectares (150.81 Acres) vide lease deed dated 26.03.1962 (**Annexure C**) respectively. HZL is paying lease rent on regular basis & demand notice dated 18.07.2017 is attached herewith as **Annexure D**. Request for getting the demand notice for remaining lease rent till date has been submitted to SDM. HZL commissioned the referred Zinc Smelter unit in 1968. Hindustan Zinc Limited, whilst being an erstwhile public sector undertaking, acquired additional land from nearby villages in and around the 1990s, for the purpose of its operations.
- **Plant and colony were established in 1968** and being used for non-forest purposes before the Forest (Conservation) Act, 1980, came into effect, therefore Forest Clearance was not applicable for Zinc Smelter Debari.
- As per Hon'ble Supreme Court orders (State Of Bihar vs Banshi Ram Modi & Ors, 7.05.1985), "forest area which is broken up or cleared before the commencement of the Act, prior approval of the Central Government in terms of Section 2 of the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 is not required and it would be required, when lease granted before the commencement of the said Act, is renewed after its coming into force. During the continuance of the lease period, the approval of the Central Government under Section 2 of the said Act is not required.
- In this case also, prior approval under Van (Sanrakshan Evam Sanwardhan) Adhiniyam, 1980, will only be required during renewal of Zinc Smelter Debari's lease i.e. 2061. At present, the lease of the unit is valid and in continuance.
- Environment Clearance (EC) for expansion of Zinc Smelter (80,000 TPA to 1,00,000 TPA) at Village: Debari, Tehsil: Girwa, District: Udaipur (Rajasthan) was granted by MOEFCC, New Delhi vide F.No.J-

11011/479/2006-IA.II(I) 19.03.2008 for total land area of 190.05 ha. CTE for the same was obtained from RSPCB vide F.No. 12(30-86) RPCB/Gr II/49 dated 5.04.2008 followed by CTO vide Letter F: 12(30-86) RPCB/Gr II/2701 dated 17.09.2008. The plant is in operation as per renewed CTO obtained from RSPCB vide Order no. 2022-2023/ITDF/9282 dated 17.03.2023 (Valid upto 31.03.2027).

- Subsequent to the above, M/s. Hindustan Zinc Limited proposed for the Expansion of Zinc Smelter (1,00,000 TPA to 1,40,000 TPA) through Modernization within the existing premises of Debari Zinc Smelter under clause 7(II) of EIA Notification 2006 amended from time to time At Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan). While submitting the online application along with kml file of the Plant area on the Parivesh portal vide Proposal No. IA/RJ/IND1/457836/2024 dated 06.01.2024 withdrawn on 19.07.2024, it was found that:

- Some part of land covering, security colony, substation, some plantation etc. is showing under forest land. Upon observing this discrepancy, for further verification of the referred land, we consulted DCF-Udaipur (North Region) and found a reflection of the same in the Decision Support System. This is contrary to the revenue records as are in place, since in the same, this land parcel as which is part of the lease deed awarded to HZL in 1962, for 99 years, is recorded in HZL's name.

- After further enquiry with the revenue and forest departments it was found that the total area of Zinc Smelter Debari complex (Plant and Colony) comes out to be 184.2 ha (Instead of 190.05 Ha mentioned in the EC letter). Remaining 5.85 Ha area falls outside the physical boundary Plant area (129 Ha) & Residential colony area (55.2 Ha). Hence, 184.2 Ha area is considered as projects area for this proposal.

- Out of this 129 ha of plant area, as per the information available with Forest department, 1.77 ha of Khasara No. 4522 and 5.20 ha of Khasra No. 4523 falls under Kantiya Forest (total area – 292 ha), which was notified as reserve forest by Mewar Government on 27.12.1947.

- Similarly, out of 55.2 ha. of colony area, 11.60 ha of Kasara No. 4509, 2.40 Ha. of Khasara No. 4510 and 2.46 Ha of Khasara No. 4511 falls under Parwadi Forest (total area 225 ha), which was notified as reserve forest by Mewar Government on 21.02.1943.

- NOC from forest department obtained vide letter dated 02.08.2024 is enclosed herewith as **Annexure E.**

- Whereas old revenue records of samwat 2051 (year 1994) are showing above khasra No. 4522, 4523,4509, 4510, 4511 as factory area (***Annexure F***). Khasara Map of the Zinc Smelter Debari including plant and colony area is enclosed as **Annexure G.**

In this connection, we hereby request your goodself to kindly consider our project for further process for grant of EC.

Thanking you,

For Hindustan Zinc Limited.

Yours faithfully,

Manas Tyagi

Dy. CEO – IBU Smelters, Hindustan Zinc Limited

ANNEXURE A

2R$

INDIA

दो रुपया

TWO RUPEES भारत TWO RUPEES

EX A1 25/10/94

Case No. 33/86 (Mon(E) 36/93)

Ex 13/10

19

THIS DEED OF LEASE made on Monday the twenty-ninth of January of one thousand nine hundred and sixty-two, between -

The Governor of the State of Rajasthan hereinafter referred to as the Lessor (which expression shall where the context so requires, include his successors and assigns) of the first part; and

The Metal Corporation of India Ltd., a Public Limited Company, registered under the Indian Companies Act, 1913, and an existing Company within the meaning of the Indian Companies Act, 1956, having its registered office at 135, Hiralal Rash Behari Basu Road (formerly Canning Street), in the town of Calcutta, hereinafter referred to as the "Lessee" (which expression where the context so requires include its successors, Liquidators and assigns) of the Second Part:

WHEREAS the Lessee intends to set up, establish and run a factory for smelting of zinc and its ancillary and related industries near Udaipur in the State of Rajasthan:

AND WHEREAS the Lessee had requested the Lessor to allot necessary plots of land to the Lessee for the purpose aforesaid on a long lease andto demise it to the Lessee for the above mentioned purpose;

AND WHEREAS the Lessor has agreed to grant lease of 427 acres of land described in the Schedule I. and shown in the plan 'A' annexed hereto, for 99 years (renewable for a further period of 99 years) to the Lessee, under the provisions of Rajasthan Industrial Area Allotment Rules, 1959, framed under Section 100 of the Rajasthan Land Revenue Act No.15 of 1956;

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FACTORY MANAGER
Hindustan Zinc Limited
Zinc Smelter, Debari
UDAIPUR (Raj.) 313024

आज दिनांक [illegible] को पृष्ठ [illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

S/D Atul Chander Dutta

S/D Nanalal Vaya
उप पंजीयक [illegible]
[illegible] (राजस्थान) 27-10-62.

[illegible]
557.25 6.00 15.00
20.00 0.50 1.50
[illegible] 88
600.25 98

[illegible]

S/D Nanalal Vaya
27-1-62

Shri Atul Chandra above named and (2) Shri Bankim Chandra Chakravarti S/o Late Shri Surendranath Cast Sharma R/O Calcutta occupation service admitted execution of this deed as Director ~~of the~~ & Executive officer respects of the Mettal Corporation of India L.L. Calcutta, which is an incorporated company under the Company Law. It is also stated by Shri Bankim Chandra that he has been authorised by a resolution dated 25th Jan. 1962.

The executants have been identified by one Shri N. L. Bhattacharya Advocate Udaipur & (2) Shri Harnath Singh Mehta S/o Shri Jagnath Singh Ji

AND WHEREAS in pursuance of the said agreement between the Lessor and the Lessee the latter has deposited with the former a sum of Rs.47,000/- (rupees forty-seven thousand only) as development charges and rent for the first year in respect of said land and the Lessor has permitted the Lessee to take possession of the said land and to commence erection and construction of buildings etc. ;

AND WHEREAS the Lessor and the Lessee desire to execute a Lease Deed for the site for the factory for smelting zinc and its ancillary on terms and conditions agreed to between the parties;

NOW THIS DEED WITNESSETH that in pursuance of the terms and conditions agreed as aforesaid between the parties and in consideration of the rent hereby reserved and covenants hereinafter contained the Lessor hereby demises (transfers by way of lease) unto the Lessee, land measuring 244.01 acres in village Debari and Bechdi in the District of Udaipur (more particularly described in the Schedule 'II' hereto) and for greater clearness delineated on the map or plan 'B' annexed hereto and thereon shown with its boundaries coloured red, together with all easements and appurtenances whatever, buildings or appertenant thereto and with the liberties, powers and privileges to be exercised and enjoyed in connection therewith, hereinafter mentioned subject to the covenants restrictions and conditions, to the exercise and enjoyment of such liberties, powers and privileges, hereinafter mentioned TO HAVE AND TO HOLD the said land hereby demised unto the Lessee from the 13th day of July, 1961, for a term of 99 year (subject to option of renewal on the Lessee's part under the said term and conditions except as to rate of rent for a further period of 99 years).

The Lessor and Lessee hereby actually covenant, agree and declare as follows, that is to say :-

1. The Lessee shall pay to the Lessor yearly rent of Rs.15/- (rupees fifteen only) per acre for the portion of land demised for the zinc smelter and its ancillary including the land to be used for office, stores, roads, railway siding, ponds, etc. The Lessee will also pay Rs.100/-(rupees one hundred only) per acre as Development charged and the amount already deposited by the Lessee with the Lessor shall be adjusted against the said charges. The annual rent of Rs.15/-(rupees fifteen only) shall be paid by yearly instalments before the 7th day o

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सब रजिस्ट्रार
बदनवार (राजस्थान)

of each calendar year at the Treasury of Rajasthan Government at Udaipur or such other place as the Lessor may from time to time appoint on this behalf. The annual rent as aforesaid shall be subject to revision after every thirty years and the enhancement in rent at each such revision shall not exceed 25% of the rent payable for the period immediately preceding such revision. The Lessee hereby agrees to pay such enhanced rent to the Lessor as a result of the revision aforesaid.

2. The Lessee shall be entitled to set up, erect, construct and establish factory for smelting zinc and its ancillary on the said land. It can, (subject to the terms of this agreement) do everything, which it considers necessary, convenient or incidental thereto, for any purpose connected with the zinc smelter and without prejudice to the generality of the provisions of this paragraph, the Lessee may make any permanent or temporary structures, ~~xxx~~ alter the surface of the said land including digging earth and stones therein. The Lessee agrees not to construct or build any structure or building on the said plot of land or on a portion thereof which may not have the object of using for the industry aforesaid for which the said plot has been leased.

3. The Lease shall terminate on the expiry of 99 years from the date of commencement of this agreement. The Lessee shall have option of renewal of the lease under similar terms and conditions except that relating to annual rent to be determined by mutual consent, for a further period of 99 years, after the expiry of the present lease.

4. The Lessee may at any time after the expiry of twenty years from the date of this lease upon giving six months previous notice in writing to the Lessor surrender this lease hereby created and thereupon all consequences will follow as herein contained as if the lease had expired after full 99 years.

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Chandra Gupta
13/7/62

5. The Lessee will at the expiration of the said term or sooner surrender or determination thereof, peaceably and quietly surrender to the Lessor the said land after removing any construction and fixtures made by it thereon within a period not exceeding two years from the date of termination or earlier surrender or determination unless the Lessor shall express its willingness to purchase the same at a fair valuation in which case the Lessee shall sell the same to the Lessor at such valuation to be made by mutual consent.

6. That any person or persons duly appointed or authorised by the Lessor in this respect, may, after giving reasonable notice in writing, enter into the said land for the purpose of inspection, at reasonable hours without causing any disadvantage to the Lessee.

7. That the lessee shall set up on the said plot of land zinc smelter industry for which land has been leased to him by the lessor within a period not exceeding three years hereof and in case of his failure to do so the said plot shall revert to the lessor unless the period of three years is extended by the lessor on valid grounds.

8. That the Lessee shall not sublet or underlet the land or any part thereof. He shall have the limited ownership on the said plot till the lease subsists and shall have the right to assign, create, charge, mortgage or lien on the land hereby demised or any portion thereof including building construction, structures, siding and erection, fixtures, machineries, fittings, factory etc., for securing loans or other monetary obligations, subject to the condition mentioned in clause 7, for the development of the industry for which the said land has been leased to the Lessee.

9. The Lessee shall have a right to cut trees and plants growing on the said land and to appropriate the same for its own use.

10. The rent as aforesaid excludes all kinds of taxes which the Municipal Board, Panchayat or any other civil body has imposed or

or may impose during the period of lease in respect of the said plot and the Lessee agrees to pay such taxes to the authorities concerned direct.

11. The Lessor shall not grant any mining or quarrying lease or licence to any person whthin the said land.

12. In case any default is made by the Lessee in respect of any of the terms and conditions aforesaid, the said plot of land shall revert to the Lessor. The Lessee shall have to remove from there, within a period not exceeding one year, at his cost, all the buildings and structures constructed by him therein and in case of his failure to do so, the Lessor shall have the right to dispose of the said structures and buildings and to refund the proceeds to the Lessee, after recovering all the same due (if any) to him from the Lessee.

Provided, however, that before any such action as aforesaid is proposed to be taken by the lessor, he shall give a notice in writing to the lessee and if the Lessee within a period of three months thereof, satisfies the Lessor that the same shall be remedied within a period of three months from the date of the receipt of the notice, and actually remedies the same within such period, no such action as aforesaid shall be taken.

13. If any dispute arises between t[illegible] parties to this deed, it shall be referred to an Arbitrator mu[illegible]lly agreed by both the parties, or to two Arbitrators, one [illegible] appointed by each party and in case of any difference of opini[illegible]etween such two Arbitrators, the matter may be referred [illegible] decision of an Umpire, agreed upon between the said tw[illegible]rators and failing such agreement as appointed by a Court. (And stamps of the value of Rs.742.50 nP. has been paid in persuance of the order of the Collector, Udaipur No.37 R/61/1299 dated the 27th January, 1962)

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[illegible]
[illegible]

14. The cost and expenses incidental to the preparation, execution and registration of this lease, including stamps duty (if(any)shall be borne and paid by the Lessee.

15. In witness whereof the parties hereto have set their hands on the dates mentioned against their signatures:-

Sd/- P. K. C. Kaury
Collector, Udaipur 29/1/62

1. Witness

1. Signed for and on behalf of the Governor of the State of Rajasthan.

(Seal)
Court of Collector
& Dist. Magistrate
Udaipur (Rajasthan)

2. Witness

1. Witness

Sd/-
M. L. Bhattacharya
Advocate, Udaipur
29.1.62

1. Signed for and on behalf of the Metal Corporation of India Ltd., Calcutta.

For & on Behalf of
The Metal Corporation of India Ltd.
Sd/- A. K. Calcutta
Manager
29/1/62

2. Witness

Sd/-
Harnath Singh Mehta
29.1.62

2

(Seal)
The Metal Corporation of India Ltd.
Calcutta

For the Metal Corporation of India Ltd.
Sd/-
[illegible]
Executive Officer
29/1/62

True Copy
Manager Copy
31 4 62
सत्य रजिस्ट्रार
[illegible] (राजस्थान)

SCHEDULE II

LIST OF KHASARA NUMBER OF THE LAND COMPRISED OF 244.01 ACRES IN THE VILLAGE DEBARI AND DICHDI GIVEN ON LEASE TO THE METAL CORPORATION OF INDIA LIMITED FOR THE FACTORY ZINC SMELTER AND ITS ANCILLARIES BY THE GOVERNMENT OF RAJASTHAN

VILLAGE DEBARI

S.No.	Name of Village	Khasara No.	Area Bigha	Area Biswa
1.	Debari	1620	39	1
		1621	1	7
		1622	14	15
		1623	-	16
		1624	-	1
		1625	-	11
		1626	-	8
		1628	-	15
		1629	-	17
		1630	-	12
		1639	-	8
		2807-1643	-	8
		2810-1643	4	7
		2811-1643	-	3
		1627	-	11
		1631	-	7
		1632	-	3
		1633	-	6
		1634	1	-
		2806-1643	-	10
		2808-1643	3	-
		1635	-	9
		1638	-	8
		2805-1643	1	9
		1636	-	11
		1637	-	8
		1641	-	11
		1642	-	5
		2804-1643	1	11
		1640	-	1
		1643	5	10
		2809-1643	3	3
		1618	29	13
		1619	11	-
		1617-4,K	15	14
		1617-5,K	4	-
		1617-2,M	10	-
		1617-5,KH	6	4
		1617-4,KH	8	17
		1617-2	4	18
		1617-3	-	4
		1617-M	45	4
		1614-1	9	2
		1577-1	9	-
		1506-1	2	10
		Total:	241	18

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बरनगर (राजस्थान)

VILLAGE: BIGHDI

S.No.	Name of Village	Khasara No.	Area Bighas	Biswas
1.	BIGHDI	136-3	3	10
		136-4	4	7
		136-7,K	2	18
		136-8,K	2	-
		136-9	4	8
		136-10	-	10
		136-6	8	8
		136-8,KH	3	7
		136-7,KH	2	4
		136-10	4	4
		15 - 6	16	-
		136-5	8	2
		5-15	2	5
		136-28	5	10
		136-17	8	-
		136-3	4	-
		136-27	1	6
		136-26	-	17
		136-21	1	4
		136-18	1	16
		136-20	5	13
		136-31	1	6
		136-M	103	3
		5 M	3	18
		14 M	1	2
		15-6	15	10
		5 M	1	10½
	The Village Bighdi Total :		215	12½
	GRAND TOTAL : FACTORY AREA :-		457	10½

(Four hundred fifty seven bighas and ten & half biswas)

= 244.01 acres.

P.K.B Khan.

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ANNEXURE B

2 Rs

INDIA

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दो रुपया

TWO RUPEES भारत TWO RUPEES

RAJASTHAN

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Kanalal Vaidya 13/8/62

सब रजिस्ट्रार
सदरपुर (राजस्थान)

LEASE DEED OF RAILWAY SIDING

THIS DEED OF LEASE made on Monday the twenty sixth of March one thousand nine hundred and sixty two, between;

The Governor of the State of Rajasthan hereinafter referred to as the Lessor (which expression shall where the context so requires, include his successors and assigns) of the First Part: and,

The Metal Corporation of India Ltd., a Public Limited Company, registered under the Indian Companies Act, 1913, and an existing company within the meaning of the Indian Companies Act, 1956, having its registered office at 135, Biplabi Rash Behari Basu Road (formerly Canning Street) in the town of Calcutta, hereinafter referred to as the "Lessee" (which expression where the context so requires includes its successors, Liquidators and assigns) of the Second Part:

WHEREAS the Lessee intends to set up, establish and run a factory for smelting of zinc and its ancilliary and related industries including Residential Colony for its Employees and the Railway Siding, near Udaipur in the State of Rajasthan.

AND WHEREAS the Lessee had requested the Lessor to allot necessary plots of land to the Lessee for the purpose aforesaid on a long lease and to demise it to the Lessee for the above mentioned purposes.

आज दिनांक 12 माह जून सन् 1962 को

श्री हरनाथसिंह महता के मध्यस्थ/कार्यालय

के कार्यालय में श्री हरनाथसिंह महता पुत्र श्री जगन्नाथसिंह जी उम्र 50 साल

जाति महता व्यवसाय पेशा निवासी उदयपुर ने पेश किया कि जिनकी

तरफ वस्तुत विक्रय पत्र दिया है।

Sd. H.S. Mehta 13/6/62 Sd. Nanalal Vaya 13/6/62

फीस रजि. 7.00 नकल 6.00 फीस पेस्टीग की० कमीशन 0.50 0.50

अन्य शीर्ष संख्या नम्बर रोकड़ पन्ना 1.00

10/6/62 Sd. Nanalal Vaya

जमा हुवे ह० उप पंजियक उदयपुर 13.6.62

श्री हरनाथसिंह महता उक्त ने इस दस्तावेज पर हस्ताक्षर

(1) श्री प्रतुलचंद्र पिता श्री जितेन्द्रदत्त पेशा व्यापार नि० कलकत्ता व

(2) श्री नेमिचन्द्र चक्रवर्ती पिता श्री सुरेन्द्रनाथ चक्रवर्ती पेशा नौकरी नि० कलकत्ता के होना स्वीकार किया व बयान किया कि उन्होंने हस्ता-क्षर बहैसियत Director मेटल कोरपोरेशन आफ इंडिया लिमिटेड कलकत्ता व बहैसियत Executive Officer उक्त कंपनी के किये हैं।

श्री हरनाथसिंह महता को उक्त दोनों संपादन-कर्ताओं ने Power of attorney दे रखी है कि जो रजिस्ट्रार एश्युरेंस कलकत्ता द्वारा धारा 22 कानून रजिस्ट्री के अधीन क्रम नं. 256 सन 62 पर ता: 12-6-62 को प्रमाणीकरण किया गया है। अतः तसदीक की गई।

मु० खास पत्र यहां के स्थायी रिकार्ड में रखा गया है।

Sd. H.S. Mehta ता: 13-6-62 पंजीयन में

Sd. Nanalal Vaya

13.6.62

सब रजिस्ट्रार

उदयपुर (राजस्थान)

वि. अं. से मुक्त किया गया है।

Sd. Nanalal Vaya

13.6.62

सब रजिस्ट्रार

उदयपुर (राजस्थान)

Certified that the deed has been executed by Shri P.K.B. Kurup Collector Udaipur in his official capacity

631

AND WHEREAS the Lessor has agreed to grant lease of 427 acres of land described in the Schedule 'I' and shown in the plan 'A' for 99 years (renewable for further period of 99 years) to the Lessee, under the provisions of Rajasthan Indistrial Area All-otment Rules, 1959, framed under section 100 of the Rajasthan Land Revenue Act No.15 of 1956, for the said smelter factory Residential Colony and Railway Siding.

AND WHEREAS in pursuance of the said agreement between the Lessor and the Lessee, the latter has deposited with the former a sum of Rs.47,000/- (rup-ees forty seven thousand) as development charges and rent for the first year in respect of the said plots of land and the Lessor had permitted the Lessee to take possession of the said plots of land and to commence erection and construction of buildings etc.

AND WHEREAS it has been agreed to between the Lessor and the Lessee, that three separate Deed of Lease will be executed for the factory of Zinc Smelter, Residential Colony and Railway Siding.

AND WHEREAS the Lessor and the Lessee desire to execute a Lease Deed for the site of Railway Siding including Staff Quarters etc. on terms and conditions agreed to between the parties:

NOW THIS DEED WITNESSETH that in pursuance of the terms and conditions agreed as aforesaid between the parties and in consideration of the rent hereby reserved and covenants hereinafter contained the Lessor hereby demises (transfers by way of Lease) unto the Lessee land measuring 32.18 acres in village Debari in the District of Udaipur (more particularly described in the Schedule 'II' hereto) and for greater clearness delineated on the map of plan 'B' annexed hereto and thereon shown with its boundaries coloured red, together with all easements and appurtenances whatever, buildings or appertenant thereto and with

True Copy
तहसीलदार
उदयपुर (राजस्थान)

on behalf of the government of Rajasthan state, & hence his appearance & signatures are exempted under section 84 of In. Regis. Act. & this deed is admitted as executed on behalf of the government of Rajasthan.

Sd. Nanalal Vaz
13.6.02
सब रजिस्ट्रार
उदयपुर (राजस्थान)

Nanalal Vaz
13.6.02
सब रजिस्ट्रार
उदयपुर (राजस्थान)

with the liberties, powers and privileges to be exercised and enjoyed in connection therewith, hereinafter mentioned subject to the covenants restrications and conditions to the exercise and enjoyment of such liberties, powers and privileges hereinafter mentioned TO HAVE AND TO HOLD the said land hereby demised unto the Lessee from the 13th day of July, 1961, for a term of 99 years (subject to moption of renewal of the Lessee's part under the said terms and conditions except as to rate of rent for a further period of 99 years).

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The Lessor and the Lessee hereby mutually COVENANT, AGREE and DECLARE as follows, that is to say:-

1. The Lessee shall pay to the Lessor yearly rent @ Rs.15/- (rupees fifteen only) per acre for the portion of land demised for the Railway Siding, Road crossing, Residential Quarters, Shops, Platforms, Godowns Shed, Control Room etc. and all other things which can be coveniently provided for such Railway Siding and residential quarters. The Lessee will also pay Rs.100/- (rup-ees one hundred) per acre as development charges and the amount already deposited by the Lessee with the Lessor shall be adjusted against the said charges. The annual rent of Rs.15/- (rupees fifteen only) shall be paid by yearly instalment before the 7th day of each calendar year at the Treasury of Rajasthan Government at Udaipur or such other place as the Lessor may time to time appoint on this behalf. The annual rent as aforesaid shall be subject to revision after every thirty years and enhancement in rent at each such revision shall not exceed 25% of the rent payable for the period immediately preceding such revision. The Lessee hereby agrees to pay such enhanced rent to the Lessor as a result of the revision aforesaid.

2. The Lessee shall be entitled to put up, erect and construct the Railway Siding, with road crossing & staff quarters, roads, platforms, godowns, control rooms, sheds, shops etc. required for

for the factory for smelting zinc and its ancilliary on the said land. It can, (subject to the terms of this agreement) do everything, which it considers necessary, convenient or incidential thereto, for any purpose connected with the Railway Siding and staff quarters and without prejudice to the generality of the provisions of this paragraph, the Lessee may make any permanent or temporary structures, alter the surface of the said land including digging earth and stones therein. The Lessee has agreed not to construct or to build any structure or building on the said plot of land or on a portion thereof which may not have the object of using it for the aforesaid purpose for which the said plot has been leased.

True Copy

3. The Lease shall terminate on the expiry of 99 years from the date of commencement of this lease. The Lessee shall have option of renewal of the lease under similar terms and conditions except that relating to annual rent to be determined by mutual consent, for a further period of 99 years, after the expiry of the present lease.

4. The Lessee may at any time after the expiry of twenty years from the date of this lease upon giving six months' previous notice in writing to the Lessor surrender this lease hereby created and thereupon all consequences will follow as herein contained as if the lease had expired after full 99 years.

5. The Lessee will at the expiration of the said term or sooner surrender or determination thereof, peaceably and quietly surrender to the Lessor the said land after removing any construction and fixture and by it thereon within a period not exceeding two years unless the Lessor shall express its willingness to purchase the same at a fair valuation in which case the Lessee shall sell the same to the Lessor at such valuation to be made by mutual consent.

6. That any person or persons duly appointed or authorised by

the Lessor in this respect, may, after giving reasonable notice in writing enter into the said land for the purpose of inspection at reasonable hours without causing any disadvantage to the Lessee.

7. That the Lessee shall put up on the said plot of land Railway Siding etc. for which the land has been leased to him by the lessor within a period not exceeding three years hereof and in case of his failure to do so, the said plot shall revert to the Lessor unless the period of three years is extended by the Lessor on valid grounds.

True Copy
Nanalal Vaya 13/6/82
सब रजिस्ट्रार
उदयपुर (राजस्थान)

8. That the Lessee shall not sublet or underlet the land or any part thereof. He shall have the limited ownership on the said plot till the lease subsists and shall have the right to assign, erect charge, mortgage or lien on the land hereby demised or any portion thereof including Railway Siding, staff quarters structures, erection, fixtures, fittings, etc., for securing loans or other monetary obligations, subject to the condition mentioned in clause 7, for the development of the said factory which includes Residential Colony and Railway Siding for which the said plots of lands have been leased to the Lessee.

9. The Lessee shall have the right to cut trees and plants growing on the said land and to appropriate the same for its own use.

10. The rent as aforesaid excludes all kinds of taxes which the Municipal Board, Panchayat or any other civic body has imposed or may impose during the period of lease in respect of the said plot and the Lessee agrees to pay such taxes to the authorities concerned direct.

11. The Lessor shall not grant any mining or quarrying lease or licence to any person within the said land or near about.

12. In case any default is made by the Lessee in respect of any of the terms and conditions aforesaid, the said plot of land shall revert to the Lessor. The Lessee shall have to remove from

there, within a period not exceeding one year, at his cost, the Railway Siding, buildings, and structures constructed by him therein and in case of his failure to do so, the Lessor shall have the right to dispose of the said Railway Sidings, structures or buildings and to refund the proceeds to the Lessee, after recovering all the sums due (if any) to him from the Lessee.

Provided, however, that before any such action as aforesaid is proposed to be taken by the Lessor, he shall give a notice in writing to the Lessee and if the Lessee within a period of three months thereof satisfies the Lessor that the same shall be remedied within a period of three months from the date of receipt of the notice and actually remedies the same within such period, no such action as aforesaid shall be taken.

True Copy
Nanalal Vaya 13/6/62
उप रजिस्ट्रार
उदयपुर (राजस्थान)

13. If any dispute arises between the parties to this deed, it shall be referred to an Arbitrator mutually agreed by both the parties, or to two Arbitrators, one to be appointed by each party and in case of any difference of opinion between such two Arbitrators, the matter may be referred to the decision of an Umpire agreed upon between the said two Arbitrators and failing such agreement as appointed by a court.

14. The cost of expenses incidental to the preparation, execution and registration of this lease, including stamps duty (if any) shall be borne and paid by the Lessee and stamps of the value of Rs.104.00 (Rupees One Hundred and four only) has been paid in persuance of the order of the Collector, Udaipur No. R. 2805 dated 24th, March 1962.

15. In witness whereof the parties hereto have set their hands on the dates mentioned against their signatures:-

(6)

170

Sd. P.K.B. Kurup.
Collector Udaipur.

1. Witness

1. Signed for and on behalf of the Governor of the State of Rajasthan.

2. Witness

Seal Collector & Dist. Magistrate Udaipur (Raj.).

True Copy
Manalal Udaipur 13/6/62
उप रजिस्ट्रार
[illegible]

1. Witness

Sd. H.S. Mehta.

2. Signed for and on behalf of the Metal Corporation of India Ltd. Calcutta

For the metal corporation India Ltd. Sd. A.C. Datta.
Director.

2. Witness

Seal.
Metal Corporation of India Ltd. Calcutta.

For The metal corporation of India Ltd. Sd. B.C. Chakravarti
(Executive officer)

(5)

165

SCHEDULE I

LIST OF KHASARA NUMBERS OF THE LAND COMPRISING 427 ACRES IN THE VILLAGE DEBARI AND BICHDI GIVEN ON LEASE TO THE METAL CORPORATION OF INDIA LIMITED BY THE GOVERNMENT OF RAJASTHAN FOR PUTTING UP THE FACTORY OF ZINC SMELTER AND ITS ANCILLIARIES IN THREE SEPARATE PLOTS:(1) FACTORY SITE - 244.01 ACRES, (2) COLONY SITE - 150.81 ACRES AND (3) RAILWAY SIDING - 32.18 ACRES.

FACTORY SITE

S.No.	Name of Village	Khasara No.	Area Bigha	Area Biswa
1.	DEBARI	1620	39	1
		1621	1	7
		1622	14	15
		1623	-	16
		1624	-	1
		1625	-	11
		1626	-	8
		1628	-	15
		1629	-	17
		1630	-	12
		1639	-	8
		2807-1643	-	8
		2810-1643	4	7
		2811-1643	-	3
		1627	-	11
		1631	-	7
		1632	-	8
		1633	-	6
		1634	1	-
		2806-1643	-	10
		2808-1643	3	-
		1635	-	9
		1638	-	8
		2805-1643	1	9
		1636	-	11
		1637	-	8
		1641	-	11
		1642	-	5
		2804-1643	1	11
		1640	-	1
		1643	6	10
		2809-1643	3	3
		1619	11	-
		1617-4,a	15	14
		1617-5,a	4	-
		1617-2,a	10	-
		1617-5,b	6	4
		1617-4,b	8	17
		1617-2,	4	18
		1617-3,	-	4
		1617-a	45	4
		1614-1	9	2
		1577-1	9	-
		1576-1	2	10
		Total	241	18

True Copy
Manaklal
13.6.62
(सत्य प्रतिलिपि)

Sd. Collector Udaipur
Seal
Collector & Dist. Magistrate Udaipur (Raj.)

For the metal corporation of India Ltd. Sd. A.C. Datta
Director.

168

S.No.	Name of village	Khasara No.	Area Bigha	Area Biswa
2.	BICHDI	136-3	3	10
		136-4	4	7
		136-7,a	2	18
		136-8,a	2	-
		136-9	4	8
		136-10	-	10
		136-6	8	8
		136-8,b	2	7
		136-7,b	2	4
		136-10	4	4
		15-6	16	-
		136-5	6	2
		5-15	4	5
		136-28	5	10
		136-17	3	-
		136-3	4	-
		136-27	1	6
		136-26	-	17
		136-21	1	4
		136-18	1	10
		136-20	5	13
		136-31	1	6
		136-m	103	3
		5-m	3	18
		14-m	1	2
		15-6	15	10
		5-m	1	10½
		Total Village Bichdi	215	12½
		GRAND TOTAL: FACTORY AREA	457	10½

(Four hundred fifty seven bighas and ten and half biswas)

= 244.01 acres

Sd. P. K. B. Kurup. Collector Udaipur.

Seal Collector & District Magistrate Udaipur (Raj.)

for the metal corporation India Ltd. Sd. A. C. Datta. Director

COLONY SITE

1.	DEBARI	1645/1	10	-
		1645/2	10	-
		1645/3	4	6
		1645/4	8	15
		1645/M	40	19
		Total Village Debari	74	--
2.	BICHDI	1/M	52	-
		2/M	91	7
		3/M	65	10
		Total Village Bichdi	208	17
		GRAND TOTAL	282	17

(Two hundred eighty two bighas and seventeen biswas)

= 150.81 acres.

True Copy
Nanalal Vey
3/6/62
सब रजिस्ट्रार
उदयपुर (राजस्थान)

167

RAILWAY SIDING

S.No.	Name of Village	Khasara No.	Area Bigha	Area Biswa
1.	DEBARI	1401/M	3	16
		1402/M	-	3
		1403/M	13	7
		1404/M	-	3
		1411/M	41	-
	Total Village Debari		58	9
2.	GUDLI	[illegible]/M	1	17
		GRAND TOTAL :	60	6

= 32.18 acres

(Thirty-two point eighteen acres)

Sd. P.K.B. Kurup
Collector Udaipur.
Seal
Collector & District
Magistrate Udaipur (Raj.).
For the metal corporation
India Ltd. Sd. A.C. Datta.
Director.

True Copy
Nandlal [illegible]
13/8/62
उप रजिस्ट्रार
उदयपुर (राजस्थान)

(2)

166

SCHEDULE II

LIST OF KHASARA NUMBER OF THE LAND COMPRISING OF 32.18 ACRES IN THE VILLAGE DEBARI GIVEN ON LEASE TO THE METAL CORPORATION OF INDIA LIMITED FOR THE RAILWAY SIDING BY THE GOVERNMENT OF RAJASTHAN.

S. No.	Name of Village	Khasara No.	Area Bigha	Area Biswa
1.	DEBARI	1401/M	3	16
		1402/M	-	3
		1403/M	13	7
		1404/M	-	3
		1411/M	41	-
		Total Village Debari:	58	9
2.	GUDLI	32/M	1	17
		GRAND TOTAL :	60	6

= 32.18 Acres

(Thirty-two point eighteen acres)

True Copy
Nanalal Gaya 13/6/62
सब रजिस्ट्रार
उदयपुर (राजस्थान)

Sd. P.K.B. Kurup
Collector Udaipur.
O Seal
Collector & Dist.
Mag-Strate Udaipur (Raj.).
For the metal corporation
India Ltd. Sd. A.C. Datta.
Director

मु. दिया
Nand Lal

इस्वास्त नं. ६२ सन ६२
[illegible] इस्वास्त १३-६-६२
[illegible] १३-६-६२
[illegible] १३-६-६२
[illegible]

True Copy
Nanalal Gaya 13/6/62

Nanalal Gaya 13/6/62
सब रजिस्ट्रार
उदयपुर (राजस्थान)

642

ANNEXURE C

2 RS

INDIA

TWO RUPEES भारत TWO RUPEES

Ex H-1

RAJASTHAN

LEASE DEED OF RESIDENTIAL COLONY

THIS DEED OF LEASE made on Monday the twenty sixth of March one thousand nine hundred and sixty two, between;

The Governor of the State of Rajasthan hereinafter referred to as the Lessor (which expression shall where the context so requires, include his successors and assings) of the First Part; and

The Metal Corporation of India Ltd., a Public Limited Company, registered under the Indian Companies Act, 1913, and an existing company within the meaning of the India Companies Act, 1956, having its registered office at 135, Biplabi Rash Behari Basu Road (formerly Canning Street) in the town of Calcutta, hereinafter referred to as the "Lessee" (which expression where the context so requires includes its successors, Liquidators and assigns) of the Second Part:

WHEREAS the Lessee intends to set up, establish and run a factory for smelting of zinc and its ancilliary and related industries including Residential Colony for its employees and the Railway Siding near Udaipur in the State of Rajasthan;

AND WHEREAS the Lessee had requested the Lessor to allot necessary plot of land to the Lessee for the purpose aforesaid on a long lease and to demise it to the Lessee for above mentioned purposes;

प्रथम दिनांक १४ मास १ सन १९६३

को [illegible] उदयपुर के

[illegible] हरनाथ सिंह जी

पुत्र श्री जगन्नाथ सिंह

ऐडमीनीस्ट्रेटीव आफिसर मेटल कोरपोरेसन

व्यवसाय [illegible]

[illegible] प्रस्तुत किया गया

उदयपुर सीन्धी बाजार

H.S. Metha
14-1-63

Sd - भवरलाल जैन 18/1/63
अंग्रेजी में

V No. 2 R. No. 40

फीस रजिस्ट्री 491-44

प्रतिलिपि फीस 7-00

[illegible] फीस 0-50 0-50

[illegible]

[illegible]

[illegible]

[illegible] 499-44

उक्त श्री हरनाथ सिंह जी ने नौ सपादन करना स्वीकार किया जीनसे मे [illegible] रूप से प्रचीत है।

Sd H.S. Metha
14.1.63

Sd भवरलाल जैन 18/1/63

अंग्रेजी में सब रजिस्ट्रार उदयपुर राजस्थान।

[illegible] श्री पी [illegible] जी

[illegible] उदयपुर

[illegible]

[illegible]

और [illegible]

[illegible]

Sd - भवरलाल जैन 18/1/63 अंग्रेजी में

[illegible]

यह दस्तावेज एडीशनल बुक नं० १ की जिल्द नं० [illegible] के फ्रा १०७ से नं० 221 के क्रम नं० 105 पर [illegible] किया गया 24/1/63 ई.

नोट:- पेज नं० १०८ बी [illegible] सेवन खाली रह गया है।

Sd B.L. Jain

Sd Bhawarlal Jain
सब रजिस्ट्रार उदयपुर नार्थ 24.1.63

AND WHEREAS the Lessor has agreed to grant lease of 427 acres of land described in the Schedule 'I' and shown in the Plan 'A' for 99 years (renewable for further period of 99 years) to the Lessee, under the provisions of Rajasthan Industrial Area Allotment Rules, 1959, framed under section 100 of the Rajasthan Land Revenue Act No.15 of 1956, for the said Zinc Smelter, Residential Colony and Railway Siding.

AND WHEREAS in pursuance of the said agreement between the Lessor and the Lessee, the latter has deposited with the former a sum of Rs.47,000/- (rupees forty seven thousand) as development charges and rent for the first year in respect of the said plots of land and the Lessor has permitted the Lessee to take possession of the said plot of land and to commence erection and construction of buildings etc.

AND WHEREAS it has been agreed to between the Lessor and the Lessee, that three separate deeds of lease will be executed for the Factory of Zinc Smelter, Residential Colony and Railway Siding.

AND WHEREAS the Lessor and the Lessee desire to execute a lease deed for the site of the Residential Colony required for Officers & Employees working in the factory on terms and conditions agreed to between the parties.

NOW THIS DEED WITNESSETH that in pursuance of the terms and conditions agreed as aforesaid between the parties and in consideration of the rent hereby reserved and covenants hereinafter contained the Lessor hereby demises (transfers by way of lease) unto the Lessee land measuring 150.81 acres in Village Debari and Rechdi in the District of Udaipur (more particularly

५३ ३६१
२४/१/

sd- Bhawar Lal Jain
24.1.63

इस दस्तावेज का कोनटर पार्ट बुक नंबर १ की जिल्द नंबर ५३ के पेज नंबर ३६१ से ३६२ तक व क्रम नंबर १११ पर आज तारीख २४/१/१९६३ इसवी को रजिस्ट्री कीया गया

ता० २४/१/६३ ई०

sd- Bhawar Lal Jain
24.1.63

Bhanwar Lal

200

described in the Schedule 'II' hereto) and for greater clearness delineated on the map of plan 'B' annexed hereto and thereon shown with its boundaries coloured red, together with all easements and appurtenances whatever, buildings or appertenant thereto and with the liberties, powers and privileges to be exercised and enjoyed in connection therewith, hereinafter mentioned subject to the covenants restrictions and conditions to the exercise and enjoyment of such liberties, powers and privileges hereinafter mentioned TO HAVE AND TO HOLD the said land hereby demised unto the Lessee from the 13th day of July, 1961, for a term of 99 years (subject to option of renewal on the Lessee's part under the said terms and conditions except as to rate of rent for a further period of 99 years).

The Lessor and the Lessee hereby mutually COVENANT, AGREE and DECLARE as follows, that is to say:-

1. The Lessee shall pay to the Lessor yearly rent @ Rs.15/- (rupees fifteen only) per acre for the portion of land demised for the Residential Colony which would include roads, markets, hospital, School, playgrounds, gardens, place of entertainment and all other things which can be conveniently provided for such Residential Colonies. The Lessee will also pay Rs.100/- (rupees one hundred) per acre as development charges and the amount already deposited by Lessee with the Lessor shall be adjusted against the said charges. The annual rent of Rs.15/- (rupees fifteen only) shall be paid by yearly instalment before the 7th day of each calender year at the Treasury of Rajasthan Government at Udaipur or such other place as the Lessor may from time to time appoint on this behalf. The annual rent as aforesaid shall be subject to revision after every thirty years and enhancement in rent at each such revision shall not exceed 25% of the rent payable for the period immediately preceding such revision. The Lessee hereby agrees to pay such enhanced rent to

to the Lessor as a result of the revision aforesaid.

2. The Lessee shall be entitles to set up, erect, construct and establish Residential Colony for Officers and Employees working in this factory for Smelting Zinc and its ancilliary on the said land. It can, (subject to the terms of this agreement) do everything, which it considers necessary, convenient or incidental thereto, for any purpose connected with the Residential Colony and without prejudice to the generality of the provisions of this paragraph, the Lessee may make permanent or temporary structures, alter the surface of the said land incl-uding digging earth and stones therein. The Lessee has agreed not to construct or to build any structure or building on the said plot of land or on a portion thereof which may not have the object of using for the colony aforesaid for which the said plot has been leased.

3. The Lessee shall terminate on the expiry of 99 years from the date of commencement of this lease. The Lessee shall have option of renewal of the lease under similar terms and conditions except that relating to annual rent to be determined by mutual consent, for a further period of 99 years, after the expiry of the present lease.

4. The Lessee may at any time after the expiry of twenty years from the date of this lease upon giving six months' previous notice in writing to the Lessor surrender this lease hereby created and thereupon all consequences will follow as here in contained as if the lease had expired after full 99 years.

5. The Lessee will at the expiration of the said term or sooner surrender or determination thereof, peaceably and quietly surrender to Lessor the said land after removing any construction and fixture made by it thereon within a period not exceeding two years from the date of termination or earlier surrender or determination unless the Lessor shall express its willingness to

purchase the same at a fair valuation in which case the Lessee shall sell the same to the Lessor at such valuation to be made by mutual consent.

6. That any person or persons duly appointed or authorised by the Lessor in this respect, may, after giving reasonable notice in writing enter into the said land for the purpose of inspection at reasonable hours without causing any disadvantage to the Lessee.

7. That the Lessee shall set up on the said plot of land Residential Colony for which the land has been leased to him by the Lessor within a period not exceeding three years hereto and in case of his failure to do so, the said plot shall revert to the Lessor unless the period of three years is extended by the Lessor on valid grounds.

8. That the Lessee shall not sublet or underlet the land or any part thereof. He shall have the limited ownership on the said plot till the lease subsists and shall have the right to assign, erect, charge, mortgage or lien on the land hereby demised or any portion thereof including building construction, structures, erection fixtures, fittings, etc. for securing loans or other monetary obligations, subject to the condition mentioned in clause 7, for the development of Residential Colony for which the said land has been leased to the Lessee.

9. The Lessee shall have the right to cut trees and plants growing on the said plot of land and to appropriate the same for its own use.

10. The rent as aforesaid excludes all kinds of taxes which the Municipal Board, Panchayat or any other civic body has imposed or impose during the period of lease in respect of the said plot and the Lessee agrees to pay such taxes to the authorities concerned direct.

11. The Lessor shall not grant any mining or quarrying lease or licence to any person within the said land.

12. In case any default is made by the Lessee in respect of any of the terms and conditions aforesaid, the said plot of land shall revert to the Lessor. The Lessee shall have to remove from there, within a period not exceeding one year, at his cost, all the buildings and structures constructed by him therein and in case of his failure to do so, the Lessor shall have the right to dispose of the said structures and buildings and to refund the proceeds to the Lessee, after recovering all the sums due (if any) to him from the Lessee.

Provided, however, that before any such action as aforesaid is proposed to be taken by the Lessor, he shall give a notice in writing to the Lessee and if the Lessee within a period of three months thereof satisfies the Lessor that the sale shall be remedied within a period of three months from the date of receipt of the notice and actually remedies the same within such period, no such action as aforesaid shall be taken.

13. If any dispute arises between the parties to this deed, it shall be referred to an Arbitrator mutually agreed by both the parties, or to two Arbitrators, one to be appointed by each party and in case of any difference of opinion between such two Arbitrators the matter may be referred to the decision of an Umpire agreed upon between the said two Arbitrators and failing such agreement as appointed by a court.

14. The cost of expenses incidental to the preparation, execution and registration of this lease, including stamps duty (if any) shall be borne and paid by the Lessee and stamps of the value of Rs.455/- (rupees four hundred and fifty five only) has been paid in pursuance of the order of the Collector, Udaipur No.A.2778 dated 23rd March 1962.

(78)

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15. In witness whereof the parties hereto have set their hands on the dates mentioned against their signatures:-

16. As per subsequent order from the Collector, stamps worth Rs.200.25 (Rs.Two hundred & Np.Twenty-five) have been further added with this lease deed.

sd. P K B Kurap collector Udaipur.

1. Witness

1. Signed for and on behalf of the Governor of the State of Rajasthan.

COPY

Mangini 25/4/63

2. Witness

1. Witness

sd HS metha

1. Signed for and on behalf of the Metal Corporation of India Ltd., Calcutta.

For the metal corporation of India Ltd.

Sd- A.C. Dutta
Director.

2. Witness

For the metal corporation India Ltd.

Sd- B.C. Chakrawarti
Executive officer.

P K B. Kurap
Collector Udaipur
1-6-63

SCHEDULE I

LIST OF KHASARA NUMBERS OF THE LAND COMPRISING 427 ACRES IN THE VILLAGE DEBARI AND BICHDI GIVEN ON LEASE TO THE METAL CORPORATION OF INDIA LIMITED BY THE GOVERNMENT OF RAJASTHAN FOR PUTTING UP THE FACTORY OF ZINC SMELTER AND ITS ANCILLIARIES IN THREE SEPARATE PLOTS : (1) FACTORY SITE - 244.01 ACRES, (2) COLONY SITE - 150.81 ACRES AND (3) RAILWAY SIDING - 32.18 ACRES

FACTORY SITE

S.No.	Name of Village	Khasara No.	Area Bigha	Area Biswa
1.	DEBARI	1620	39	1
		1621	1	7
		1622	14	15
		1623	-	16
		1624	-	1
		1625	-	11
		1626	-	8
		1628	-	15
		1629	-	19
		1630	-	12
		1639	-	8
		2807-1643	-	8
		2810-1643	4	7
		2811-1643	-	3
		1627	-	11
		1631	-	7
		1632	-	3
		1633	-	6
		1634	1	-
		2806-1643	-	10
		2808-1643	3	-
		1635	-	9
		1638	-	8
		2805-1643	1	9
		1636	-	11
		1637	-	8
		1641	-	11
		1642	-	5
		2804-1643	1	11
		1640	-	1
		1643	6	10
		2809-1643	3	3
		1618	11	-
		1617-4,a	15	14
		1617,5,a	4	-
		1617-2,m	10	-
		1617-5,b	6	4
		1617-4,b	8	17
		1617-2,	4	18
		1617-3,	-	4
		1617-m	45	4
		1614-1	9	2
		1577-1	9	-
		1576-1	2	10
		1614	19	12
		Total :	241	18

196 (24)

VILLAGE [illegible]

S.No.	Name of Village	Khasara No.	Area Bigha	Area Biswa
2	Bichari	136 - 3	3	10
		136 - 4	4	7
		136 - 7,a	2	18
		136 - 8,a	2	-
		136 - 9	4	8
		136 - 10	-	10
		136 - 6	8	8
		136 - 8,b	2	7
		136 - 7,b	2	4
		136 - 10	4	4
		15 - 6	16	-
		136 - 5	6	2
		5 - 15	4	5
		136 - 23	5	10
		136 - 17	8	-
		136 - 3	4	-
		136 - 27	1	6
		136 - 26	-	17
		136 - 21	1	4
		136 - 18	1	10
		136 - 20	5	13
		136 - 31	1	6
		136 - m	103	3
		5 - m	3	18
		14 - m	1	2
		15 - 6	15	10
		5 - m	1	10½
	Total: Village Bichari		215	12½
	GRAND TOTAL: FACTORY AREA		457	10½

(Four hundred fifty seven bighas and ten and half biswas)

= [illegible].01 acres

[illegible] SITE

1.	[illegible]BARI	1645/1	10	-
		1645/2	10	-
		1645/3	4	6
		1645/4	8	15
		1645/[illegible]	40	19
	Total Village Bebari		74	-
2.	[illegible]CHDI	1/[illegible]	52	-
		2/[illegible]	91	7
		3/[illegible]	65	10
	Total Village [illegible]chdi		208	17
	GRAND TOTAL		282	17

(Two hundred eighty two bighas and seventeen biswas)

= 1[illegible]0.21 acres.

(25)

195

RAILWAY SIDING

S. No.	Name of Village	Khasara No.	Area Bigha	Area Biswa
1	Debari	1401/M	3	16
		1402/M	-	3
		1403/M	13	7
		1404/M	-	3
		1411/M	41	-
		Total Village Debari	58	9
2	Gudli	22/M	1	17
		Total Village Gudli	1	17
		GRAND TOTAL:	60	6

= 32.18 acres

(Thirty two point eighteen acres)

SCHEDULE II

LIST OF KHASARA NUMBER OF THE LAND COMPRISED OF 150.81 ACRES IN THE VILLAGE DEBARI AND BICHDI GIVEN ON LEASE TO THE METAL CORPORATION OF INDIA LIMITED FOR THE RESIDENTIAL COLONY AND ITS ANCILLIARIES BY THE GOVERNMENT OF RAJASTHAN.

S.No.	Name of Village	Khasara No.	Area Bigha	Area Biswa
1	Debari	1645/1	10	00
		1645/2	10	00
		1645/3	4	6
		1645/4	8	15
		1645/M	40	19
	Total Village Debari		74	00
2.	Bichdi	1/M	52	00
		2/M	91	7
		3/M	65	10
	Total Village Bichdi		208	17
	Grand Total:		282	17

(Two hundred eighty two bighas and seventeen Biswas)

= 150.81 Acres

Sd. P. K. B. Kurup
14.1.63
Collector Udaipur.

For the metal corporation
of India Ltd.
A. C. Dutt.
Director

Ex A-2

राजस्थान सरकार — फार्म नं. ६०

भू-अभिलेख विभाग

(राजस्थान भू-राजस्व नियम २१ के अन्तर्गत)

[illegible] के लिये पर्चा [illegible]

ग्राम देवाली तहसील गिर्वा जिला उदयपुर

[illegible] का नाम — खाता सं. [illegible]

एम एस जैन्स मिनरल प्रोपराइटर [illegible]

[illegible]

आर्च इन्डीया [illegible] 135 [illegible]

[illegible] उदयपुर

खसरा नम्बर / [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]					
[illegible]	4492				1983
[illegible]					1990
[illegible]					1983
[illegible]					1983
1522					1983
1523					
1524					1983
1525					1983
[illegible]					1983
1526					1983
1527					1982
1530					[illegible]
1531					[illegible]
1532	4504				[illegible]
1533					2483
1534					[illegible]
1535	4546				[illegible]
1536					
1538	4545				
1539	पाकुन्द				
1540					
1541					
1542					

4 = 34-1040

X

656

(३)

१६१५/२ मी	४६८१ पार्टी	०-०४००			
१६१६/२ मी	४६५२ पार्टी	०-०३००			
१६१७ मी	४६८२	२९-३२००			
१६१८/३ (३)					
१६१९/१२					
१६२०/२ मी					
१६१९/३ क/२					
१६८६/२ आ					
१६८८/मी					
१६१८/क	४६९४	०-३८००			
१६८६/२ मी					
१६८७/मी					
१६८५/२ मी	४८२१	०-१५००			
१६८५/२ मी	४८२१ मी/२ पार्टी (४६८९)	०-१५००			
	६	२९-०६८७			

[illegible]

[illegible]

[illegible]

[illegible]

क्रमांक:जिं.सं./एच.आर./2017/

दिनांक: 18.07.2017

श्रीमान तहसीलदार सा.,
तहसील गिर्वा,
जिला-उदयपुर

विषय:- CAG रिपोर्ट वर्ष 2011-12 का अनुच्छेद सं. 4.13.2 बाबत लीज रेन्ट की वसूली बाबत ।

संदर्भ: कार्यालय जिला कलक्टर के पत्र क्रमांक प-5/3-2(17)जिराले/12-13/ दिनांक 19.6.17 एवं आपका पत्र क्रमांक त.रा.ले/वसूली/ दिनांक 3/5/17 ।

महोदय,

उपरोक्त विषय एवं पत्र के संदर्भ में इस पत्र के साथ चेक नं. 282292 दिनांक 17/7/2017 रु 7,41,160/- संलग्न किया जाता है । दूरभाष पर हुई चर्चा के अनुसार उक्त विषय पर कृपया इसे अंतिम वसूली समझी जाय ।

धन्यवाद ।

संलग्न:-उपर्युक्त

भवदीय,

(मनोज नशीने)
महाप्रबंधक
इकाई प्रधान
हिन्दुस्तान जिंक लिमिटेड
जिंक स्मेल्टर-देबारी, उदयपुर (राज.)

प्रतिलिपि: श्रीमान जिलाधीश महोदय,
जिलाधीश कार्यालय ,उदयपुर

Cheque No. 282292 Recd.
(T.R.A.)
19-7-2017

HINDUSTAN ZINC LIMITED
Head Office Extension CHDL
Shared Services Center
Zinc Smelter PO Debari, Udaipur
313020

[illegible]

Regd. Courier
[illegible] CASH NO
TEHSILDAR,GIRWA,UDAIPUR

UDAIPUR

Sir,
Ref:- NET PAY 741160-as per CAG report
Please find enclosed Cheque DD bearing number 282292 dated
17.07.2017 of Rs.741,160.00
SEVEN LAKH FOURTY ONE THOUSAND ONE HUNDRED SIXTY ONLY
Details of the same are as below:-

Cheque Number	Date	Gross Amount	Remarks
282292	17.07.2017	741160.00	
LESS			
BANK-CHARGES		0	
TDS		0	
PENALTY SECURITY		0	
OTHERS		0	
NET PAYABLE		741160.00	

Invoice No.:- Letter
Remarks : NET PAY 741160-as per CAG report
P.O. No.:

Yours Sincerely
Accounts Officer.

This system generated copy of signature not required. For any payment Related Queries Please Contact Vendor Helpdesk at [illegible]@vedanta.co.in or +91-0294-2452666.

IDBI BANK
Specialised Corporate Branch
[illegible] 47 Panchwati Sahelli Marg, Near DIT Circle,
UDAIPUR - 313004, RAJASTHAN

A/c Payee Only

VALID FOR THREE MONTHS ONLY
17.07.2017
D D M M Y Y Y Y

PAY TEHSILDAR,GIRWA,UDAIPUR

OR ORDER

RUPEES SEVEN LAKH FOURTY ONE THOUSAND ONE HUNDRED SIXTY

ONLY

INCL. OF ₹ 741,160.00

For HINDUSTAN ZINC LIMITED - ZSD

A/c No. 013103000004312

IFS Code - IBKL0300392
Payable at Par at all IDBI Bank Branches

Authorised Signatory

Authorised Signatory
Please sign above

⑈282292⑈ 313259003⑆ 039200⑈ 30

कार्यालय तहसीलदार कुराबड जिला उदयपुर राज.

क्रमांकः– तराले / 2024 / 28 दिनांक :–21.11.2024

निमित्तः

एस.बी.यु. निदेशक जिंक स्मेल्टर,
उदयपुर।

विषयः लीज रेंट भुगतान बाबत्।

प्रसंगः आपके पत्रांक HZL/ZSD/ENV/A-19/2024-25/06 के क्रम में।

उपरोक्त विषयान्तर्गत प्रासंगिक पत्र के संदर्भ में रिपोर्ट पटवारी हल्का जिंकस्मेल्टर के अनुसार हिंदुस्तान जिंक लिमिटेड की 2024–25 की लीज राशि 6405 रू. बकाया है। पूर्व वर्ष 2023–24 की समस्त राशि जमा होकर चालान जमा किये जा चुके है।

तहसीलदार
कुराबड़, जिला उदयपुर

कार्यालय उप वन संरक्षक, उदयपुर (उत्तर)

राजकीय मुद्रणालय के पास, गुलाब बाग रोड़, उदयपुर–313001
Email: dcf.udprn.forest@rajasthan.gov.in Tel. no. & Fax no. 0294-2421962

क्रमांकः एफ4( )सर्वे / हि.जि.लि.दे. / उवसं–उत्तर / 2023–24 / 5813 दिनांकः 02/08/2024

Director Corporate Services,
Hindustan Zinc Limited,
Udaipur. 313004

विषयः Request for Grant of NOC/Authentication for project area of Zinc Smelter Debari, Hindustan Zinc Ltd.

प्रसंगः Director Corporate Services, HZL उदयपुर का पत्र क्रमांक 1073 दिनांक 20.06.2024 के कम में।

महोदय,

उपरोक्त विषयान्तर्गत प्रासंगिक से आप द्वारा हिन्दुस्तान जिंक लिमिटेड, उदयपुर के जिंक मेटल प्रोडक्शन प्लांट के विस्तार क्षेत्र के किसी भी निकटतम वनक्षेत्र से दुरी पुष्टि प्रमाण पत्र तथा हिन्दुस्तान जिंक लिमिटेड का वनक्षेत्र में नही होने के संबंध में तथ्यात्मक टिप्पणी चाही गई थी।

जिस कम में आप द्वारा आवेदित क्षेत्र का मौका निरिक्षण अनुसार हिन्दुस्तान जिंक लिमिटेड, देबारी में आने वाले कुल क्षेत्र 183.6 हैक्टेयर की तथ्यात्मक रिपोर्ट निम्नानुसार प्रेषित है– हिन्दुस्तान जिंक लिमिटेड, देबारी में आने वाले ग्राम बिछडी व जिंक स्मेल्टर के पत्र में वर्णित आराजीयात का मिलान वनखण्ड कांटिया व मनवाडी के रिकार्ड से किया गया।

जिसमें पाया की आराजी संख्या 4522, 4523, 5526/4523, 4644, 4671, 4682, 4684, 4509, 4510 व 4511 में से आराजी 4522 रकबा 1.77 है0, 4523 रकबा 33.40 है0 में से 5.20 हैक्टर वनखण्ड कांटिया के वनसीमा में व खसरा बन्दोबस्त में पुर्ण रकबा स्थित है जो वनखण्ड नक्शा में भी वन सीमा में स्थित है। वनखण्ड कांटिया का नोटिफिकेशन मेवाड गवर्नमेन्ट के द्वारा दिनांक 27.12.1947 से जारी किया गया था जिसमें आरक्षित वनखण्ड के रूप में कुल 1349 बीघा 14 बीस्वा अर्थात 292 हैक्टर वनक्षेत्र घोशित हुआ है। तथा आराजी 4509 रकबा 11.60 है0, 4510 रकबा 2.40 है0 व 4511 रकबा 2.46 है0 जो वनखण्ड मनवाडी के वनसीमा में व खसरा बन्दोबस्त मे पुर्ण रकबा स्थित है जो वनखण्ड नक्शा में भी वन सीमा में स्थित है। वनखण्ड मनवाडी का गजट नोटिफिकेशन सं. 732 दिनांक 21.02.1943 से जारी किया गया जिसमें आरक्षित वनखण्डके रूप में कुल 225 हैक्टर वनक्षेत्र घोशित हुआ है।

मौका निरिक्षण अनुसार हिन्दुस्तान जिंक लिमिटेड, देबारी द्वारा उक्त वन विभाग के आराजीयात 4522, 4523, 5526/4523, 4644, 4671, 4682, 4684, 4509, 4510 व 4511 में वर्ष 1962 में जिला कलक्टर, उदयपुर के द्वारा उद्योग संचालन हेतु लीज आवंटन के आधार पर उद्योग स्थापित किया गया है जो वर्ष 1980 से संचालित किया जा रहा है तथा वनक्षेत्र में पुर्व से निरन्तर संचालित होकर वर्तमान में हिन्दुस्तान जिंक लिमिटेड, देबारी के पजेशन में है बताया गया है।

भवदीय,

(अजय चित्तोड़ा)
I.F.S.
उप वन संरक्षक,
उदयपुर (उत्तर)

Office of the Deputy Conservator of Forest, Udaipur (North)

Near Government Printing Press, Gulab bagh Road, Udaipur-313001

Email: dcf.udprn.forest@rajasthan.gov.in Tel. no. & Fax no. 0294-2421962

No. F4 () SURVEY/H.Z.L.D/DFO-NORTH/2023-24/5813 Date: 02/08/2024

Director Corporate Services,

Hindustan Zinc Limited,

Udaipur – 313004

Subject: Request for Grant of NOC/Authentication for project area of Zinc Smelter Debari, Hindustan Zinc Ltd.

Ref: Director Corporate Services, HZL Udaipur vide letter no. 1073 dated 20.06.2024

Sir,

With the reference to aforesaid subject, you asked for a certificate confirming the distance of the expansion area of the Zinc Metal Production Plant of Hindustan Zinc Limited, Udaipur from any nearest forest area and also a factual confirmation regarding Hindustan Zinc Limited is not being located in the forest area.

In the order, as per the field inspection of the area applied for by Hindustan Zinc Limited, Debari, the factual report of the total area of 183.6 hectare is published as follows – The area of Hindustan Zinc Limited, in village of Debari Bichhari and Zinc Smelter in Debari was matched with the records of forest blocks Kantiya and Panwari.

In which Khasra No. 4522, 4523, 5526/4523, 4644, 4671, 4682, 4684, 4509, 4510 and 4511, out of which Khasra No. 4522 (Area: 1.77 hectare), Khasra No. 4523 (Area: 33.40 hectare) 5.20 hectare forest block is situated in the forest boundary of Kantia and the entire area is situated in Khasra settlement, which is also situated in the forest boundary in the forest block map. The notification of Forest block Kantiya was issued by the Mewar government on 27.12.1947 in which total land area of 1349 bigha ;292 hectare has been declared as Reserved forest area. And the area is Khasra no. 4509 area 11.60 hectare, Khasra no. 4510 area 2.40 hectare and Khasra no. 4511 area 2.46 hectare which is situated in the forest boundary of forest block Panwari and in the total area in Khasra settlement which is also situated in the forest block map. Forest block Panwari's gazette notification number 732 dated 21.02.1943 was issued in which the total area of 225 hectares was declared as Reserved forest area.

According to the field observation, Hindustan Zinc Limited, Debari provided lease for the operation of the industry by the District Collector, Udaipur in the year 1962 for 5522, 4523, 5526/4523, 4644, 46711, 4682, 4684, 4509, 4510 and 4511. The industry has been established on the basis of which is being operated since 1980 and has been continuously operating in the area since the past and is currently in the possession of Hindustan Zinc Limited, Debari.

Yours Sincerely,

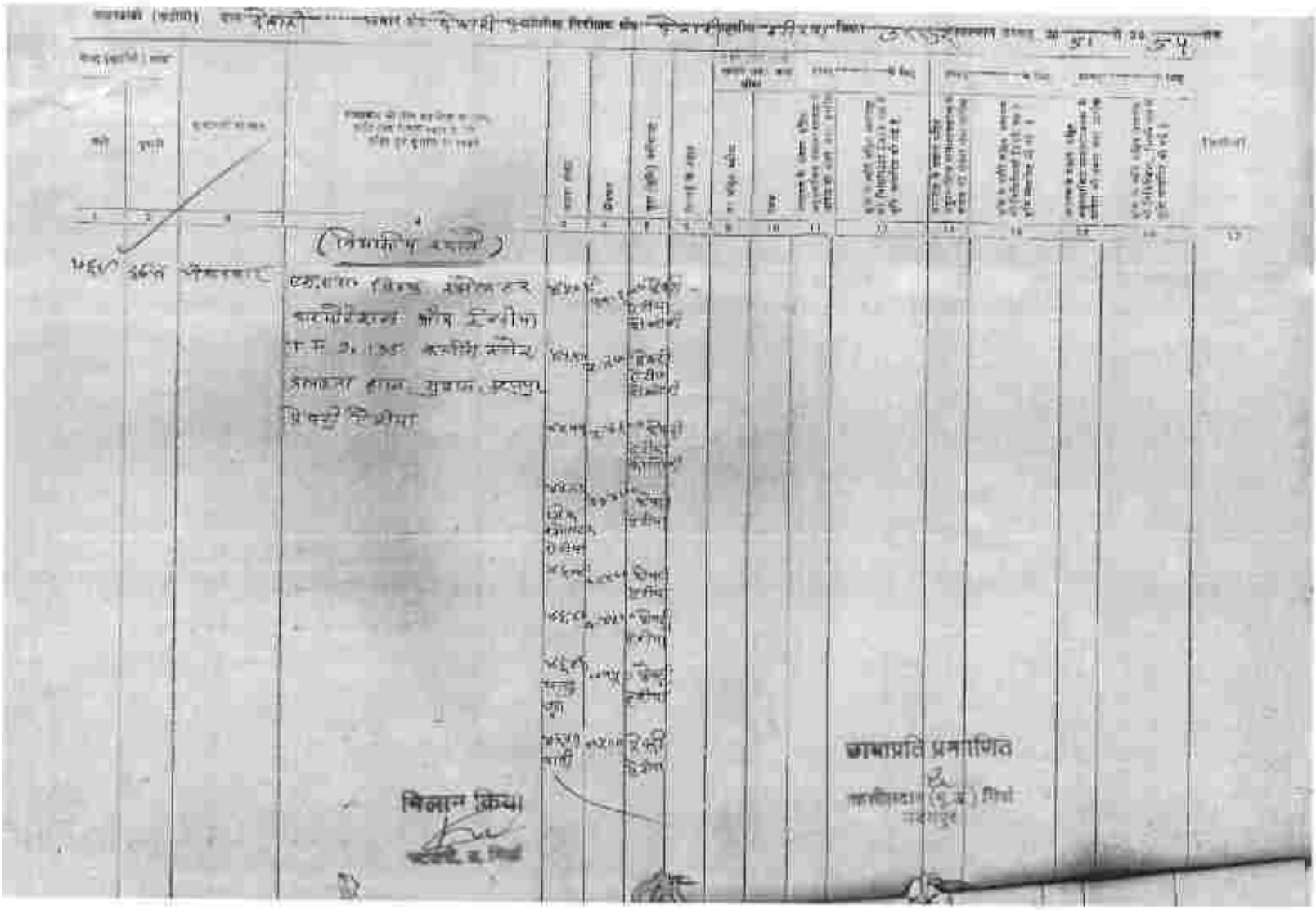
Sd.

(Ajay Chittora)

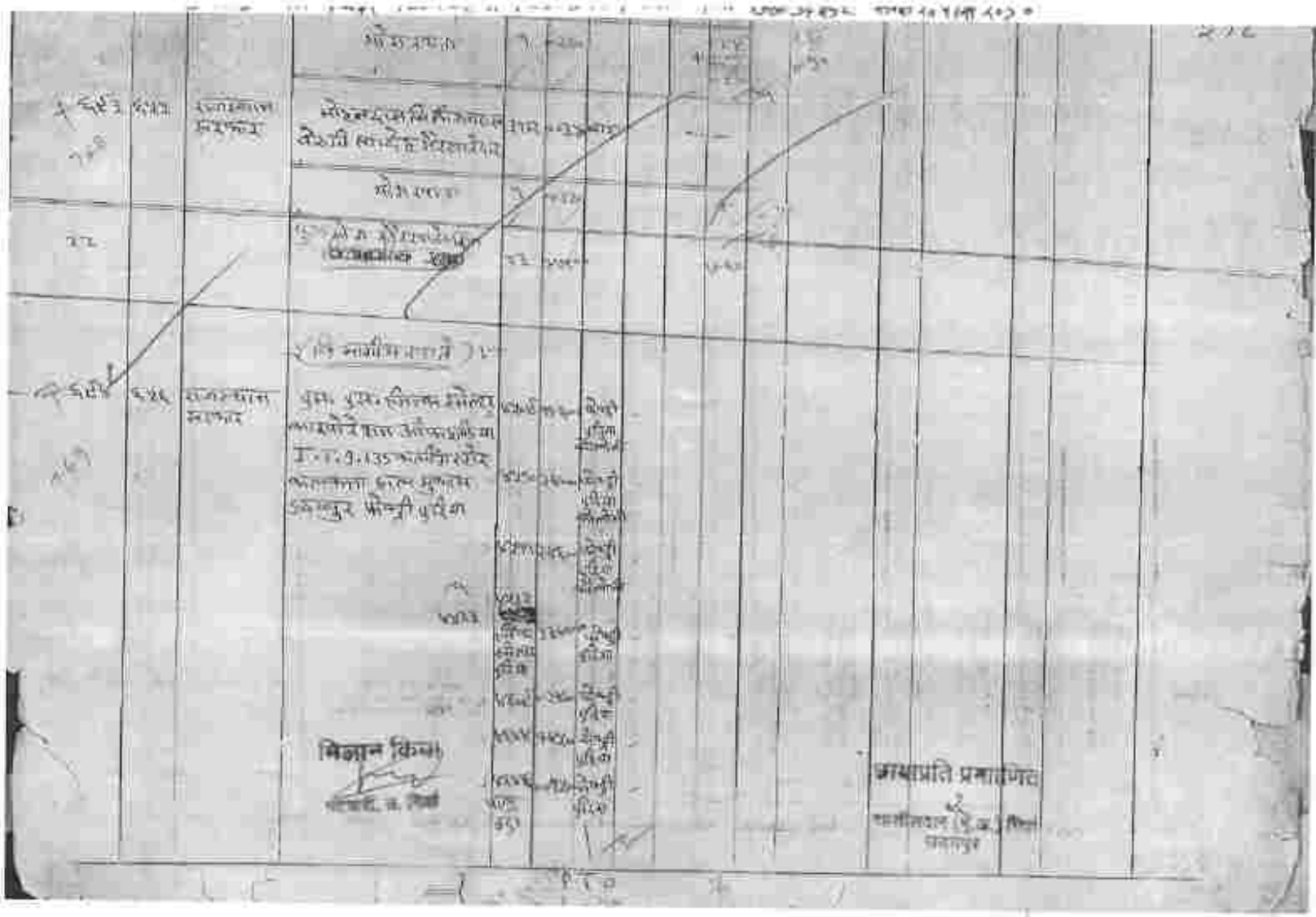
I.F.S

Deputy Forest Conservator

Udaipur (North)


मिलान किया
छायाप्रति प्रमाणित

मिलान किया

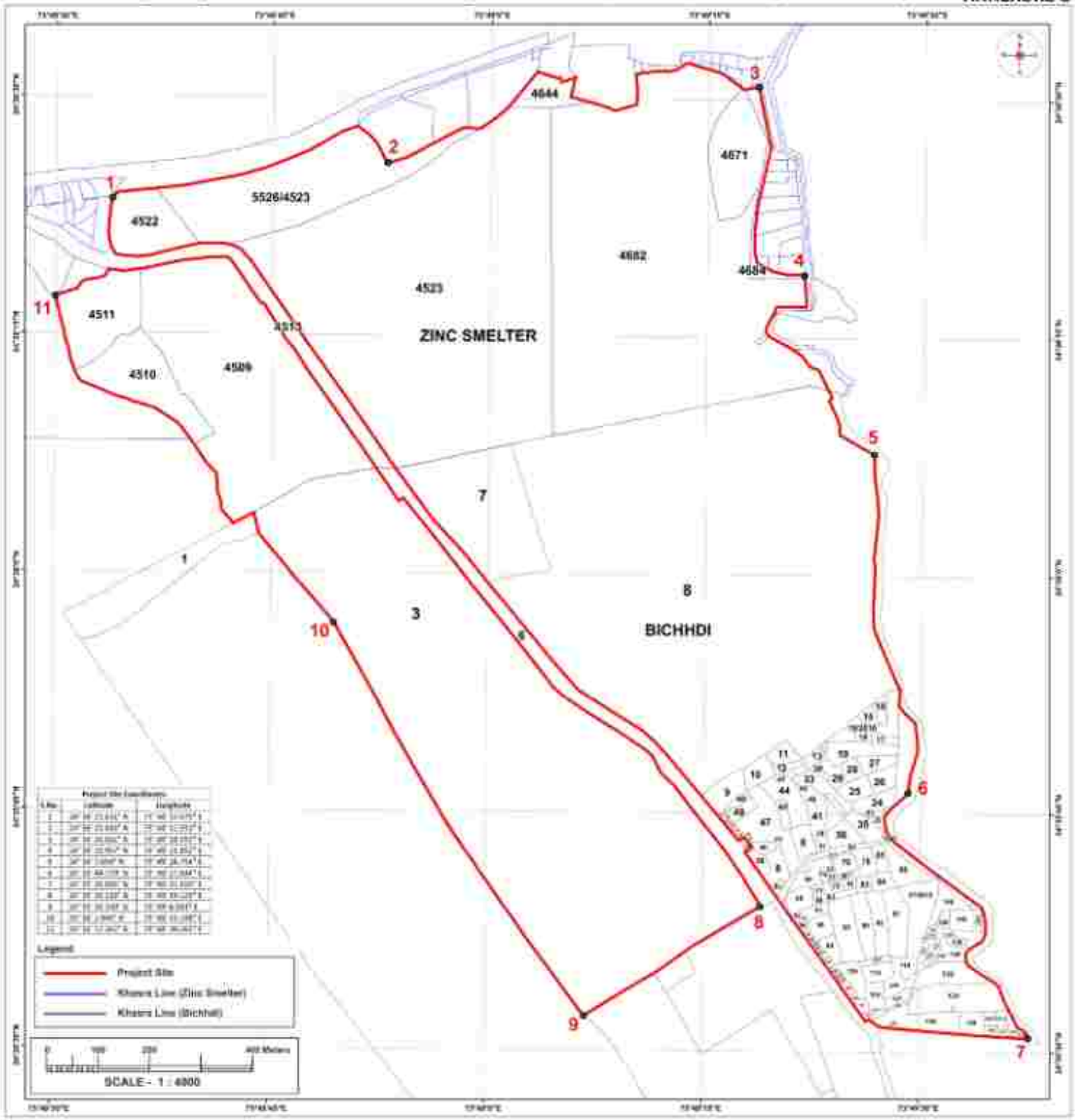


मिलान किया

छायाप्रति प्रमाणित

Map Showing 1:4000 Scale Geo-Referenced Khasra Map of Zinc Smelter Debari, Tehsil-Girwa, District-Udaipur in the State of Rajasthan

ANNEXURE G



CIN:U75144RJ2016SGC049591

UDAIPUR SMART CITY LIMITED

Municipal Corporation, Udaipur, Town Hall, Udaipur
Tel: 0294-2421255 ; Fax: 0294-2421255
Website:www.udaipursmartcity.in, E-mail: mc_udaipur@rediffmail.com

F. No. ( ) USCL//2017-18/ 71 Date:- 22-6-17

LETTER OF ACCEPTANCE

Chief Executive Officer
Hindustan Zinc Limited,
Udaipur (Raj)

Sub: - "Design, construction, supply, installation, testing and commissioning and operating for 15 years under Hybrid Annuity Model (Which will include all Civil, Mechanical, electrical, instrumentation & other necessary works) of STP's (25 MLD + 10 MLD + 5 MLD) based on SBR Process (equivalent or higher process) having provision for reuse of 50% treated water of Udaipur Town "

It is to notify that your price bid dated 25-04-2017 for the work " Design, construction, supply, installation, testing and commissioning and operating for 15 years under Hybrid Annuity Model (Which will include all Civil, Mechanical, electrical, instrumentation & other necessary works) of STP's (25 MLD + 10 MLD + 5 MLD) based on SBR Process (equivalent or higher process) having provision for reuse of 50% treated water of Udaipur Town " for the contract price of **Rs. 79,99,90,000/-** (Rs. Seventy Nine Crore Ninty Nine Lac Ninty Thousand only) has been approved by tender approval committee of USCL, Udaipur with terms and conditions as per the bid documents and your negotiation letter dated 19-6-2017, where you has consented to execute the work by agreeing to the following points-

1. **Construction of STP** –HZL will construct the STPs' as per the present bid, wherein one 25 MLD plant is to be constructed at Eklingpura, while two decentralized STPs are to be constructed along Ayad of combined capacity of 15 MLD. In addition to this, as per the MoU provision, HZL has agreed that "in case USCL provides more than 25 MLD raw sewerage at the inlet of STP, HZL agrees to treat this sewerage also up to maximum additional 10% of design capacity subject to technical feasibility and will be free to use excess treated water for its own purpose".
2. **O & M provision** –The O&M period of all STPs' shall be extended by 7.5 years, thus the total O&M period will be 22.5 years.

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CIN:U75144RJ2016SGC049591

UDAIPUR SMART CITY LIMITED

Municipal Corporation, Udaipur, Town Hall, Udaipur

Tel: 0294-2421255 ; Fax: 0294-2421255

Website:www. udaipursmartcity.in, **E-mail:** mc_udaipur@rediffmail.com

3. **Payment to HZL** - HZL has agreed that the only payment due to HZL shall be against electricity charges, and the same shall be made through Annuity payments. As per the agreement now, the total amount payable by USCL shall be paid in the form of annuity against the payment of electricity charges and no amount shall be payable upfront.

You are hereby directed that within 15 (Fifteen) days of the date of issue of the Letter of Acceptance your firm shall furnish performance guarantee as detailed below in table:

Name of City	Net value of capital works	Performance Guarantee (INR) 10% of capital works as per clause 4.3 of SCC
1	2	3
Udaipur	Rs.79,99,90,000/- (Rupees Seventy Nine Crores Ninety Nine Lacs & Ninety Thousand Only)	Rs. 7,99,99,000/- (Rupees Seven Crores Ninety Nine Lacs & Ninety Nine Thousand Only)

Total Performance Security of Amount of **Rs. 7,99,99,000/-** ((Rupees Seven Crores Ninety Nine Lacs & Ninety Nine Thousand Only) of the Contract Price before or at the time of executing the agreement & shall be effective up to end of expected defect liability period i.e. 5-9-2020. This Performance Security may be released when O&M Performance Security of amount Rs. 3,99,99,500/- (Rupees Three Crores Ninety Nine Lacs Ninety Nine Thousand & Five Hundred Only) will be submitted effective up to the period of 5-3-2043.

The Security Deposit shall be in the form of unconditional Bank Guarantee & shall be in the name of Chief Executive Officer, USCL issued from any branch of Nationalized / Scheduled Bank. Such Bank Guarantee, if invoked, shall be en-cashable when presented in specified Branch Office Located at Udaipur.

You are hereby directed that Within 15 (Fifteen) calendar days from the date of issue of the Letter of Acceptance your Firm shall sign the form of Agreement, in duplicate, on non-judicial stamp paper of Rs. 15,000/- as per regulation of the Government of Rajasthan on

Scanned by CamScanner

CIN:U75144RJ2016SGC049591
UDAIPUR SMART CITY LIMITED
Municipal Corporation, Udaipur, Town Hall, Udaipur
Tel: 0294-2421255 ; Fax: 0294-2421255
Website:www. udaipursmartcity.in, E-mail: mc_udaipur@rediffmail.com

any working day in this office and return it to this office failing which action as stated in sub-section 2 of section 42 of the Rajasthan Transparency in Public Procurement Act 2012 and Instruction to bidders shall be taken. One Copy of the signed agreement will be provided to the successful Contractor, and the original will be retained by the office.

Chief Executive Officer
Udaipur Smart City Limited

Copy to :-

1- Joint Secretary (Smart cities) MoUD, Government of India, Delhi.
2- Chairman, USCL and Principal Secretary, LSGD, Jaipur.
3- Vice Chairman, USCL & Mayor MCU / Distt. Collector, Udaipur
4- Additional, Chief Executive Officer, USCL
5- Financial Advisor / Chief Account Officer, USCL
6- Superintending Engineer, USCL
7- Executive Engineer, USCL

Superintending Engineer
Udaipur Smart City Limited

Scanned by CamScanner

Smart City

Agreement

Year 2017-18

UDAIPUR SMART CITY LIMITED

AGREEMENT NO. .....

Year ~~2016-17~~ 2017-18

Division UDAIPUR

Name of work :

Name of Contractor... Hindustan Zinc Limited

CONTRACT FOR WORK

GENERAL RULES AND DIRECTIONS FOR THE GUIDANCE OF CONTRACTORS

1. All worked, proposed for execution by Contract, will be notified in a form of invitation to tender pasted on public places and on a board hung up in the office of and signed by the Commissioner or other duly authorized Engineer. The form of invitation to tender will state the work to be carried out, as well as the date of submitting and opening of tenders and the time allowed for carrying out the work, also the amount of Earnest Money to be deposited with the tender and the amount of the Security Deposit to be deposited by the successful tenders and the percentage, if any, to be deducted from bills. Copies of the specifications, designs and drawings and estimated rates/scheduled rates and any other documents required in connection with the work signed for the purpose of identification by the Executive Engineer shall be open for inspection by the Contractor at the offic of the Commissioner or other duly authorized Engineer during office hours.

2. In the event of the tender being submitted by a firm, it must be signed separately by each partner, thereof, or in the event of the absence of any partner, it must be signed on his behalf by a person holding a Power of Attorney, authorizing, him to do so. Such Power of Attorney will be submitted with the tender and it must disclose that the firm, is duly is duly registered under the Indian Partnership Act, by submitting the copy of the registration certificate.

3. Receipts for payments, made on account of a work then executed, by a firm must also be signed by the several partners, except where the contractors are described in their tender as a firm, in which case the receipts must be signed in the name of the firm by one of the partners or by some other person having authority to give effectual receipts for the firm.

4. Any person, who submits percentage rate tender, shall fill up the usual printed form stating at how much percent above or below the rates specified in Schedule G, he is willing to undertake the work. Only one rate of percentage, more or less, on all the estimated rates/ scheduled rates shall be mentioned. Tenders which propose any alteration in the work, specified in the said form of invitation of tender, or in the time allowed for carrying out the work, or which contain any other conditions of any sort will be liable to rejection. No single tender shall include more than one work, but Contractors, who wish to tender for two or more works, shall submit a separate tender for each work. Tenders shall have the name and number of work, to which they refer, written outside the envelope.

5. The Commissioner or other duly authorized Engineer will open the tenders in the presence of any contractor (s) or their authorized representatives who may be present at the time, and will annoOunce and enter the rates/amounts of all tenders in the Register of Opening of Tenders (Form RPWA 20A). In the event of the tender being accepted, a receipt for the earnest money deposited shall be given to the Contractors, who shall sign copies of the specifications and other documents mentioned in Rule 1. In the event of a tender being rejected, the Earnest Money forwarded with such unaccepted tenders shall, be returned to the Contractor making the same.

6. The Commissioner or other duly authorized Engineer shall have the right of rejecting all or any of the tender without assigning any reason.

7. The receipt of an Accountant, Cashier or any other official, not authorized to receive such amount, will not be considered as an acknowledgement of payment to the Commissioner or other duly authorized Engineer.

8. The memorandum of work tendered for, memorandum of materials and tools and plant to be supplied by the Department and their rates, shall be filled in and completed in the office of the Commissioner or duly authorized Engineer before the tender form is issued.

9. If it is found that the tender is not submitted in proper manner, or contains too many corrections and or unreasonable rates or amounts, it would be open for the Engineer-in-charge not to consider the tender, forfeit the amount of earnest money and/or duelist the contractor.

(R. PANDWAL)
COMPANY SECRETARY
HINDUSTAN ZINC LTD.
YASHAD BHAWAN, UDAIPUR

10. The tenderer shall sign a declaration under Official Secrets Act for maintaining secrecy of the tender documents, drawings or other record connected with the work given to him in form given below. The unsuccessful tenderers shall return all the drawing given to them.

Declaration:

"I/We hereby declare that I/We shall treat the tender documents, drawings and other records, connected with the work as secret, confidential documents and shall not communicate information derived there from to any person other than a person to whom I/We am/are authorized to communicate the same or use the information in any manner prejudicial to the safety of the same".

11. Any percentage rate tender containing item-wise rates, and any item rate tender containing percentage Rate below or above estimated/scheduled rates, will be summarily rejected. However, if a tenderer voluntarily offers a for payment within a stipulated period, this may be considered.

12. On acceptance of the tender, the name of the accredited representative (s) of the Contractor (with a photograph signature attested), who would be responsible for taking instructions form the Engineer in charge, shall communicated to the Engineer in charge.

13. Sales tax or any other tax on materials, or Income Tax in respect of the contract shall be governed by Clause 36 A,B and C and D of the Conditions of Contract Deductions of Income Tax at source will be made as per provisions of the Income Tax Act, in force from time to time.

14. The tender to work shall not be witnessed by a Contractor or Contractors who himself/themselves has/have tendered or who may and has/have tendered for the same work. Failure to observe the secrecy of tenders will render tenders of the contractors, tendering as well as witnessing the tender, liable to summary rejection.

15. If on check there are discrepancies the following procedure shall be followed.

(i) Where there is a difference between the rates in figures and words, lower of the two rates shall be take as valid and correct rate.

(ii) When the rate quoted by the contractor in figures and in words tallies, but the amount is not worked out correctly, the rate quoted by the contractor shall be taken as correct and not the amount worked out.

(iii) While quoting rates, if rate rates against any item or items are found to be omitted, the rate given in the Schedule 'G' by the department for such times will be taken into account while preparing comparative statement and contractor shall be Bound to execute such item on 'G' Schedule rates.

(iv) In case where percentage is given but the 'above' or 'below' not scored, the tender will be non-responsive.

16. The Contractor shall comply with the provisions of the Apprenticeship Act, 1961 and the rules and orders issued there under, from time to time. If he fails to do so, his failure will be a breach of the contract and original sanctioning authority in his discretion may cancel the contract. The contractor shall also be liable for any pecuniary liability arising on account of violations by him of the provisions of the Act.

17. The Contractor shall read the specifications and study the working drawings carefully before submitting the tender.

18. The site for execution of the work will be made available as soon as the work is awarded. In case, it is not possible for the Department to make the entire site available on the award of the work, the Contractor shall arrange his working programme accordingly. No claim, whatsoever, for not giving the site in full on award of the work or for giving the site gradually in parts will be tenable. The contractor may satisfy himself regarding site, acquisition of land, approach roads etc.

19. The Tender documents show already the specific terms and conditions on which tenders are required by the Government. Hence all tenders should be in strict conformity with the tender documents and should be fulfilled in, wherever necessary, and initiated. Incomplete tenders are liable to be rejected. The terms and conditions of the tender documents are firm, as such conditional tenders are liable to be rejected.

20. The tender, while submitting tender, must provide adequate information regarding his financial, technical and organizational capacity and working experience to execute the work of the nature and magnitude.

21. The Commissioner or other duly authorized Engineer reserves the right to ask for submission of samples as in respect of materials for which the tenderer has quoted his rates before the tender can be considered for acceptance. If the tenderer, who is called up on to do so, does not submit within seven days of written order to do so, the Engineer-in-Charge shall be at liberty to forfeit the said earnest money absolutely.

22. The Contractor shall submit the list of the works which are in hand (progress). In the following form :-

(R. PANDWAL)
COMPANY SECRETARY
HINDUSTAN ZINC LTD.
YASHAD BHAWAN, UDAIPUR

Name of work	Name & Particulars of the Sub Division/Division, where work is being executed	Amount of Work	Position of works in progress	Remarks
1	2	3	4	5

23. The Contractor should quote his rates only in one language i.e. either in Hindi or English. Rates should be quoted in figures as well as in words. In case a contractor has quoted rates in both the languages, and the rates so quoted differ, then the lower of the two shall be treated as the one quoted by the Contractor.

24. All additions, deletions, corrections and overwriting, must be serially numbered and attested by the Contractor at every page, so also by the officer opening the tenders, so as to make further disputes impossible on this score.

25. After acceptance of the tender, the Contractor or all partners (in the case of partnership firm), will append photographs and signatures duly attested at the time of execution of Agreement.

26. If any contractor, who having submitted a tender does not execute the agreement or start the work or does not complete the work and the work has to be put to retendering, he shall stand debarred from participating in such retendering if addition to forfeiture of Earnest Money/Security Deposit and other action under agreement.

27. The tender documents shall be issued to those contractors only having valid enlistment as on the date of issue of documents.

28.

(a) If a tender reduces the rates voluntarily after opening of tenders/negotiations, his offer shall stand cancelled automatically, his earnest money shall be forfeited and action for debarring him from business shall be taken as per enlistment rules.

(b) If a non-tenderer offers lower rates after opening of tenders, action for debarring him from business shall be taken as per enlistment rules.

29. Contractors shall submit only unconditional tenders. Conditional tenders are liable to be rejected summarily.

CO[illegible]
HP[illegible]
YA[illegible]

TENDER FOR WORKS

I/We hereby tender for the Execution for the USCL of the work specified in the underwritten memorandum with the time specified in such memorandum at the rates, (in figures) .....% (as well as in words)..... .....below / above the amount, entered in the schedule 'G' and 'H' in all respect in accordance with the specifications, designs, and instructions in writing referred to in Rule 1 in all respects in accordance with such conditions so far as applicable. I/We have visited the site of work and am/are fully aware of all the difficulties and conditions likely to affect carrying out the work. I/We have fully acquainted myself ourselves about the conditions in regard to accessibility of site and quarries/kilns, nature and the extent of ground, working conditions including stacking of materials, installation of tools & Plant, conditions effecting accommodation and movement of labour etc. required for the satisfactory execution of contract.

Memorandum

General description of work STP
as per details in "Scope of Work" and Specification for Works.

(a) Estimated cost Rs 7999.9 Lacs

(b) Earnest money Rs ..... Lacs @ 2% for enlisted contractors outside their zone of enlistment and Rs ..... Lacs @ 1/2% within their zone of enlistment

(c) Security Deposit: BG.NO. 170392IBGP00028 Rs 7,99,99,000/=

(i) "The security deposit @ 5% of the gross amount of the running bill shall be deducted from each running bill and shall be refunded as per rules on completion of the contract as per terms and conditions. The earnest money deposit shall however be adjusted while deducting security deposit from first running bill of the contractor. There will be no maximum limit of security deposit.

A contractor may, however, elect to furnish bank guarantee or any acceptable form of security for an amount equal to the full amount of security deposit @ 5% of the work order before or at the time of executing the agreement. In that case earnest money may be refunded only after furnishing of the bank guarantee as above. During the execution of the work or after completion of the work also a contractor may replace the security deposit by furnishing bank guarantee for an equal amount. However, during execution of the work if cost of work exceeds as shown at the time of furnishing bank guarantee, balance security deposit shall be deducted from the Running Account Bills."

If the contractor during the course of execution of the work or after completion of the work desires to replace the security deposit paid in cash or deducted from running bills by bank guarantee, he may be allowed to furnish a bank guarantee in the prescribed form for the required amount and period and after accepting of such bank guarantee the amount of such security deposit earlier deposited/deducted may be refunded.

(ii) Bank Guarantee shall in all cases be payable at the headquarter of the Division or the nearest District Headquarters.

(d) Time allowed for the completion of work (to be reckoned from the 10th day after the date of written order to commence the work) is ..... months. Should this tender be accepted in whole or in Part, I/We hereby agree to abide by and fulfill all the terms and provisions of the conditions of contract annexed hereto and of the detailed notice for technical and financial bids, or in default thereof, to forfeit and pay to the Governor of Rajasthan or his successors in office, the sum of money mentioned in the said conditions.

A sum of Rs. ..... lacs is forwarded herewith in the form of Cash, Bank Draft, Bankers Cheque as Earnest Money. This amount of earnest money shall absolutely be forfeited to the Governor of Rajasthan or his successor in office without prejudice to any other right or remedies of Governor of Rajasthan or his office, should I/We fail to commence the work specified in the above memorandum.

NTP, tender document (GCC & SCC) shall be part of this agreement.
Letter no 70 dt 17/6/2017 of USCL letter no 10/HO/Proj/2017-18 dt 19/6/17 shall be part of this agreement.

Signature of Witness

Witness's address & occupation

Signature of Contractor

Address of Contractor

(R. PANDWAL)
COMPANY SECRETARY
HINDUSTAN ZINC LTD.
YASHAD BHAWAN, UDAIPUR

Date .....

The above tender is hereby accepted by me on behalf of the USCL.

Dated the

Superintending Engineer
USCL

Chief Executive Officer
USCL

MEMORANDUM OF UNDERSTANDING

BETWEEN

GOVERNMENT OF RAJASTHAN

AND

HINDUSTAN ZINC LIMITED,
UDAIPUR

FOR

IMPLEMENTATION OF MAHSEWAKAL PROJECT STAGE-I

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding (MOU) is made on this day i.e. **Tuesday**, the **11th day of February** 1997 between the Governor of State of Rajasthan through the **Principal Secretary** to the Government in the **Public Health Engineering Department** of Rajasthan (hereinafter which expression shall unless repugnant to the subject or context shall include his heirs, successors or assigns) of the FIRST PART and **Hindustan Zinc Limited**, a Government of India Enterprise, incorporated under the Companies Act, 1956 having its registered office at Yashad Bhawan, Udaipur (hereinafter referred to as Hindustan Zinc Limited which expression where the context so require include its successors and assigns) of the OTHER PART.

WHEREAS Government of Rajasthan vide their letter dated 15th September 1992 from the Chief Engineer(HQ), Public Health

Contd ...2

laying of pipeline, provide right of way and acquire land for the same, if required/necessary, and HZL will bear all the financial liabilities.

3. The estimated cost of the project is Rs.60.00 Crores based on June, 1996 prices (Annexure A). Cost shall be shared by State Government and Hindustan Zinc Limited in the ratio of 70:30 when HZL share works out to Rs.18 Crores. Similarly, the operational/maintenance cost of the scheme as far as it is common to both the State Government and HZL shall be shared in the proportion of 70:30, except for power charges which shall be charged on actual consumption basis and proportionate to withdrawal of water by HZL.

4. The water cess will be charged from Hindustan Zinc Limited @ Rs.2.00 per thousand cft. The State Government can also decide to revise the water cess for all captive dams for industries in the State including above, however, such revision shall not be more than the proportionate revision that State Government may make for industrial use of water in the State.

5. Detail design of dam will be carried out through Central Water Commission, New Delhi. In case certain data/information is required from the State Government, the same shall be made

Contd...4

available by the Additional Chief Engineer, Irrigation Department, Udaipur.

6. Model studies will be conducted at Gujarat Engineering Research Institute, Baroda and for ecological and foundations grade finalisation, Engineering Wing of Geological Survey of India will be appointed.

7. Land for the project shall be acquired by State Government. The cost of land so acquired shall be adjusted against the Government share of the project cost.

8. To maintain the schedule of construction, timely availability of funds is essential. The delay in release of fund by Government and consequent delay in the royalty amount deposited by HZL will not attract any interest and or penalty, whatsoever.

9. For power arrangement, 132 KVA transmission line will be laid by Rajasthan Electricity Board from nearest grid station.

10. For liason with Government, Additional Chief Engineer, PHED/Irrigation Department stationed at Udaipur will be contact officer.

11. An Irrigation Engineer will be provided on deputation to HZL for construction supervision at usual terms of State Government.

12. The environmental clearance from Salmon bodies or permission for construction of Dam, submergence of forest land, service road, power line and development of quarries etc. shall be obtained by Government of Rajasthan. Hindustan Zinc Limited will extend all necessary help.

13. Scheme after completion will be operated and maintained by Public Health Engineering Department.

14. Rehabilitation of oustees will be the responsibility of the State Government.

15. In the event of any dispute or difference arising between the parties hereto as to the interpretation of the terms of this MOU or the rights, duties or obligations of the parties aforesaid or any matter arising out of or concerning and/or touching this MOU or in case the parties hereto fail to come to mutual agreement in respect of any matter falling under the scope of this MOU or connected thereto the matter shall be referred to Arbitration as per provisions contained in the Government of India Cabinet Secretariat, Department of Cabinet Affairs Circular No. 53/3/1/75/CT dated 19.12.75 as amended from time to time.

Contd. 7

Engineering Department, Rajasthan, Jaipur communicated that the work related to implementation of **Mansi Wakal Stage-I Project** situated in Tehsil, Bhilwal of Udaipur District for water supply alongwith repair of tunnel of Dewas Stage-I Project shall be implemented by Hindustan Zinc Limited.

The scope of work shall be following :-

- Construction of Dam
- Water conveyance system from dam site to Dewas Stage-I
- Revival of Dewas Stage-I tunnel
- 132 KVA transmission line from RSEB grid sub station near Udaipur to dam site

The implementation of the project by HZL will be on the following terms and conditions

1. That the water so diverted from the Mansi Wakal Stage-I Project, 30% of water available at off-take point of the common carrier system shall be made available to HZL.

2. At a future date in case HZL decides to lay a dedicated pipeline for its share of water from a point between outlet of Dewas Stage-I tunnel or Nandesheva Dam or Pichola Lake to Zinc Smelter, Debari, the State Government will give permission for

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भारतीय गैर न्यायिक

एक सौ रुपये Rs. 100

रु. 100 ONE HUNDRED RUPEES

भारत INDIA

INDIA NON JUDICIAL

राजस्थान RAJASTHAN

राजस्थान
24 APR 2012
उदयपुर (राज.)

R 599432

This agreement is made on this Wednesday, 9th of May 2012, at Udaipur, Rajasthan.

Between

(A) Municipal Council Udaipur acting through its Commissioner (hereinafter referred to as UMC, which expression shall unless repugnant to the context or meaning thereof, mean and include its successors and assignees)

(B) Urban Improvement Trust, Udaipur acting through Secretary (hereinafter referred to as UIT, which expression shall unless repugnant to the context or meaning thereof, mean and include its successors and assignees)

Referred as ONE PART

AND

Hindustan Zinc Ltd (HZL), a Company incorporated under Companies Act 1956 and having its registered office at Yashad Bhawan, Udaipur – 313 004 (hereinafter referred to as "HZL" which expression shall, unless repugnant to the context or meaning thereof shall mean and include its successors and assignees) where the context so require include its successors and assignees of the OTHER PART.

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नगर विकास प्रन्यास
उदयपुर (राज.)

(R. PANDWAL)
COMPANY SECRETARY
HINDUSTAN ZINC LTD.
YASHAD BHAWAN, UDAIPUR

WHEREAS

1. UMC has the jurisdiction to collect, store, treat and dispose Sewage, Gas and Sludge generated from Households of Udaipur and has decided to develop Municipal Sewage collection and treatment facility for the Udaipur city to protect environment and facilitate the health and hygiene of the city.

HZL is a leading Industry in the vicinity of Udaipur engaged in the Mining and Mineral processing. It requires water, to meet its process requirement at the plants located near Debari, also to meet the requirements of future expansion and new units in the state of Rajasthan. Thus, HZL has potential to make best use of Treated Sewage Water.

In consideration to have exclusive right to use or dispose treated water, HZL offered to construct suitable Sewage Treatment Plant on behalf of UMC on DBOOT (Design Build Own Operate and Transfer) basis.

NOW THEREOFRE THE AGREEMENT WITNESSETH AND IT IS HEREBY AGREED BY AND BETWEEN THE PARTIES AS FOLLOWS:

1. Definitions and Interpretation

"Agreement" means this agreement between UMC, UIT and HZL including its schedules and annexures and includes any amendments made hereto in accordance with the provision hereof.

"Date of commissioning" or DOC means the date notified by the UMC when Sewage treatment plant is complete in all respect and successful trial has been conducted of all the equipments and the STP is ready to take delivery of sewage water on regular basis.

"Effective date" means the date on which this agreement is formally signed.

"Sewage Treatment Plant or STP" means STP with MBBR Technology with facilities including equipments and civil work created by HZL for treatment of 20 MLD of Sewage at Manwa Khera (Technology details at ANNEXURE - I.)

"Force Majeure Event" means any event which prevents or delays the performance of obligations under this agreement in whole or in part by either party by reasons of public agitation, civil disturbances, riots, war, hostilities, acts of public enemies civil commotion, sabotage, fire, flood, earthquake, epidemics, explosion, strikes, lockouts, acts of God, rules and regulations or delay or abandonment due to order of court or any other cause beyond the reasonable control of the party affected.

"Conveyance mains" means the pumping station and pipe line laid by HZL for taking off the treated sewage water to its existing plants or expansion locations.

"Term" means the time period of twenty five years or any extended period thereafter for which this agreement remains valid and effective.

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(R. PANDWAL)
COMPANY SECRETARY
HINDUSTAN ZINC LTD.

"Treated Sewage" means liquid residue derived from the sewage treatment process of the STP that is capable of re-use for purpose other than human consumption and meets discharge norms.

2. Interpretation

All the words in singular shall be deemed to connote their respective plurals and vice-versa, unless the context suggests otherwise.

Headings of the clauses in this agreement are merely for the purpose of convenience and shall have no bearing on the interpretation of this agreement.

3. Sewage Treatment Plant

3.1 HZL has agreed to construct 20 MLD STP facilities at Manwa Khera. The plant will be designed to take peak load and seasonal fluctuations with an average treatment capacity of 20 MLD based on MBBR technology as per annexure -I. The plant will meet all standards and norms prescribed by the pollution control authorities or agencies for discharge of treated water.

3.2 UMC, in consideration of capital expenditure and operating expenses during the term of the agreement, hereby vests HZL with the exclusive right for the term to take off treated water from STP and use at its plants or expansion location of plants. In no case HZL will use this water for commercial sale.

3.3 UMC hereby agrees that it will ensure delivery of whatsoever sewage generated through its collection network at the input point of STP up to 20 MLD. However, 20 MLD sewage to STP can only be assured after completion of sewerage network proposed to be done under NLCP in the STP catchment. Maintenance of the sewage collection network shall be responsibility of the UMC. The junction connections structure of sewerage system with STP shall be developed by HZL at their cost.

3.4 HZL & UMC hereby agree that the STP is capable to treating Domestic Sewage only. The UMC agrees to take all possible steps to check merging of industrial sewage & hazardous waste, if any occurring in the catchments area & lawful action shall be initiated against defaulters by UMC to check recurrences.

3.5 UMC shall have the exclusive right over the manure generated by STP. Manure shall be collected & stored properly by HZL on a site within the land provided for STP. HZL shall provided unhindered access to UMC for the purpose of disposing the manure as may be determined by UMC from time to time. UMC will take steps to dispose the manure on fortnightly basis so that it is not accumulated in the STP site and interfere with STP operations.

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(उदयपुर सिटी)

(R. PANDWAL)
COMPANY SECRETARY
HINDUSTAN ZINC LTD.
YASHAD BHAWAN, UDAIPUR

3.6 HZL may suspend the treatment Sewage at STP by giving 24 Hours notice in the event of Force majeure event, if any, arises during the term of agreement.

3.7 The land for the STP is being acquired by PHED, Government of Rajasthan. the compensation for the land would be paid by the UIT and land will be transferred in the name of UIT. The land required, by HZL for construction of STP and disposal of residual solid waste at Manwa Khera shall be provided to HZL on lease rent basis at a token amount, of Rs. 1.00/ square meter per year by UIT.However incase, the land measuring 6.51 hectares or part thereof is utilized by HZL for development of STP or its expansion in future, HZL shall reimburse the compensation amount to UIT. The land so made available shall be exclusively used for the STP and no other use. In case HZL fails to construct and operate the STP as per CPCB or RSPCB norms, UMC will be free to take possession of the land along with the STP and other fixed assets with all its operating equipments free from all encumbrances for its regular operation at risk and cost of HZL. However HZL's right for treated water would remain intact.

3.7(a) Alternatively HZL will also explore possibilities of purchasing suitable alternate land at Manwakhera or near by area. The cost of purchasing land will be born by HZL for setting of STP and lands so purchased will be surrendered to UIT by HZL and same will be again allotted to HZL on lease rent basis at a token amount of Rs. 1.00 per square meter per year by UIT for setting up STP. HZL agrees to build all necessary infrastructure facilities internal and external along with approach roads to alternate site at their cost.

HZL further agrees to bear the cost of additional trunk sewer line from the exisiting site of Manwakhera to alternate site. The cost of additional sewer line will be intimated by UIT to HZL.

HZL will take all necessary steps for change of land use , environmental clearance, NOC and permission for routing of sewer line and pumping facility that may be required to put on the bank of the river shall be at their cost. However, UMC or UIT (as the case may be) shall provide necessary support for getting permission from statutory body.

3.8 The STP with its operating infrastructure, tertiary and additional treatment plants, if any, fixed asset, equipments, land etc situated within the premises of the land made available to the HZL or alternate land purchased by HZL, excluding the treated water conveyance system developed by HZL for its use, shall be handed over by HZL to UMC without any encumbrances on expiry of the Term of this Agreement in working condition.

4. Battery Limits

HZL battery limits will start from Sewage intake point of STP, prior to sewage intake point all the ownership or responsibilities with respect to Sewage collection system etc lies with UMC.

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5. Operation

HZL shall manage the operation and maintenance of STP during the term of this Agreement at its own cost including payment of power charges required for operation of the plant.

6. Power Connection

HZL shall take the power connection as per the requirement of the STP plant; however UMC shall provide HZL authorization required in this connection. Monthly Bills as per utilization of power shall be paid by HZL at their cost. Power, water and any other charges, expenses during construction period will be born by HZL at its own cost.

7. Force Majeure

Notwithstanding anything contained in this agreement, in case of a Force Majeure Event, If the party which is prevented from performing its obligations under this agreement has given notice of the force majeure event to other party, within 30 days of occurrence of such event than the particular obligation of that party, which cannot be performed due to occurrence of force majeure event shall be suspended without any liability towards the other party. The Term of this agreement shall stand extended by the time lost by virtue of such Force Majeure Event.

8. Dispute Resolution & Arbitration

In the event of any dispute or difference arising out of, relating to, under or in respect of this agreement between the parties the same shall be referred to the Divisional Commissioner, Udaipur by the aggrieved party and the decision made by the Divisional Commissioner will be binding on all the parties to the agreement.

9. Term

Both the parties agree that this agreement shall be valid for a period of twenty five years from the date of commissioning of the STP or signing of Agreements whichever is later, and shall be reviewed thereafter for extension with mutual consent.

10. Miscellaneous

10.1 The parties hereto represent that this Agreement has been duly executed in accordance with the applicable law, regulations and bye-laws governing them and that it is valid, binding and legally enforceable upon them.

10. 2 any tax liability during the Term of the Agreement relating to STP shall be borne by HZL at his own cost.

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नगर विकास प्रन्यास
उदयपुर (राज.)

(R. PANDWAL)
COMPANY SECRETARY
HINDUSTAN ZINC LTD.
YASHAD BHAWAN, UDAIPUR

10.3 All the notices or communication required to be served under this Agreement shall be issued by registered post, fax, E-mail or hand delivered to the following address or as intimated by each party :-

i. Company Secretary, Hindustan Zinc Limited, Yashad Bhavan, Udaipur -313004

ii. UMC – Commissioner, Municipal Council, Udaipur – Town Hall Road, Udaipur- 313001

iii. UIT-Secretary, Urban Improvement Trust, Udaipur-313001

10.4 Delay in exercising or omission to exercise any right to a party under this agreement shall not impair any such right and shall not be considered to be a waiver thereof.

10.5 No modification alteration or amendment of this Agreement shall be valid unless executed with mutual consent and acknowledged accordingly.

10.6 Obtaining all the statutory certifications or clearance from Statutory Bodies and Government will be the sole responsibility of HZL. However if required, UMC may assist in getting all statutory permissions for installation of STP to HZL, for its efficient operations and developing water conveyance system for treated water to HZL plants.

10.7 HZL undertakes to build all necessary infrastructure, like roads, drainage, administrative buildings, lighting, water supply , toilets, boundary wall etc, within the STP premises at their cost and maintain the same.

10.8 Ownership of STP, including with its developed infrastructure there in for operation will remain with HZL during Term of the Agreement.

10.9 HZL shall commission the STP within a period of 18 months from the date of taking over possession of the designated land free from all encumbrances. In case of delay on the part of HZL in constructing of STP, Performance Guarantee may be forfeited partly or fully as may be determined by the UMC. In case of failure, the land along with infrastructure so developed therein shall vest in the UMC.

10.10 The UMC & other authorities of the Government shall have the right to enter, inspect the STP during construction, implementation or running of the project at any time with prior intimation to HZL.

10.11 The treated water should meet the Central Pollution Control Board (CPCB) and the Rajasthan State Pollution Control Board (RSPCB) norms.

10.12 The drawings, design and project appraisal of the STP (20 MLD capacity) including the necessary infrastructures, as developed and estimated by the consultant appointed by the HZL shall be got vetted by any of the IITs or MNIT, Jaipur.

आयुक्त
नगर परिषद, उदयपुर

सचिव
नगर विकास प्रन्यास

(R. PANDWAL)
COMPANY SECRETARY
HINDUSTAN ZINC LTD

10.13 HZL agrees to establish a laboratory in the STP premises for day to day testing of the quality of treated sewage water meet the CPCB and RSPCB norms or standards at their cost.

10.14 In case UMC provides more than 20 MLD of raw sewage at inlet point of STP, HZL agrees to treat the excess sewage also in the STP plants, maximum up to additional 10% of design capacity, and will be free to use the excess treated water for their own purpose. In case the raw sewage quantity gets increased more than aforesaid limit, HZL agrees in principal to modify the STP to treat the same to such an extend, it is technically feasible with limited modifications in the STP. The said modifications along with the modality of disposing the excess treated water born out of this modification shall be decided mutually at that point of time.

10.15 HZL agrees to utilize the treated water of STP for its own Plants and their expansion plans in future & will not use the treated water for any other commercial purpose or sale etc. And if a situation so arises that HZL is not in a position to use all the treated water in their own plants and future expansions due to any force majeure events, then the alternate disposal of treated water shall be worked out with the mutual consent of HZL and UMC.

10.16 HZL agrees to be liable and responsible for any unforeseen happening or accident fatal or nonfatal in the premises of STP during its construction and operation of during the period of Term of Agreement or till such time the STP is lawfully handed over to UMC or upto the time the STP is taken over by the UMC , as the case may be. HZL will take all reasonable measures and precautions for the safety and security of the STP and its premises.

10.17 HZL agrees to be solely responsible for the happening of any theft , damage , breakages of the structure etc during construction or operation of STP & till such time the STP and its premises are handed over to ,or, taken over by UMC. HZL shall restore the damages, breakages etc to its original position immediately at their cost.

10.18 HZL agrees to make investments required for the setting up of the STP and it is estimated to cost approximately Rs 26.25 crores as per ANNEXURE-II, and Rs. 10 crores for establishment of additional treatment facility to make the treated water usable in industry, excluding the cost of land for STP at Manwa Khera and operation and maintenance for 25 years after commissioning of STP for generating sources of water for its plants or expansions. HZL also agrees to arrange water and electricity required during construction of the entire work and all other expenses during pre-commissioning period at their cost.

9.5.1

आयुक्त
नगरपरिषद् उदयपुर

सचिव
नगर विकास प्रन्यास
उदयपुर (राज.)

(R. PANDWAL)
COMPANY SECRETARY
HINDUSTAN ZINC LTD.
YASHAD BHAWAN, UDAIPUR

10.19 HZL also agrees to release 15% of the treated water from the STP in the river during dry season (March through June) every year to maintain the water table in the area for the potential users or farmers.

10.20 UMC and State Government reserve the right to terminate the agreement incase of any breach of terms and conditions of this MOU after providing an opportunity of hearing to HZL.

10.21 HZL also agrees to provide a performance guarantee within a period of one month from the signing of this agreement or handing over the land which ever is later, in the form of Bank Guarantee for Rs 2.5 crores from a Nationalized bank valid for 36 Month in favour of UMC for successful construction , completion and commissioning of the STP within the scheduled period of 18 months. UMC shall have right to impose penalty for non performance and forfeiture of the bank Guarantee in part of full. UMC's decision in this regard shall be final and binding on all parties.

10.22 HZL agrees, to provide Rs. 15.00 crores as financial support to the implementing agency for laying of trunk sewer lines in the STP's catchment area. This amount will be paid to the implementing agency of the Sewerage project and the amount will be paid by HZL in three installments of 30% (on issuance of work order), 30% (on completion of 40% of the physical progress) and 40% (on completion of 75% of the physical progress), respectively. Any default shall attract an interest @ 18% per annum.

10.23 HZL agrees to pay, from date of commissioning, Rs. 20.00 lacs annually for first five years, 30 lacs annually for next five years and Rs. 40 lacs annually for rest of the years up to 25 years to UMC on account of maintenance of the sewerage network system in the catchment area of the STP. The said amount shall be payable in two equal installments every year. The first installment shall be paid within thirty days from date of commissioning and the second installment shall be paid after the completion of six month from the date of commissioning but within a period of thirty days thereafter. The installments for rest of years shall become due and payable as per the same principal at an interval of six months. Any default shall attract an interest @ 18% per annum.

10.24 HZL will also incur a minimum expenditure of Rs. 1.00 Crore per annum under its corporate social responsibility in Udaipur city and the utilization of this amount will be decided by a committee under the chairmanship of the District Collector, Udaipur, Chair person of Municipal Council, secretary, UIT and a representative of HZL as its member and Commissioner, UMC as its member Secretary.

10.25 In case the water tariff for industrial use is increased by the competent authority in future, HZL agrees to pay 40% of such incremental tariff to UMC on monthly basis. This increase rate will be calculated on the basis of 20.00 MLD of water supply , irrespective of the actual delivery of raw sewage water to the STP. However, this system will come in

to force only after the completion of 5 years from date of commissioning of the STP. Any default shall attract an interest @ 18% per annum.

10.25(a) HZL further agrees to abide by rules of National and State water policy as approved by State Government and in case of water crisis the orders of State Government shall prevail for such duration.

10.26. HZL undertakes to plant trees in the buffer zone of the premises and maintain the same.

10.27. All parties shall abide by any amendment or directions issued by State Government which shall be mutually agreed in writing upon by all parties to the Agreement from time to time in respect of all the clauses of this Agreement in future.

11 Court of Jurisdiction

The courts situated at Udaipur in the State of Rajasthan shall alone have jurisdiction over matters arising out of this agreement.

This Agreement bears the approval of the State Government vide letter no F55()PA/SE/DLB/10/STP/Udaipur/12654 dated16.8.2011 and No 2077 dated 01.05.2012.

IN WITNESS whereof the parties have executed this Agreement on the date and month aforementioned in the presence of witness named hereunder:

For and on Behalf of:

UMC	UIT	HZL
Name Satya Narayan Acharya	Name Dr. R.P. Sharma	Name (R. PANDWAL) COMPANY SECRETARY HINDUSTAN ZINC LTD. YASHAD BHAWAN, UDAIPUR
Designation आयुक्त नगर परिषद, उदयपुर	Designation	Designation
Date	Date 09-05-2012	Date
Place	Place Udaipur सचिव नगर विकास प्रन्यास उदयपुर (राज.)	Place

In witness hereof:

1. (D.S. Rathore) HZL

2. (B.L. Kothari)

Witness 3 (S.K. Choudhary)

Witness 4. (ANIL GOPLANI)

Annexure 10

CENTRAL HOSPITAL
Hindustan Zinc Ltd
Rajasthan, Debari
Phone: 0294-265-2341

Periodical Medical Examination

FORM NO: 19
(Prescribed under rule 14)
HEALTH REGISTER
(In respect of persons employed in occupations declared to be dangerous operations under Section 87)

Employee Details

Employee Number	ZSD0013010	**Employee Name**	Rahul Trivedi
State	Rajasthan	**Region**	
Location	Debari	**CheckUp Type**	Periodical Medical Examination
Company	Hindustan Zinc Limited		

General Examination

Current PME Date: 22-Oct-2022 **Next PME Date:** 22-Oct-2023 00:0

Date	22-Oct-2022	**Examined By**	Dr. Sumit Siroya
Height	178	**Weight**	72.2
Blood Group	A+	**Pulse**	90
Correct Vision	6/6 ^ 6/6	**Color Vision**	Normal
BP(Systolic)	134	**BP(Diastolic)**	76

Dental Condition	NAD	**Deformities**	NAD
ENT	NAD		

Urine Examination

Urine	NIL	**Urine Sugar Micro**	NIL

Chest Examination

Inspiration	92	**Expiration**	87

Systemic Examination

Respiratory System	NAD	**Cardiovascular System**	NAD
Gastrointestinal System	NAD	**Nervous System**	NAD
Genitourinary System	NAD	**Any Other Findings**	NAD
Advice			
Unfit	Fit	**Unfit Reason**	

Signature of Employee

Dr. Sumit Siroya

690

eport has been generated by computer and does not require signature and not valid for Medico Legal Cases. Kindly correlate with the clinical pictures.

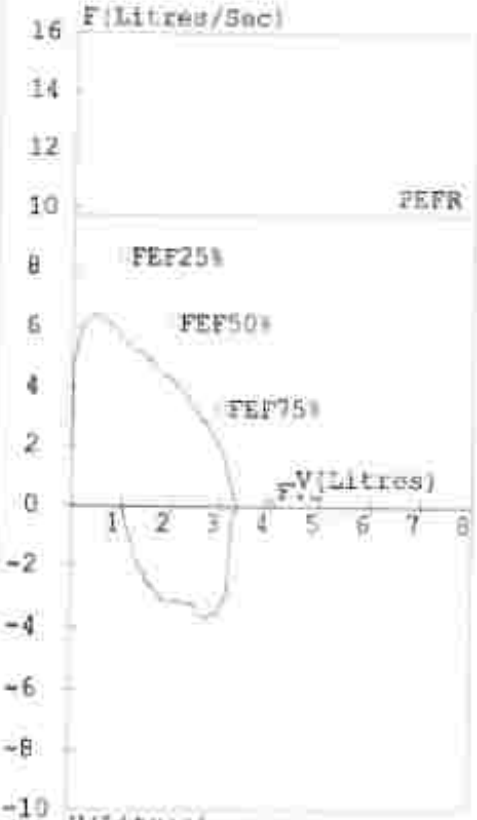
ARTH DIAGNOSTICS PVT. LTD.

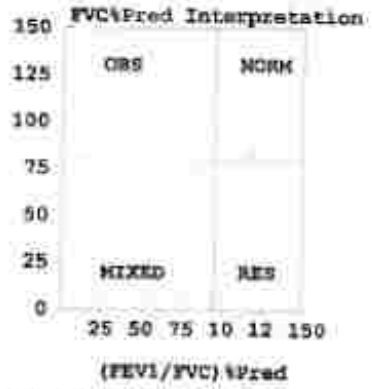
4C APEX CHEMBER MADHUBAN BEHIND LOK KALA MANDAL UDAIPUR (RAJ.)

Patient: MR RAHUL TRIVEDI
Refd. By: DR. CENTRAL HOSPITAL DEB
Pred.Eqns: RECORDERS
Date : 21-Oct-2022 02:44 PM

Age : 30 Years
Height : 178 Cms
Weight : 72 Kgs
ID: 1078547

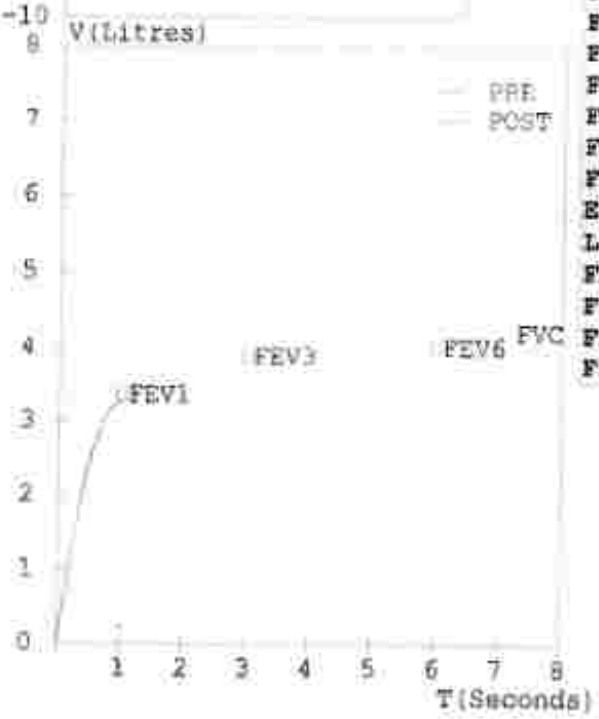
Gender : Male
Smoker : Yes
Eth. Corr: 100
Temp :





Spirometry(FVC Results)

Parameter		Pred	M.Pre	%Pred	M.Post	%Pred	%Imp
FVC	(L)	03.99	03.29	082	-----	---	---
FEV1	(L)	03.36	03.27	097	-----	---	---
FEV1/FVC	(%)	84.21	99.39	118	-----	---	---
FEF25-75	(L/s)	04.54	04.50	099	-----	---	---
PEFR	(L/s)	09.77	06.40	066	-----	---	---
FIVC	(L)	-----	02.25	---	-----	---	---
FEV.5	(L)	-----	02.49	---	-----	---	---
FEV3	(L)	03.87	03.29	085	-----	---	---
PIFR	(L/s)	-----	03.68	---	-----	---	---
FEF75-85	(L/s)	-----	02.80	---	-----	---	---
FEF.2-1.2	(L/s)	07.98	05.89	074	-----	---	---
FEF 25%	(L/s)	08.36	05.95	071	-----	---	---
FEF 50%	(L/s)	06.13	04.66	076	-----	---	---
FEF 75%	(L/s)	03.24	03.20	099	-----	---	---
FEV.5/FVC	(%)	-----	75.68	---	-----	---	---
FEV3/FVC	(%)	96.99	100.00	103	-----	---	---
FET	(Sec)	-----	01.12	---	-----	---	---
ExplTime	(Sec)	-----	00.06	---	-----	---	---
Lung Age	(Yrs)	030	031	103	-----	---	---
FEV6	(L)	03.99	-----	---	-----	---	---
FIF25%	(L/s)	-----	02.39	---	-----	---	---
FIF50%	(L/s)	-----	00.44	---	-----	---	---
FIF75%	(L/s)	-----	03.60	---	-----	---	---



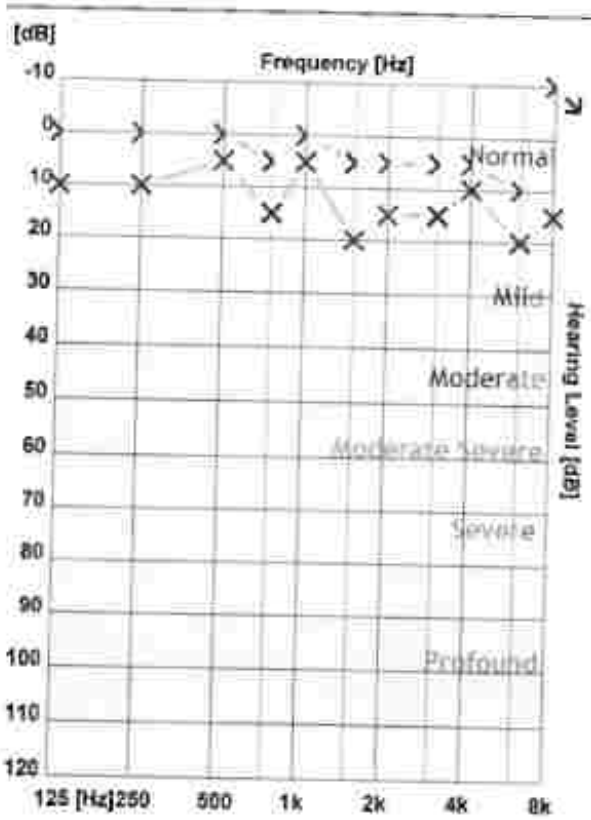
Pre Medication Report Indicates
Early Small Airway Obstruction as FEF 25-75 %Pred or PEFR %Pred < 70
Spirometry within normal limits as (FEV1/FVC)%Pred >95 and FVC%Pred >80.

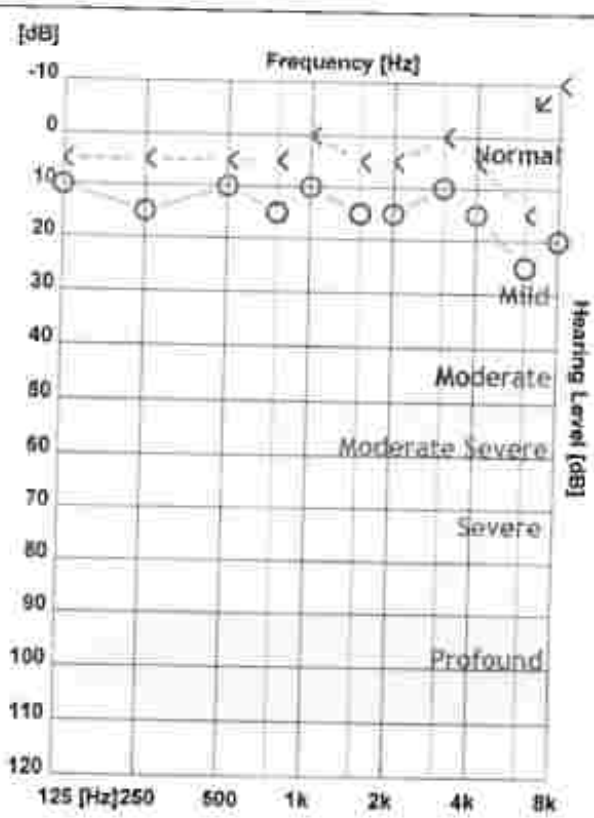
ARTH DIAGNOSTICS

NABL व NABH प्रमाणित

Patient ID : 18002
Name : MR RAHUL TRIVEDI
CR Number : 20221021144502
Registration Date : 21-Oct-2022

Age : 30
Gender : Male
Operator : arth diagnostic





	125 Hz	250 Hz	500 Hz	750 Hz	1000 H	1500 H	2000 H	3000 H	4000 H	6000 H	8000 H
X - Air Left	10	10	5	15	5	20	15	15	10	20	15
O - Air Right	10	15	10	15	10	15	15	10	15	25	20
[- Bone Left	0	0	0	5	0	5	5	5	5	10	-10
] - Bone Right	5	5	5	5	0	5	5	0	5	15	-10

Clinical Notes :

https://www.rmsindia.com © RMS Audiometer(HERMES_v1.0.0.2)Print Date 21-Oct-2022

ARTH DIAGNOSTICS

NABL व NABH प्रमाणित

Name	:	Mr.RAHUL TRIVEDI S/O ASHOK TRIVEDI	Lab No.	:	0 2210210241
Age/Gender	:	30 YRS/MALE	Sample Received	:	2 Oct/2022 01:30PM
Centre	:	Walk-In	Result Reported	:	2 Oct/2022 02:24PM
Ref.By	:	Dr. CENTRAL HOSPITAL DEBARI MINES(HINDUSTAN ZINC LIMITED)	Reg. No.	:	1 78547

HZL-STANDARD PROFILE

HAEMATOLOGY

Test Name	Result	Unit	Normal Value	Method
		HB-TLC-DLC		
Haemoglobin	15.20	gm/dl	12.0 -15.00	
Total Leucocyte Count	8,500		4000-11000	ell ounter/Microscopy
Differential Count				
Neutrophils	72	%	40-80	ectronic Cell ounter
Lymphocyte	24	%	20-40%	
Eosinophils	2	%	1-6%	
Monocytes	2	%	2-10%	
ESR (After 1 hr.)	1	mm	0-15	estergreen method

Dr. A.Singh
(M.D. Pathol.)

ARTH DIAGNOSTICS

NABL व NABH प्रमाणित

Name	:	Mr.RAHUL TRIVEDI S/O ASHOK TRIVEDI	Lab No.	:	0[illegible]210210241
Age/Gender	:	30 YRS/MALE	Sample Received	:	2[illegible] Oct/2022 01:30PM
Centre	:	Walk-In	Result Reported	:	2[illegible] Oct/2022 02:19PM
Ref.By	:	Dr. CENTRAL HOSPITAL DEBARI MINES(HINDUSTAN ZINC LIMITED)	Reg. No.	:	1[illegible]8547

BIOCHEMISTRY

Test Name	Result	Unit	Normal Value	Method
Blood Glucose Random	133.6	mg/dL	Normal : 70 to 139 mg/dl Prediabetes: 140 to 199 mg/dl Diabetes : >200 mg/dl	
Urea, Serum	26.00	mg/dL	10.0-40.0	
Creatinine, Serum	0.900	mg/dL	0.40-1.20	
SGPT (ALT), Serum	16.00	U/L	9.00-49.00	IFCC without pyridoxal phosphate
SGOT (AST), Serum	16.70	U/L	9.00-49.00	IFCC without pyridoxal phosphate

Dr. [illegible]
(MD) [illegible]

Quality Registration by USA

ARTH DIAGNOSTICS

NABL व NABH प्रमाणित

Name	:	Mr.RAHUL TRIVEDI S/O ASHOK TRIVEDI	Lab No.	:	0 210210241
Age/Gender	:	30 YRS/MALE	Sample Received	:	2 Oct/2022 01:30PM
Centre	:	Walk-In	Result Reported	:	2 Oct/2022 02:30PM
Ref.By	:	Dr. CENTRAL HOSPITAL DEBARI MINES(HINDUSTAN ZINC LIMITED)	Reg. No.	:	8547

BIOCHEMISTRY

Test Name	Result	Unit	Normal Value	Method
LIPID PROFILE, Serum				
Total Cholesterol	164.7	mg/dL		CHOD-PAP
Triglyceride	152.3	mg/dL		
HDL Cholesterol	49.8	mg/dL		Direct (PVS/PEGME precipitation & under reaction)
LDL Cholesterol	90	mg/dL		
VLDL Cholesterol	24.4	mg/dL		
Total / HDL Cholesterol Ratio	3.31	Ratio		
Non HDL Cholesterol	114.90	mg/dL		

Reference range according to NCEP ATP III guidelines.

Total Cholesterol	Triglycerides	HDL Cholesterol	LDL Cholesterol
<200 Desirable 200-239 Borderline high >=240 High	<150 Normal 150-199 Borderline high 200-499 High >=500 Very high	<40 Low >=60 High	<100 Optimal 100-129 Near optimal/Above optimal 130-159 Borderline high 160-189 High >=190 Very high
Non HDL Cholesterol <130 Optimal <160 Borderline high <190 High >=190 Very high			

Note : For better accuracy and superior predictability of cardiac risk, we at Arth Diagnostics, do LDL Cholesterol by Direct method (Not calculated). So calculation of VLDL by triglyceride is not applicable here.

Dr. Aakanksha Pandya
M.B.B.S., MD
RMC NO-19

Name	:	Mr.RAHUL TRIVEDI S/O ASHOK TRIVEDI	Lab No.	:	0 210210241
Age/Gender	:	30 YRS/MALE	Sample Received	:	2 Oct/2022 01:30PM
Centre	:	Walk-In	Result Reported	:	2 Oct/2022 04:29PM
Ref.By	:	Dr. CENTRAL HOSPITAL DEBARI MINES(HINDUSTAN ZINC LIMITED)	Reg. No.	:	1 0547

SEROLOGY

Test Name	Result	Unit	Normal Value	Method
BLOOD GROUP (ABO & RH FACTOR)				
ABO	A			Slide/Tube method
Rh Typing	POSITIVE			Slide/Tube method

Dr. [illegible]
(M.D. Pathol)

ARTH DIAGNOSTICS
Meaningful, Authentic & Dedicated

NABL व NABH
प्रमाणित

Name	:	Mr.RAHUL TRIVEDI S/O ASHOK TRIVEDI	Lab No.	:	6...2102 10241
Age/Gender	:	30 YRS/MALE	Sample Received	:	2...022 02:37PM
Centre	:	Walk-In	Result Reported	:	2...022 03:23PM
Ref.By	:	Dr. CENTRAL HOSPITAL DEBARI MINES(HINDUSTAN ZINC LIMITED)	Reg. No.	:	1...5477

CLINICAL PATHOLOGY

Test Name	Result	Unit	Normal Value	Method
URINE ROUTINE EXAMINATION				
Physical Examination				
Colour	LIGHT YELLOW		Light Yellow	
Specific Gravity	1.020		1.005-1.030	
pH	6.0		4.6-8.0	
Sugar	NIL		Nil	
Protein	NIL		Nil	
Ketones	NEGATIVE		Negative	
Nitrite	NEGATIVE		Negative	
Blood	NEGATIVE		Negative	
Urobilinogen	NORMAL		Normal	
Bile pigment	NEGATIVE		Negative	
Microscopic Examination				
Pus Cells	OCC.		0-5/hpf	
Red Blood Cells	NIL		0-3/hpf	
Epithelial Cells	OCC.			
Cast	NIL		Nil	
Crystals	NIL		Nil	
Bacterial Flora	NIL			
Others	NIL			

*** End Of Report ***

Dr. Aakanksha [illegible]
M.B.B.S., MD [illegible]
RMC NO-[illegible]

Quality Registration by USA
No. [illegible]

ARTH DIAGNOSTICS

Arth Diagnostic Pvt. Ltd.
4C, Apex Chamber, Behind Lok Kala Mandal
Opp. Canara Bank, Madhuban, Udaipur (Raj.)
Tel.: 7410960960, 7073308880, 7073819880, 7410970970
Customer Care : 07725992990, 08107753342

Name	: Mr. RAHUL TRIVEDI S/O ASHOK TRIVEDI	Reg.No	:1078547
Age/Gender	:30 YRS/MALE	Date	:21-10-2022
Refer By	:Dr. CENTRAL HOSPITAL DEBARI MINES(HINDUSTAN ZINC LIMITED)		
Panel/Centre	:Standard		

SKIAGRAM CHEST P.A. VIEW

- Both lung fields are normal in translucency with normal bronchovascular markings.
- Both c.p. angles are clear. Both domes are normal in position and contour.
- Cardiac shadow is normal in size shape and position.

INFERENCE: No cardiopulmonary pathology is seen.

Dr. Rajendra Kachhawa
M.D.(Radio Diagnosis)
RMC-13100

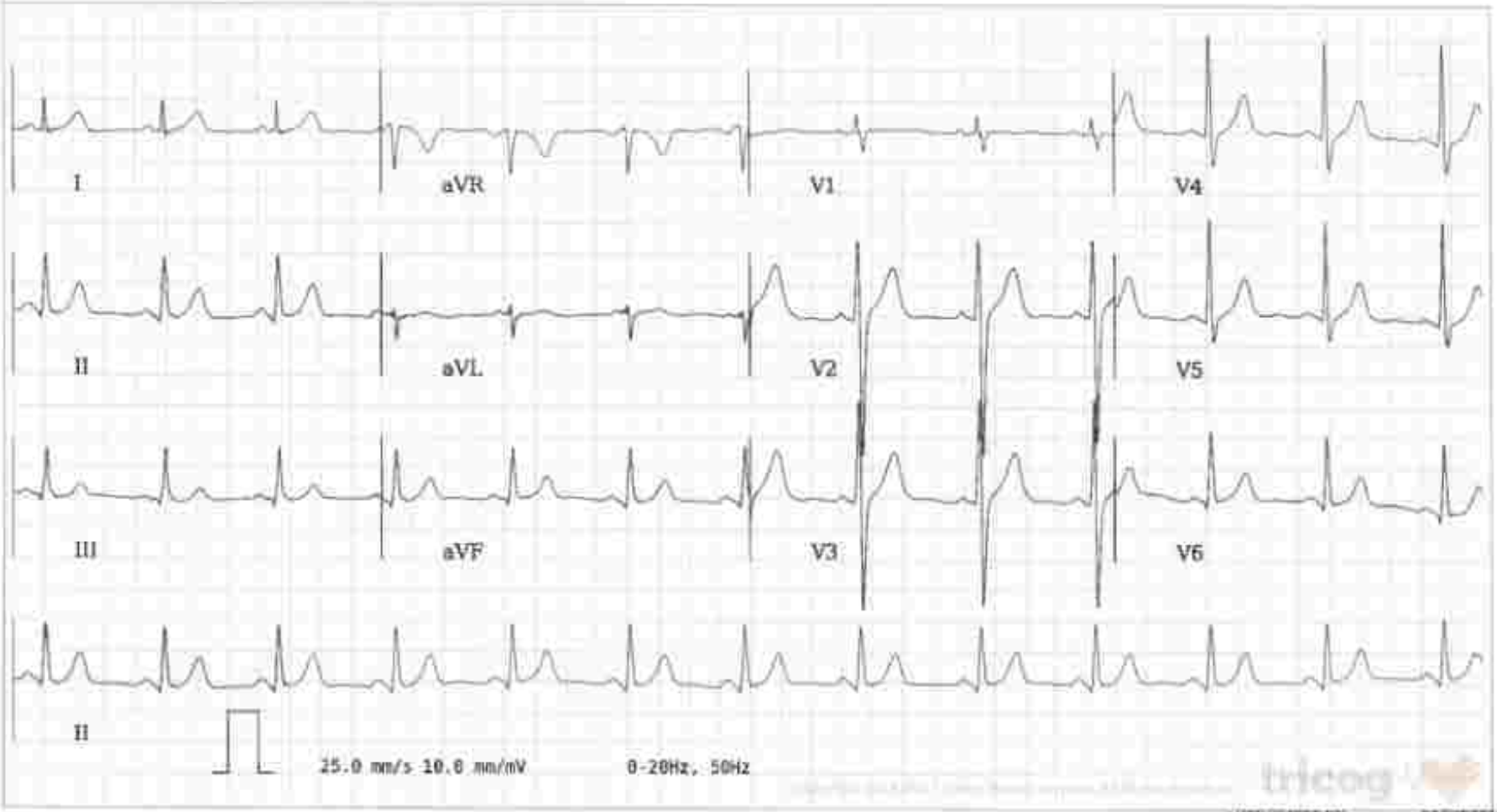
Dr. Chandan K. Agarwal
M.D.(Radio Diagnosis)
RMC-11849

Dr. Ashwani Khandekar
M.D. (Radio Diagnosis)
RMC - 31079/19153

Dr. Ruchi Sarawgi
M.D.(Radio Diagnosis)
RMC - 37890

Arth Diagnostics-I

Age / Sex:	30 / MALE	Date of ECG:	October 21st 2022, 15:56:21
Patient ID:	0001078547		
Patient Name:	RAHUL TRIVEDI S/O ASH	Referred By:	CENTRAL HOSPITAL DEBA



AR: 79bpm VR: 79bpm QRSD: 102ms QT: 356ms QTc: 408ms PRI: 126ms P-R-T: 48° 67° 57°

AUTHORIZED BY

EXPORTED BY

ECG Within Normal Limits

Warning: Analysis in this report is based on ECG alone and should only be used as an adjunct to clinical history, questions and results of other invasive and non-invasive tests and must be interpreted by a qualified physician

AMBIENT AIR QUALITY

Location: Plant Site **Unit: µg/m³**

Date	CLOCK HOURS								
	00-08		08-16		16-24		24 Hours	24 Hours	24 Hours
	SO_2	Nox	SO_2	NOx	SO_2	NOx	PM2.5	PM10	CO
3.03.2022	10.6	15.62	11.03	18.1	10.46	16.71	33.40	62.5	0.73
4.03.2022	10.48	15.93	10.81	19.35	10.57	17.36	34.92	62.0	0.78
10.03.2022	10.51	16.04	10.96	18.21	10.5	17.27	37.02	58.5	0.80
11.03.2022	10.52	15.45	10.66	18.22	10.97	16.29	39.63	61.4	0.76
17.03.2022	10.58	15.66	10.72	18.63	10.99	17.03	36.49	60.6	0.73
18.03.2022	10.6	15.58	10.72	18.55	10.82	17.04	38.66	60.6	0.7
24.03.2022	10.59	15.81	10.97	18.62	10.71	16.48	37.43	61.4	0.75
25.03.2022	10.56	15.56	10.99	17.73	10.63	16.53	33.91	61.0	0.77
01.04.2022	10.52	15.28	10.99	19.06	10.52	16.237	37.03	61.4	0.78
02.04.2022	10.53	15.75	10.51	17.57	10.73	16.32	34.92	61.9	0.72
07.04.2022	10.49	15.55	10.52	18.15	10.90	16.96	38.24	58	0.79
08.04.2022	10.63	15.41	10.53	17.81	10.70	17.12	37.64	60.4	0.73
14.04.2022	10.52	15.63	10.96	19.14	10.53	16.73	36.18	61.5	0.75
15.04.2022	10.64	15.36	10.41	18.97	10.70	17.29	34.79	59.1	0.77
21.04.2022	10.56	15.78	10.62	18.96	10.60	16.85	37.89	59.4	0.79
22. 04.2022	10.69	16.39	10.60	18.49	10.51	17.32	34.16	59.0	0.76
28.04.2022	10.58	16.21	10.63	17.83	10.54	16.43	35.22	59.9	0.74
29.04.2022	10.47	16.22	10.59	18.26	10.91	16.53	35.31	62.0	0.73
04.05.2022	10.69	15.50	10.66	17.63	10.63	16.66	39.64	61.1	0.77
05.05.2022	10.59	16.20	10.77	18.03	10.74	16.83	37.12	62.2	0.80
11.05.2022	10.56	16.01	10.55	17.53	10.5	17.26	38.92	58.5	0.76
12.05.2022	10.66	16.02	10.99	19.14	10.92	16.52	34.93	58.8	0.81
18.05.2022	10.59	15.31	10.32	18.21	10.42	16.82	39.12	61.3	0.78
19.05.2022	10.59	16.23	10.72	19.02	10.73	17.03	34.73	60.9	0.80
25.05.2022	10.52	15.64	10.73	18.03	10.81	16.41	34.14	60.7	0.75
26.05.2022	10.62	16.26	10.81	18.77	10.61	17.32	35.63	58.6	0.72

	SO_2	Nox	PM_{10}	$PM_{2.5}$	CO
	(Unit µg/m³)				
Max.	11.03	19.35	62.5	39.64	0.81
Min.	10.42	15.28	58	33.4	0.72
98%tile	10.95	19.15	62.3	39.6	0.8
95%tile	10.82	18.86	62.1	39.5	0.8

AMBIENT AIR QUALITY

Location: Bichhri

Unit: µg/m³

Date	CLOCK HOURS								
	00-08		08-16		16-24		24 Hours	24 Hours	24 Hours
	SO_2	Nox	SO_2	NOx	SO_2	NOx	PM2.5	PM10	CO
5.03.2022	8.91	16.01	11.25	19.7	9.94	17.11	36.3	67.6	0.61
6.03.2022	8.42	16.82	11.15	19.62	9.72	17.24	39.4	66.7	0.63
12.03.2022	8.33	15.24	10.62	18.93	9.72	17.85	36.8	61.8	0.60
13.03.2022	8.53	16.93	11.13	19.13	9.63	17.56	38.2	64.4	0.64
19.03.2022	9.15	15.42	10.31	20.33	9.95	17.26	42.2	64.9	0.63
20.03.2022	9.04	15.92	10.44	19.53	9.56	16.98	37.5	66.1	0.64
26.03.2022	9.02	16.22	10.91	20.13	10.07	17.53	40.2	66.3	0.62
27.03.2022	9.21	16.60	10.42	19.54	9.69	17.32	33.8	68.4	0.60
2.04.2022	8.86	16.42	10.53	19.48	9.79	17.63	35.8	67.1	0.63
3.04.2022	8.38	16.62	10.84	19.59	9.69	17.96	37.1	62.9	0.64
9.04.2022	8.48	15.52	10.38	18.86	9.99	17.13	42.2	68.8	0.65
10.04.2022	8.89	15.51	10.89	18.91	9.77	17.63	37.0	61.5	0.63
16.04.2022	8.57	16.81	11.23	18.84	10.08	18.63	41.2	66.2	0.62
17.04.2022	8.85	15.94	10.64	19.64	9.42	18.33	42.6	68.4	0.61
23.04.2022	9.46	15.86	10.13	20.05	9.42	18.43	35.8	66.3	0.62
24.04.2022	9.27	16.89	11.23	19.66	10.03	17.14	34.5	67.8	0.63
30.04.2022	8.32	15.68	10.87	18.99	9.51	17.15	37.8	63.1	0.64
1.05.2022	8.33	16.19	10.49	18.91	9.73	18.19	40.1	65.4	0.61
6.05.2022	8.92	16.81	10.55	19.9	9.81	17.77	35.9	63.7	0.60
7.05.2022	8.23	16.22	10.33	20.01	10.01	18.09	41.5	65.0	0.60
13.05.2022	8.92	15.62	11.05	20.02	9.51	17.82	34.4	66.7	0.62
14.05.2022	9.41	16.17	11.10	19.32	10.11	17.92	35.4	67.3	0.64
20.05.2022	9.22	16.44	11.20	19.82	9.71	17.53	37.1	63.9	0.63
21.05.2022	8.43	16.03	10.60	19.33	10.11	17.31	39.3	64.0	0.61
27.05.2022	9.01	16.92	10.93	19.73	9.71	18.32	42.0	65.2	0.60
28.05.2022	8.52	15.33	11.25	20.13	9.81	18.41	39.0	64.1	0.63

	SO_2	Nox	PM_{10}	$PM_{2.5}$	CO
	(Unit µg/m³)				
Max.	11.25	20.33	68.8	42.6	0.65
Min.	8.23	15.24	61.5	33.8	0.60
98%tile	11.12	20.1	68.6	42.2	0.6
95%tile	11.01	19.9	68.4	42.2	0.6

AMBIENT AIR QUALITY

Location: Mandesar

Unit: µg/m³

Date	CLOCK HOURS								
	00-08		08-16		16-24		24 Hours	24 Hours	24 Hours
	SO_2	Nox	SO_2	NOx	SO_2	NOx	$PM_{2.5}$	PM_{10}	CO
03.03.2022	9.01	22.22	9.61	25.71	9.51	23.51	46.3	65.8	0.71
04.03.2022	8.92	22.05	9.95	24.62	9.62	23.82	38.6	76.8	0.65
10.03.2022	8.83	20.17	10.26	26.23	9.43	22.83	45.9	78.9	0.66
11.03.2022	9.29	22.47	10.37	24.84	9.26	22.54	40.6	74.7	0.68
17.03.2022	9.04	22.03	10.06	24.99	9.38	24.43	39.0	75.0	0.67
18.03.2022	8.85	20.73	9.63	25.86	9.40	24.07	41.5	78.5	0.66
24.03.2022	9.02	21.82	10.17	26.29	9.56	22.86	43.0	69.8	0.68
25.03.2022	8.93	21.33	9.86	24.83	9.30	22.92	46.1	65.6	0.65
01.04.2022	8.98	21.69	10.12	24.87	9.64	24.03	45.3	72.0	0.67
02.04.2022	9.29	21.23	9.76	25.22	9.32	22.54	37.9	74.8	0.71
07.04.2022	8.99	20.92	10.19	26.23	9.73	22.75	39.8	66.2	0.65
08.04.2022	8.93	21.33	10.25	25.94	9.77	22.43	47.3	76.2	0.66
14.04.2022	9.18	20.72	10.32	24.96	9.46	22.65	40.0	77.3	0.68
15.04.2022	9.22	22.13	9.80	25.61	9.49	22.96	39.6	70.7	0.67
21.04.2022	9.13	21.21	9.55	25.62	9.43	24.02	41.6	78.2	0.69
22.04.2022	8.82	20.94	10.29	25.03	9.525	22.13	44.5	74.3	0.70
28.04.2022	8.83	21.55	10.32	26.09	9.62	23.03	47.0	69.3	0.65
29.04.2022	9.15	21.19	10.26	25.37	9.53	22.73	44.4	68.5	0.67
04.05.2022	9.25	21.46	9.63	26.31	9.73	22.14	44.1	65.3	0.64
05.05.2022	9.15	22.04	9.79	24.85	9.53	22.62	42.4	66.1	0.69
11.05.2022	8.96	21.52	9.83	25.56	9.43	23.96	42.6	64.5	0.70
12.05.2022	9.19	22.32	10.11	26.13	9.84	22.21	47.6	77.6	0.66
18.05.2022	8.93	22.63	9.82	24.83	9.39	22.58	46.9	77.3	0.68
19.05.2022	8.91	20.87	9.77	26.13	9.53	23.79	44.8	70.1	0.70
25.05.2022	8.92	21.62	9.92	25.63	9.27	22.76	46.7	74.1	0.65
26.05.2022	8.79	21.98	9.87	25.23	9.32	23.52	39.5	75.9	0.69

	SO_2	Nox	PM_{10}	$PM_{2.5}$	CO
	(Unit µg/m³)				
Max.	10.32	26.31	78.9	47.6	0.71
Min.	8.79	20.17	64.5	37.9	0.64
98%tile	10.22	26.2	78.6	47.3	0.7
95%tile	10.13	26.0	78.4	47.2	0.7

AMBIENT AIR QUALITY

Location: Panwari RF

Unit: µg/m³

Date	CLOCK HOURS								
	00-08		08-16		16-24		24 Hours	24 Hours	24 Hours
	SO_2	Nox	SO_2	NOx	SO_2	NOx	PM2.5	PM10	CO
5.03.2022	6.01	12.41	8.81	15.79	7.01	14.22	29.4	63.6	0.54
6.03.2022	6.52	12.92	9.02	15.41	8.12	14.03	34.9	63.3	0.55
12.03.2022	6.83	12.53	8.63	15.01	6.93	14.64	33.9	56.4	0.57
13.03.2022	5.59	12.44	9.44	15.42	7.24	14.59	27.7	63.9	0.56
19.03.2022	5.87	12.57	8.54	14.93	6.98	14.52	30.4	58.0	0.57
20.03.2022	5.40	12.62	8.92	14.91	7.79	14.06	36.9	59.0	0.58
26.03.2022	6.10	13.02	9.03	15.12	6.71	14.04	28.9	61.1	0.55
27.03.2022	6.70	12.71	8.47	15.52	6.32	14.37	30.3	60.4	0.57
2.04.2022	6.61	12.77	8.42	15.53	7.36	14.36	36.0	63.2	0.56
3.04.2022	6.63	12.72	8.83	14.84	7.04	13.53	30.8	64.3	0.59
9.04.2022	6.73	12.48	8.42	15.49	8.18	13.34	33.9	56.9	0.54
10.04.2022	6.03	12.29	9.24	15.57	7.12	13.69	28.1	62.3	0.56
16.04.2022	6.67	12.56	9.22	15.44	7.02	14.16	34.5	58.4	0.58
17.04.2022	5.65	12.25	8.83	14.96	8.13	14.45	34.2	58.8	0.55
23.04.2022	5.82	12.22	8.72	15.41	6.73	13.46	32.1	61.7	0.57
24.04.2022	6.82	12.53	9.33	15.21	8.23	14.07	29.3	58.4	0.54
30.04.2022	6.41	12.24	8.73	15.36	7.73	13.42	27.6	63.4	0.58
1.05.2022	5.32	12.73	8.92	15.89	7.80	14.31	27.7	57.7	0.59
6.05.2022	6.06	12.22	9.23	15.75	7.06	13.52	29.5	58.9	0.56
7.05.2022	5.45	13.03	8.72	14.88	6.50	13.93	38.7	62.8	0.58
13.05.2022	5.56	12.57	8.63	15.31	8.20	14.68	32.4	58.6	0.56
14.05.2022	6.76	12.79	9.22	14.95	7.65	13.89	31.9	65.4	0.54
20.05.2022	5.91	12.25	9.22	15.80	7.01	13.93	28.7	59.2	0.58
21.05.2022	6.72	12.23	9.43	15.36	6.51	13.13	31.9	61.2	0.54
27.05.2022	5.18	12.15	8.97	14.71	7.31	14.54	27.5	61.7	0.56
28.05.2022	6.40	12.67	9.06	15.62	7.22	14.22	33.0	60.0	0.53

	SO_2	Nox	PM_{10}	$PM_{2.5}$	CO
	(Unit µg/m³)				
Max.	9.44	15.89	65.4	38.7	0.59
Min.	5.18	12.15	56.4	27.5	0.53
98%tile	9.31	15.88	64.4	37.2	0.6
95%tile	9.23	15.52	64.2	36.7	0.6

AMBIENT AIR QUALITY

Location: Debari

Unit: µg/m³

Date	CLOCK HOURS								
	00-08		08-16		16-24		24 Hours	24 Hours	24 Hours
	SO_2	Nox	SO_2	NOx	SO_2	NOx	$PM_{2.5}$	PM_{10}	CO
03.03.2022	8.71	16.51	10.11	19.91	9.41	19.21	39.0	72.0	0.56
04.03.2022	8.81	17.72	9.62	19.82	9.43	19.22	43.4	72.0	0.55
10.03.2022	8.92	17.63	10.63	20.51	9.56	18.12	41.4	70.5	0.57
11.03.2022	8.86	16.63	9.76	21.02	9.29	18.44	45.2	71.9	0.58
17.03.2022	9.04	16.93	10.31	19.85	9.37	19.46	42.3	73.6	0.59
18.03.2022	9.02	17.45	10.64	20.10	9.56	18.59	41.7	67.2	0.60
24.03.2022	8.86	18.26	9.78	20.70	9.27	18.83	39.3	67.3	0.62
25.03.2022	8.92	17.12	9.68	20.30	9.35	18.13	37.4	67.7	0.61
01.04.2022	8.86	16.42	10.50	20.90	9.56	19.57	41.0	74.0	0.63
02.04.2022	8.92	18.13	10.05	21.09	9.23	19.16	37.5	67.7	0.61
07.04.2022	8.73	17.62	9.80	20.50	9.58	18.22	42.0	64.9	0.59
08.04.2022	9.0	16.53	9.65	19.61	9.23	19.06	43.4	69.0	0.57
14.04.2022	8.92	16.82	10.35	19.92	9.52	18.91	37.5	74.7	0.55
15.04.2022	8.81	16.27	9.86	20.63	9.13	19.42	38.5	74.1	0.56
21.04.2022	8.80	18.02	9.65	20.57	9.52	19.46	41.2	66.7	0.58
22.04.2022	8.80	16.82	10.21	20.98	9.12	18.86	39.5	68.9	0.60
28.04.2022	8.90	16.82	9.72	20.66	9.33	18.28	41.5	76.6	0.62
29.04.2022	8.91	18.12	9.92	20.712	9.44	18.35	42.0	69.5	0.61
04.05.2022	8.90	17.73	10.53	19.72	9.48	18.86	40.4	67.4	0.59
05.05.2022	8.80	17.12	10.42	20.92	9.59	18.76	40.4	70.1	0.57
11.05.2022	8.81	17.22	10.72	20.71	9.12	18.26	41.3	74.3	0.64
12.05.2022	8.81	17.02	10.52	20.51	9.56	18.46	38.0	68.1	0.61
18.05.2022	8.92	17.72	10.67	20.087	9.42	18.42	42.3	73.9	0.63
19.05.2022	8.89	16.61	9.80	19.78	9.55	19.62	41.1	75.3	0.61
25.05.2022	8.92	17.65	10.02	19.78	9.52	18.21	39.5	68.4	0.59
26.05.2022	8.91	17.78	9.90	20.99	9.23	19.26	36.8	69.0	0.60

	SO_2	Nox	PM_{10}	$PM_{2.5}$	CO
	(Unit µg/m³)				
Max.	10.67	21.09	76.6	45.2	0.64
Min.	8.71	16.27	64.9	36.8	0.55
98%tile	10.62	20.91	75.92	43.85	0.63
95%tile	10.52	20.73	75.16	43.41	0.63

AMBIENT AIR QUALITY

Location: Pratapnagar Udaipur

Unit: µg/m³

Date	CLOCK HOURS								
	00-08		08-16		16-24		24 Hours	24 Hours	24 Hours
	SO_2	Nox	SO_2	NOx	SO_2	NOx	PM2.5	PM10	CO
5.03.2022	9.81	23.20	10.31	27.34	10.62	25.30	48.4	85.5	0.69
6.03.2022	9.42	21.31	10.12	27.01	9.76	24.01	54.2	79.5	0.71
12.03.2022	9.63	23.22	11.33	26.12	9.66	24.85	52.5	85.6	0.73
13.03.2022	9.97	21.93	10.86	26.83	9.72	23.72	48.9	80.3	0.72
19.03.2022	9.56	21.86	10.823	26.76	10.02	23.93	56.1	79.4	0.70
20.03.2022	9.69	21.08	10.43	25.974	10.32	24.93	52.6	84.9	0.74
26.03.2022	9.53	22.263	10.42	25.78	10.22	23.57	48.5	81.5	0.76
27.03.2022	9.62	22.26	10.33	27.09	10.42	25.39	50.2	81.7	0.75
2.04.2022	9.53	22.82	11.32	26.22	10.42	25.12	47.8	83.2	0.77
3.04.2022	9.82	22.13	10.73	26.44	10.61	23.82	48.6	84.0	0.69
9.04.2022	9.93	22.68	10.32	26.95	9.70	23.53	56.0	78.6	0.71
10.04.2022	9.83	22.63	10.72	25.36	10.31	23.37	50.2	83.9	0.75
16.04.2022	9.52	21.42	11.13	26.52	9.91	25.02	50.2	79.8	0.77
17.04.2022	9.04	23.42	11.12	26.06	9.61	24.33	46.9	79.2	0.73
23.04.2022	9.82	23.52	11.02	26.52	10.51	23.20	48.4	79.8	0.70
24.04.2022	9.23	21.44	11.45	25.86	10.16	25.12	53.3	85.9	0.73
30.04.2022	9.22	22.19	10.82	26.12	10.32	23.82	53.8	79.1	0.78
1.05.2022	9.62	22.23	10.43	26.02	9.73	24.42	47.7	84.0	0.74
6.05.2022	9.44	22.92	10.44	26.56	10.31	23.43	47.8	79.7	0.75
7.05.2022	9.50	22.41	10.66	25.62	10.12	23.91	54.6	82.9	0.69
13.05.2022	9.68	23.46	11.19	26.96	10.02	24.62	54.4	84.4	0.76
14.05.2022	10.00	21.39	10.42	25.96	9.72	25.23	54.6	82.5	0.68
20.05.2022	9.765	21.712	11.22	26.23	10.07	24.93	51.1	84.8	0.69
21.05.2022	9.60	23.85	11.26	26.46	10.08	23.73	54.0	83.4	0.77
27.05.2022	9.90	22.46	10.33	26.83	10.29	23.82	56.5	79.4	0.73
28.05.2022	9.90	21.42	10.42	25.43	10.42	25.02	53.0	82.3	0.76

	SO_2	Nox	PM_{10}	$PM_{2.5}$	CO
	(Unit µg/m³)				
Max.	11.45	27.34	85.9	56.5	0.78
Min.	9.04	21.08	78.6	46.9	0.68
98%tile	11.32	26.97	85.69	56.13	0.77
95%tile	11.21	26.72	85.55	56.09	0.77

AMBIENT AIR QUALITY

Location: Lakarwas

Unit: µg/m³

Date	CLOCK HOURS								
	00-08		08-16		16-24		24 Hours	24 Hours	24 Hours
	SO_2	Nox	SO_2	NOx	SO_2	NOx	$PM_{2.5}$	PM_{10}	CO
03.03.2022	8.81	16.92	10.25	19.82	9.61	18.82	38.4	65.7	0.57
04.03.2022	9.12	16.93	9.32	20.52	9.82	18.31	34.2	67.8	0.59
10.03.2022	9.13	17.33	10.023	19.92	9.73	17.46	35.7	57.6	0.61
11.03.2022	8.91	16.53	9.59	19.53	9.82	18.43	38.0	62.9	0.60
17.03.2022	8.87	16.72	9.86	19.81	9.85	18.53	36.6	66.3	0.58
18.03.2022	9.02	17.02	10.03	19.94	9.65	18.76	35.1	58.3	0.63
24.03.2022	9.12	17.44	9.22	20.52	9.70	18.45	35.5	66.4	0.64
25.03.2022	8.92	16.49	9.19	19.12	9.705	17.56	38.9	59.5	0.62
01.04.2022	8.93	16.91	9.39	19.63	9.40	18.48	37.9	63.0	0.58
02.04.2022	8.92	16.83	10.09	20.36	9.83	17.46	38.2	63.3	0.60
07.04.2022	8.82	16.692	10.09	20.32	9.42	17.16	37.5	63.8	0.65
08.04.2022	9.00	17.51	9.49	19.83	9.70	17.42	35.5	65.5	0.59
14.04.2022	9.12	16.83	9.489	19.03	9.70	17.43	37.3	61.0	0.62
15.04.2022	9.00	17.01	9.48	19.96	9.43	17.81	35.4	67.2	0.63
21.04.2022	9.20	17.42	9.98	19.13	9.52	17.23	36.7	58.4	0.64
22.04.2022	9.12	16.70	9.32	19.26	9.25	18.32	38.2	64.9	6.59
28.04.2022	9.23	17.22	10.10	20.13	9.65	18.23	34.7	66.0	0.61
29.04.2022	8.92	17.20	10.12	19.33	9.59	17.72	36.0	61.2	0.62
04.05.2022	9.10	16.43	9.21	20.43	9.65	18.33	34.8	62.5	0.64
05.05.2022	9.10	16.40	9.32	19.73	9.35	17.42	34.7	66.0	0.60
11.05.2022	9.12	16.80	9.73	19.63	9.69	17.53	38.5	58.3	0.63
12.05.2022	9.10	17.21	9.52	19.63	9.79	17.52	37.0	59.9	0.65
18.05.2022	9.17	16.22	9.41	19.13	9.39	18.63	38.7	66.6	0.58
19.05.2022	9.06	16.30	9.21	20.34	9.36	17.72	35.9	59.6	0.61
25.05.2022	9.19	17.337	10.03	19.78	9.35	17.53	37.9	62.0	0.60
26.05.2022	8.77	16.44	9.41	20.36	9.70	17.12	37.4	61.0	0.59

	SO_2	Nox	PM_{10}	$PM_{2.5}$	CO
	(Unit µg/m³)				
Max.	10.25	20.52	67.8	38.9	0.65
Min.	8.77	16.22	57.6	34.2	0.57
98%tile	10.12	20.31	67.38	38.75	0.64
95%tile	10.01	20.17	67.07	38.63	0.64

AMBIENT AIR QUALITY

Location: Gowla

Unit: µg/m³

Date	CLOCK HOURS								
	00-08		08-16		16-24		24 Hours	24 Hours	24 Hours
	SO_2	Nox	SO_2	NOx	SO_2	NOx	PM2.5	PM10	CO
5.03.2022	9.71	18.60	10.42	21.42	9.71	20.71	38.3	69.1	0.62
6.03.2022	9.52	17.40	10.32	21.92	9.92	19.82	36.5	61.8	0.66
12.03.2022	9.53	19.21	10.22	21.23	9.93	20.22	38.7	68.4	0.63
13.03.2022	9.76	18.10	10.13	22.32	10.02	20.03	38.3	73.9	0.62
19.03.2022	9.24	17.51	10.83	21.23	9.93	20.12	37.7	63.5	0.65
20.03.2022	9.22	19.21	10.63	21.24	9.82	19.91	38.9	63.4	0.69
26.03.2022	9.73	17.72	10.23	21.13	9.93	20.62	35.9	69.1	0.67
27.03.2022	9.34	18.11	10.23	22.03	9.72	20.12	37.9	69.6	0.62
2.04.2022	9.32	18.91	10.93	22.83	9.83	20.62	37.7	62.1	0.65
3.04.2022	9.43	17.01	10.24	22.84	9.92	19.23	36.5	72.8	0.66
9.04.2022	9.72	19.11	10.32	21.00	9.83	19.12	35.7	73.3	0.64
10.04.2022	9.83	18.86	10.22	21.22	10.02	20.81	36.1	61.6	0.68
16.04.2022	9.13	18.06	10.52	21.12	9.93	20.85	35.9	69.8	0.70
17.04.2022	9.52	19.16	11.03	20.92	9.82	20.32	36.4	71.2	0.63
23.04.2022	9.52	17.06	10.53	21.02	9.90	19.43	36.1	67.5	0.67
24.04.2022	9.22	18.66	10.75	21.13	9.92	19.55	37.4	68.7	0.65
30.04.2022	9.44	18.47	10.56	21.33	9.90	20.02	36.4	72.6	0.64
1.05.2022	9.75	19.17	10.76	21.86	9.72	20.53	35.5	63.7	0.66
6.05.2022	9.60	18.47	10.54	22.43	9.70	19.60	39.2	70.2	0.62
7.05.2022	9.50	17.88	10.65	21.32	9.92	20.02	37.4	66.1	0.68
13.05.2022	9.50	17.78	10.33	21.63	9.93	19.10	37.8	61.3	0.63
14.05.2022	9.81	17.68	10.63	22.48	9.82	20.50	38.4	70.8	0.66
20.05.2022	9.32	17.68	10.82	22.60	10.00	20.30	35.4	71.3	0.68
21.05.2022	9.32	18.58	10.82	22.43	9.93	20.90	37.7	69.9	0.64
27.05.2022	9.29	19.18	10.12	22.52	9.70	20.50	35.2	63.8	0.61
28.05.2022	9.32	17.99	10.83	21.70	9.94	19.30	38.5	72.3	0.7

	SO_2	Nox	PM_{10}	$PM_{2.5}$	CO
	(Unit µg/m³)				
Max.	11.03	22.84	73.9	38.9	0.70
Min.	9.13	17.0	61.3	35.2	0.61
98%tile	10.90	22.52	73.50	39.42	0.69
95%tile	10.28	22.35	73.19	39.06	0.69

0-2km

Sno	Name	No_HH	Total Population	Total Male Population	Total Female Population	Sex Ratio	Child Population below 6	Male below 6	Female below 6	Child Sex Ratio	SC population	SC Male	SC Female	ST Population	ST Male	ST Female	Literacy population	Male Literacy population	Female Literacy population	Literacy Rate	Male Literacy Rate	Female Literacy Rate	Total Workers	Workers Rate	Main Workers	Main Workers Rate	Marginal Workers	Marginal Workers Rate	NonWorkers_P	Non Workers Rate
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
13	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

2-7km

Sno	Name	No_HH	Total Population	Total Male Population	Total Female Population	Sex Ratio	Child Population below 6	Male below 6	Female below 6	Child Sex Ratio	SC population	SC Male	SC Female	ST Population	ST Male	ST Female	Literacy population	Male Literacy population	Female Literacy population	Literacy Rate	Male Literacy Rate	Female Literacy Rate	Total Workers	Workers Rate	Main Workers	Main Workers Rate	Marginal Workers	Marginal Workers Rate	NonWorkers_P	Non Workers Rate
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
13	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
14	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
16	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
17	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
18	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
19	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
20	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
21	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
23	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
24	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
25	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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27	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
28	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

7-20km

Sno	Name	No_HH	Total Population	Total Male Population	Total Female Population	Sex Ratio	Child Population below 6	Male below 6	Female below 6	Child Sex Ratio	SC population	SC Male	SC Female	ST Population	ST Male	ST Female	Literacy population	Male Literacy population	Female Literacy population	Literacy Rate	Male Literacy Rate	Female Literacy Rate	Total Workers	Workers Rate	Main Workers	Main Workers Rate	Marginal Workers	Marginal Workers Rate	NonWorkers_P	Non Workers Rate
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
13	Udaipur (M Cl)	[illegible]	451100	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
14	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
16	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
17	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
18	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
19	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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	Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Grand total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

TEAM TEST HOUSE

(Unit of Team Institute of Science & Technology Pvt. Ltd.)

Approved by Ministry of Environment and Forest, Government of India as Environmental Laboratory

RSPCB ISO 9001:2015, ISO 14001:2015, ISO 45001:2018 (OH&S) JDA/UDH

Office : E-65, Chitranjan Marg, C-Scheme, Jaipur - 302001, Rajasthan
Phone : +91 6377210064, 9414077379,
Website : www.teamtesthouse.com
Email : team.bdhead@gmail.com

Laboratory : G1-584, RIICO Industrial Area, Sitapura, Jaipur - 302022, Rajasthan
Phone : +91 9460222039, 9460222049,
Email : director@teamtesthouse.com,
Email : marketinglab@teamtesthouse.com

TEST REPORT

Report No./ ULR No. :	TTH/SA/HZL/ZSD/2	Date :	19-10-2022
Issued To :	M/S Hindustan Zinc Limited (Debari Zinc Smelter) PO : Zinc Smelter District Udaipur (Rajasthan)	Type of Unit :	Smelter
Type of Sample :	Toxicity Characteristic Leaching Procedure(TCLP)	Date of Sample Collection/Monitoring :	15-10-2022
Point of Collection	MCTP Slag	Date of Receipt :	17-10-2022
Date of Test/Analysis:	17-10-2022 to 18-10-2022	Sampling Plan :	Not Available
Quantity of Sample :	1 Kg	Sample Collected By :	Mr. Vimal Kumar
Unit's representative:	Ms. Navodita Shaktawat	Condition of Sample :	Fit for testing

RESULTS

S.No	Parameters	Observed Value	Testing Protocol
1	Zinc [mg/l]	132	
2	Lead [mg/l]	4.27	USEPA 1311 (TCLP)
3	Copper [mg/l]	0.67	
4	Cadmium [mg/l]	0.37	APHA 2017 : 3111 B
5	Nickel [mg/l]	0.31	(Metals)
6	Manganese [mg/l]	2.17	
7	Cobalt [mg/l]	41.6	
8	Iron [mg/l]	5.09	

Notes :-

The results listed refer only to the tested sample (s) & parameters (s). Endorsement of products is neither inferred nor implied.

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The samples will be destroyed after 15 days from the date of issue of test report unless otherwise specified.

Pawan Mal Yogi
Senior Analyst

Rajesh Maheshwari
Authorized Signatory

(Report No: TTH/SA/HZL/ZSD/02)

Status of Implementation of commitments made during last Public Hearing Conducted on dated 30.04.2007 for the expansion of Zinc production from 80,000 TPA to 1,00,000 TPA within the premises of Debari Zinc Smelter

S. NO.	Issues raised during PH	Reply of Hindustan Zinc	Status of implementation
1.	Survey should be done in the farms and wells of eastern villages (Bichhadi, Godwa, Gadwa Village)	Engaged a reputed agency viz. M/s Hydro Geosurvey Consultants Private Limited for conducting studies on Hydrology, Hydrogeology and Geology of core and buffer zones of Debari Zinc Smelter. In the study, samples of soil, surface water and ground water have been collected from different locations in the core zone as well as buffer zone. Results have indicated that heavy metals in the study zones are within the permissible range. These findings are being thoroughly pondered over & critically examined by our technical team.	Implemented
2.	Leakages from old Jarosite ponds	There is no such leakage from the old ponds and these are very much intact. These old Jarosite ponds were constructed way back in 1982-83. However, being environment friendly and proactive, we chalked out an effective action plan and implemented the same to address the leakage problem in anticipation. Under that activity, 20 m holes were drilled in the downstream of Jarosite pond and pressure grouting was done using cement and bentonite. Report of the same has been submitted to and the same was verified by the Rajasthan State Pollution Control Board, Udaipur on 25th August 2006. Ground water is being monitored regularly and the monitoring data does not indicate any adverse impact to the underground water	Implemented
3.	Locations of soil samples collected by Hindustan Zinc for REIA study are not spelled out in the presentation	All the locations, where soil sampling was done, clearly indicated in the earlier REIA report and the same has also been included in the comprehensive EIA report	Implemented
4.	Independent and unbiased investigations should be conducted by an independent agency like some university or other national level agency to ascertain the soil and water pollution in the surrounding villages.	Hindustan Zinc Limited engaged a well-reputed agency, M/s Hydro-Geosurvey consultants Pvt. Ltd. For conducting studies on Hydrology, Hydrogeology and Geology of core and buffer zones of Debari Zinc Smelter. In this study, samples of soil, surface water and ground water have been collected from the core and the buffer zones. Results have indicated that by and large heavy metals in the study zones are within the permissible range. These finding are being thoroughly pondered over and critically examined by our technical team.	Implemented

S. NO.	Issues raised during PH	Reply of Hindustan Zinc	Status of implementation
5.	Hand pumps in about 25-30 villages in the downside of Hindustan Zinc and near Berach river have been spoiled and need investigations	Detailed hydrological studies, conducted subsequent to the Public Hearing at these locations, have indicated the presence of heavy metals well within the permissible levels. However, periodical monitoring of water and soil of the surrounding villages is going on continuous basis.	Implemented
6.	Essential safety information on SO_2 and NOx controls is missing in the report.	Chapter 3 of the REIA report already gives clearly the baseline data and in the next chapters elaborate information on its impact and management has been given. The same has also been included in the comprehensive EIA Report.	Implemented
7.	Zinc is such metal, which proves to be poisonous, if its concentration exceeds the standard norms in soil and water. If it is emitted outside the plant, its impact and management have been ignored.	We will ensure that it will not go outside our plant.	Being implemented
8.	There is no information on the existing SO_2 levels and levels due to expansion.	This information has been given in EIA report and SO_2 emission level will be less than 2 kg per tonne of acid production, whereas, the permitted SO_2 emission level by Indian Government is 4 kg per tonne of acid production.	Being implemented (Now SO_2 emission from stack is being maintained as per prescribed limit of 950 mg/NM3 & 1.5 kg/Ton of 100 percent concentrated acid produced from acid plant.)
9.	Presence of cadmium in drinking water is more sensitive than zinc and still the report is silent on its emission, concentration of cadmium and its remedial measures.	All relevant information is available in the report. If you are not able to get it, you may contact our environment officers and all information will be provided to you. We are fully vigilant towards the environment and do not tolerate any kind of pollution. We never want that the people in the surroundings should suffer due to environment pollution, and it is our commitment.	Being implemented

-x-x-x-x-x-

Energy Carbon Management Plan

Zinc Smelter Debari

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HINDUSTAN ZINC

Document published on: 15th March 2023.

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ZSD Energy Carbon Management Plan

Zinc Smelter Debari is the Zinc producing plant in India where zinc can be produced using hydrometallurgical processes, depending on the type of concentrate used as charge. power is the main input which are responsible for GHG emissions. A lot of amounts of heat and flue gases are generated in different processes of zinc manufacturing. There is high scope in utilizing the heat and flue gases to reduce the energy consumption in turn GHG gas emissions. Lot of work has been done and many projects have been completed, Energy saving projects, utilization of heat of gases. Still there is lot of scope in utilizing heat and reduction in energy consumption. In 2017-18 the total emissions were 320798 tCO2e and specific emissions 3.99 tCO2e per ton of metal. In 2022-23 till feb'23 the total emissions were decreased to 233650 tCO2e and specific emissions decrease 2.99 tCO2e per ton of metal till Feb 2023 In the financial year FY'23. total emission and specific emission decreases due to energy saving and other emission reduction projects.

ZSD has taken target of reduction in specific emission FY 2024-25 is 2.86 tCo2e, which is 28% reduction against its baseline 2017-18 in the terms of absolute emission. ZSD will be achieved this target well before the completion of the target baseline.

We will also seek to further assess and reduction in our scope 3 emissions

1. INTRODUCTION OF ZSD PLANT

HZL manufactures zinc as main product at its Debari smelting unit in Rajasthan. Zinc smelting is the process of converting zinc concentrates into pure zinc. Zinc Smelter Debari Unit is a smelting unit of Hindustan Zinc Limited, which mainly produces hydro metallurgical zinc.

This factory was commissioned in the year 1968 and established Hydrometallurgical smelter is designed to produce 100000 TPA, which is special high grade zinc ingot. This process is based on roaster, leaching &electro waning process.

Zinc Smelter Debari has power generating capacity of 8 MW from the Waste Heat Recovery and 12 MW AC of solar power capacity.

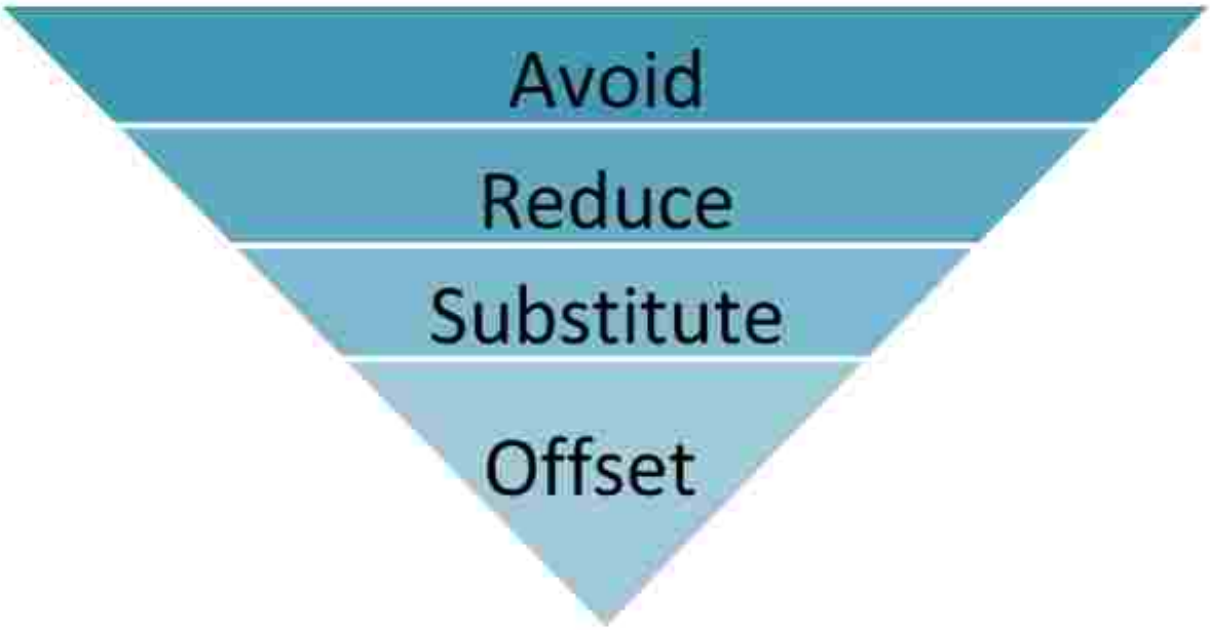
2. Greenhouse Gas Management

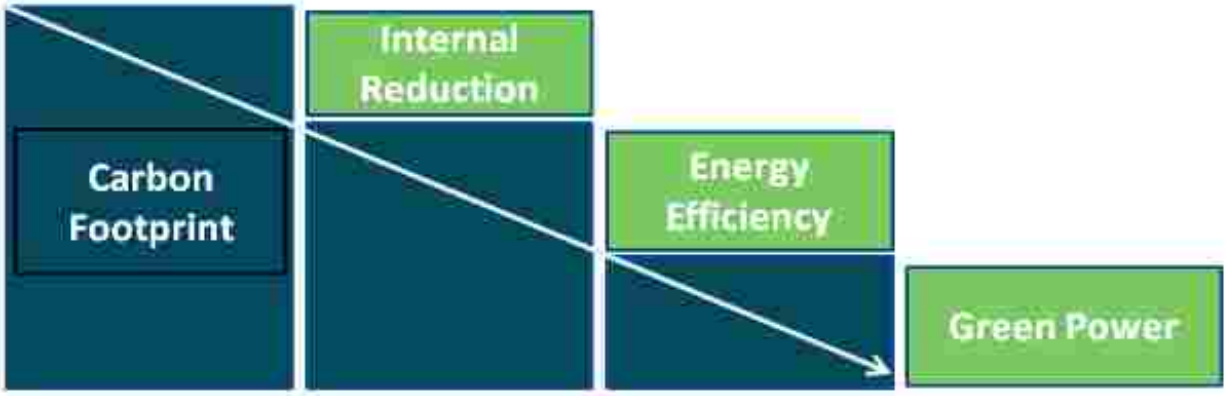
2.1 Context and drivers

We are focused on accelerating actions to lower carbon emissions generated during our operations. Our environmental conservation efforts are driven by a strategic thrust on minimizing and mitigating our impact on water, land, air quality, climate, and biodiversity. We are also committed to building harmonious relations with our stakeholders, to reduce the environmental footprint of our operations by deploying resource management systems and controls.

GHG management plan identifies the organization's current carbon emissions and a logical series of technical and managerial steps that must be taken to arrive at the required reduction target.

Avoiding use of fossil fuels and reducing dependency on them shall play a vital role in our net zero journey, substituting the conventional energy use by renewable energy and offsetting the greenhouse gas being emitted by sequestering techniques such as afforestation.





- A wide range of INDIA programs, regulation and guidance now exist that encourage all sectors of society to reduce carbon emissions like REC, RPO, PAT incentives for the renewable energy plants and efficiency improvement.

- We believe in creating long term value for our stakeholders and with stakeholders and communities we work with becoming climate conscious, responsible business becomes our priority.

- In line with becoming a sustainable business organization we have to reduce our energy consumption and move away from conventional energy sources to renewable energy sources. It has to be noted that carbon management shall yield financial savings too and can be achieved by using techniques such as utilizing waste heat.

Zinc Smelter Debari

- This would also help reduce ZSD's financial liability to purchase REC under the RPO regulation of state government of Rajasthan.

- We believe that measures aimed at reduction of GHG emissions have the potential for Climate Change reduction and ZSD acts as a leader for other units of HZL in delivering carbon emission reductions.

- We understand the reputational risk associated with climate change and GHG emissions and hence we are determined to reduce our emissions and strive towards a Net Zero journey by 2050 as envisaged by HZL.

- A target is set for the HZL to reduce 0.5 Mnt Co2 by 2025 against a 2017-18 baseline, all units of HZL are required to produce an Energy Carbon Management Plan showing how it will contribute to achieving this Target.

- Long term rises in utility costs would increase ZSD's operating costs. Thus, it is important to analyze opportunities for increased efficiency in the use of energy.

- ZSD should discharge it corporate responsibility, in part by contributing to HZL targets to reduce Green House Gas emissions.

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Energy and Climate Change Management Policy

Hindustan Zinc acknowledges the global concern on climate change and recognizes that concerted and sustained global action is required to reduce the scale of the problem and to adapt to its impacts. Hindustan Zinc is committed to this effort through its own progressive Energy and Climate Change programme that forms an integral part of our vision for sustainable development and is consistent with our overall business vision and mission.

Hindustan Zinc will:

Reduce carbon footprint

- adopt and maintain global best practices on climate change and energy management and minimising greenhouse gas emissions throughout our operations. We will continue to measure our direct energy usage and carbon emissions and maintain our year-on-year efforts to reduce energy consumption across our operations.
- set emission reduction targets that maximise the benefits of process improvements and technological advances and reduce our operational greenhouse gas emissions in line with limiting global warming to 1.5°C
- invest in clean energy and maximise benefits from waste energy recovery.
- consider carbon emissions minimization for our project and R&D investments.
- integrate climate change considerations into our strategic approach, including the adaptation of carbon pricing or similar mechanisms into our investment decision-making.

Engage stakeholders

- communicate our approach and achievements actively to stakeholders and work closely with policy makers to encourage effective and equitable abatement policies within our sectors of operation.
- periodically measure, monitor and report to all relevant stakeholders on our greenhouse gas emissions in compliance with the internationally recognised protocols and working closely with other stakeholders to reduce energy consumption and carbon intensity.
- Foster research and innovatory techniques within our operations leading to optimal utilisation of resources with continuous focus on minimising specific energy consumption in all our operations. We will seek to use our leading position within the geographies that we operate to act as an advocate of effective energy and climate change management.
- Work with our staff, wider communities and other stakeholders to demonstrate our commitment to greenhouse gas emission reduction principles and practices.

Influencing Supply Chain

- Communicating our policies and creating awareness.
- Mandatory criteria in procurement procedures.

Adapting to Climate Change

- Screening and assessing risk of climate change on our activities.
- Provide adaption and future-proofing of our facilities.

This policy is part of the Vedanta Sustainability Framework and Hindustan Zinc shall implement this policy and its related technical and performance standards. Business leaders will be held accountable for energy and carbon performance and line managers are responsible for the full implementation of the related energy and carbon standards. We will measure and report performance on a periodic basis to ensure ongoing management of energy and carbon including the sharing of good practices throughout the Hindustan Zinc. The content and implementation of this policy will be reviewed periodically.

Date: 05th July, 2022

Arun Misra
CEO & Whole Time Director, HZL

www.hzlindia.com

Zinc Smelter Debari

2.2 VISION:

The vision will be achieved through implementation of the measures outlined in the Carbon Management Plan. We envisage a low-carbon environment in which:

- Adopt and maintain global approaches on carbon and energy management to reduce our specific greenhouse gas emissions throughout our operations, including:
  - Measuring our direct energy usage and carbon emissions and maintaining our year-on-year efforts to reduce energy consumption across our operations.
  - Defining specific energy and carbon reduction targets, seeking to achieve substantial decarbonization of our business by 2050.
  - Maximizing the benefits of process improvements and technological advancements.
  - Integrating climate change considerations into our strategic approach, including the adaptation of carbon pricing or similar mechanisms into our investment decision-making.
- Extend our approach to reporting carbon emissions in compliance with internationally recognized protocols.
- Invest in clean energy and energy recovery projects.
- Engage with stakeholders and provide for adaptation to future-proof our business.
- Communicate our approach and achievements actively to stakeholders and work closely with policymakers to encourage effective and equitable abatement policies within our sectors of operation.
- Consider carbon emissions for our project and R&D investments in line with Vedanta's sustainable development commitments.

2.3 Objectives and strategy

This Carbon Management Plan is prepared for achieving the targeted emission reduction at ZSD. The CMP is also made in line with the Energy and Climate Change Management policy of HZL. Energy and carbon assessment being carried out once in a year.

The strategic objectives of the CMP are to:

- Evaluate opportunities to improve energy efficiencies or implement lower emissions sources.
- Achieve science based GHG emission targets through impactful actions.
- Reduce carbon footprint by enhancing renewable energy portfolio.
- Set challenging but achievable carbon reduction targets over the medium and long term.
- Develop systems to ensure that accurate data and reporting tools are available.
- Measure the Company's performance against milestones and report to all stakeholders.

- Sonority of approach with the HZL's policy framework, particularly the Energy and Climate change management policy.
- Plays important role in achieving HZL's targets.
- Achieve reduction in cost of product.

Net Zero Strategy

- Our net zero strategy is in line with Reducing fossil fuel-based energy use in our operations by using innovative energy efficiency technologies and process optimization.
- Shifting to renewables and/ or low-carbon solutions where possible.
- Replace diesel fueled transportation vehicles with Electric vehicles, install Hydrogen or Electric/ Induction Furnaces, enhance our carbon Capture, Storage and Utilization capacity etc.
- Climate Change risk assessment based on TCFD guidelines.
- Increasing current rating of cell house lead to GHG emission saving of 2495.7 tCO2e till feb'23
- Plantation activities undertaken at ZSD plant will also contribute to carbon sequestration over a long run.
- 1 Electric Forklifts introduced in Business partner operations in ZSD, going ahead more electric vehicles are being explored .this will lead to scope 3 emission reduction.
- We have installed 12MW capacity Solar plant. Capacity of which will be increased to 20 MW.
- 72KW capacity Solar Roof Top Project at different locations of ZSD plant.
- As a part of long-term Net zero strategy additional 450 MW Renewable energy to be procured in HZL which will replace by FY26.
- Approx 10 MW WHRB will also be installed at ZSD for R-6 project.
- As a part of long-term Net zero strategy 83% Renewable energy will use against the actual requirement for R-6.
- As a part of our net Zero Strategy HZL introduce the EV vehicle policy for employees.

ZSD Scope 1 , 2 and 3 emissions contributing factors are as follows:

Scope 1 – Direct emissions
Fuels burnt HSD – Diesel at DG sets (production of electricity)
Fuels burnt LDO – for Process
Fuels burnt LDO – for Process(ZE)
Scope 2 – Emissions associated with the use of electricity
Electricity purchased from AVVNL & sister company
Scope 3 – Indirect emissions
Transport of material – cathodes, finished, goods, coal, concentrate
Bus travel of employees

Scope 1 & 2 Emissions Baseline and Projections

3.1 Scope

ZSD's initial Carbon Management Strategy and Implementation Plan focused on energy, Fossil fuel and coal used, Utilization of waste heat and flue gases, reduction in energy of Cell house, Sinter and Refinery. However, this new plan extends the scope to include all areas of ZSD.

3.2 Baseline

We have calculated that our Scope 1 and 2 emissions in 2017-18 as

Scope	2017-18	
Scope 1 (tCO2e)	3380	1.06%
Scope 2 (tCO2e)	317418	98.94%
Total emission (tCO2e)	320798	
Production (MT)	80433	

ZSD's carbon emissions in FY 2017-18 had reported 3380 tones CO_2e in scope1 and 317418 tones CO2e in Scope 2. This had taken as base line.

3.3 Emissions since FY 2017-18

The table below indicates the Scope 1 and 2 emissions being produced across the entire ZSD. The emissions have been calculated on power and fuel consumption basis.

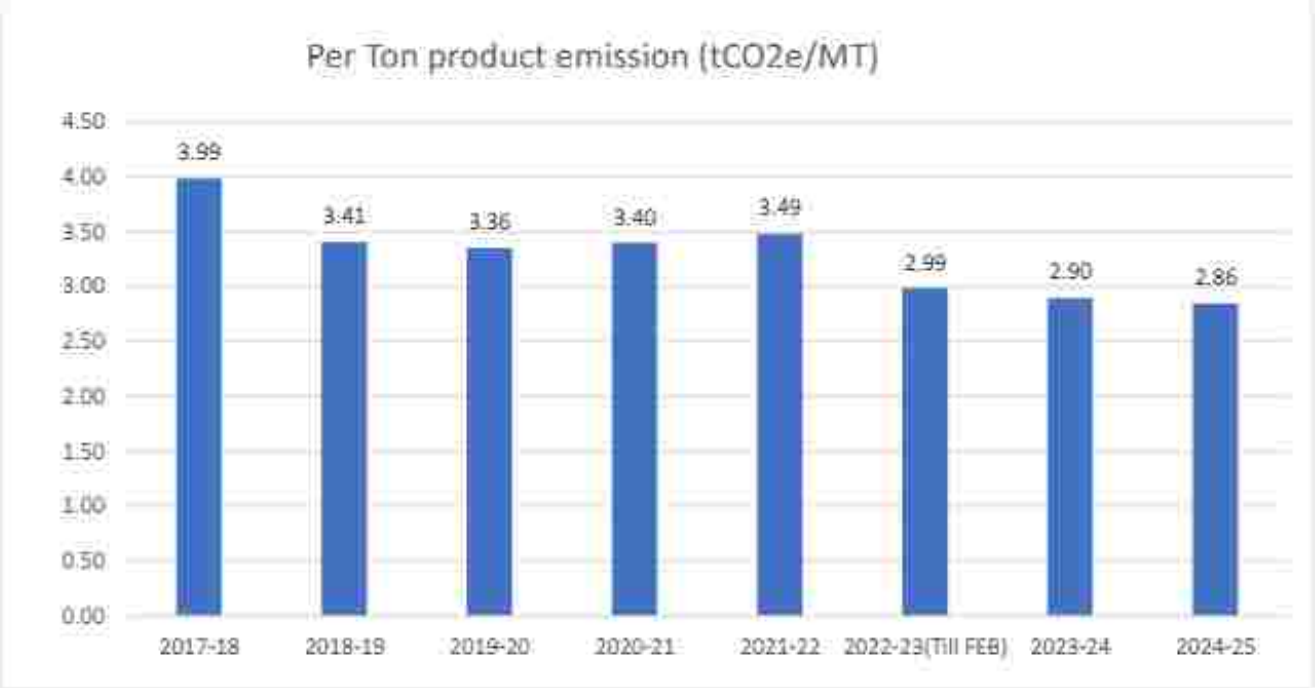
	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23(Till FEB)	2023-24	2024-25
Scope 1 (tCO2e)	3380	9378	5201	2573	3697	4424	3181	3390
Scope 2 (tCO2e)	317418	233944	211571	242431	240791	229226	261081	289224
Total Emission (tCO2e)	320798	243322	216772	245003	244488	233650	264262	292614
Production MT	80433	71382	64558	71985	70145	78105	91129	102480
Per Ton product emission (tCO2e/MT)	**3.99**	**3.41**	**3.36**	**3.40**	**3.49**	**2.99**	**2.90**	**2.86**

GHG Emission as per Fuel Consumption: -

	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23(Till Feb)	2023-24	2024-25
HSD (tCo2e)	3254	6946	3782	684	64	780	0	0
LPG/Propane (tCO2e)	126	135	132	173	167	160	190	200
LDO (tCO2e)	0	297	1287	1716	3466	3484	2991	3190
Wheeled Electricity (tCO2e)	285557	207653.9	162180	182793	178880	56114	187206	210524
Purchased Electricity (tCo2e)	31859	26290	49391	59638	61910	173112	73676	78700
Total (tCO2e)	320798	243322	216772	245003	244487	233650	264262	292614

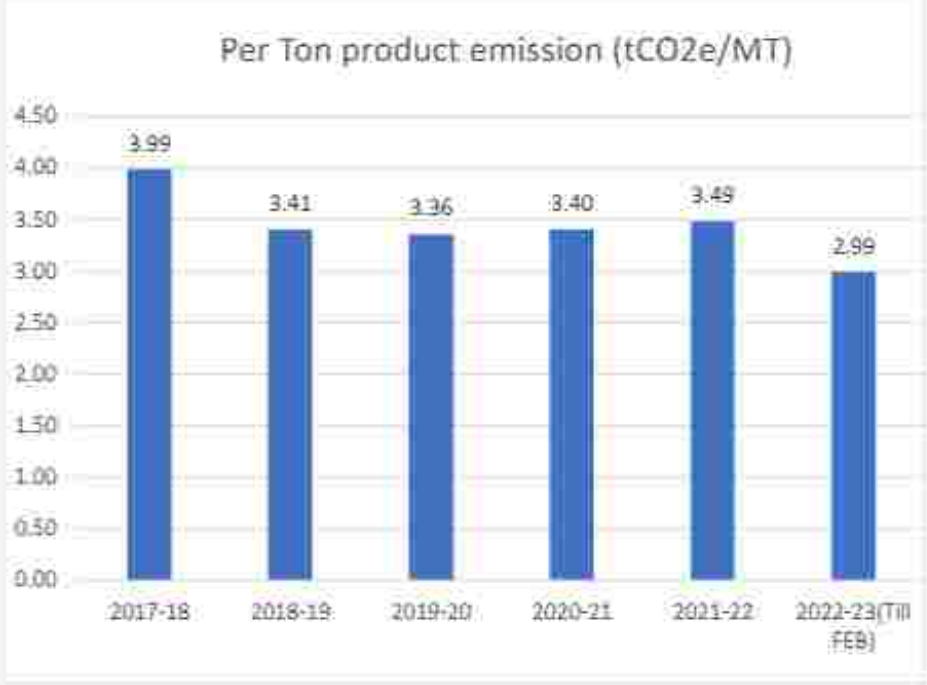
3.4 Targets

A target is set for the HZL to save 0.5 Mnt Co2 from base year 2017-18 . In line with the same the target of ZSD is set to reduce the Scope 1 and 2 absolute emissions to 2.86 tCo2e/MT by 2024-25 against 2017-18 baseline.



Achievement till 2022-23: -

In 2017-18 the total emissions were 320798 tCO2e and specific emissions 3.99 tCO2e per ton of metal. In 2022-23 till Feb'23 the total emissions were decreased to 233650 tCO2e and specific emissions achieved 2.99 tCO2e per ton of metal, which is 25 % reduction against the target 28 % total reduction by 2024-25 for ZSD . We will also seek to further assess and reduce our scope 3 emissions.



Scope 3 Emissions

The calculation of the Scope 3 emission is not possible unit wise due to constraint of the double counting. As material are inbound for some unit could be outbound for some other unit. The calculation of the Scope 3 Emission is being done at the company level.

4. Implementation Plan

4.1 Emission Reduction Opportunities

The purpose of this section of the plan is to list and priorities all of the opportunities identified for carbon emissions savings and sustainable practices which have been collected from suggestions made at brainstorming sessions/research & innovation was tailored to producing project opportunities that would either directly or indirectly reduce the carbon emissions from ZSD.

4.2 Energy and fuel saving projects past and ongoing

ZSD has been very active in the field of utility conservation for a long time. Many energy conservation and fuel saving projects has been done and in progress too.

Following carbon emission reduction project, we have implemented on site in FY 2021-22

Unit Name	List of Activity	GJ	Emission Reduction Tco2
DZS	Auto Operation of Mihir cooling tower	60.5	13.3
DZS	Removal of equilization pit pump by re-routing DM regeneration water	183.2	40.2
DZS	Installation of Solar extra plates	37.9	8.3
DZS	Rating improvement of cell house circuit	17950.7	3939.2
DZS	Reduce Idle running of ABPM 11/12	661	145
DZS	Stoppage of 05 Tank Agitator	23.3	5.1
DZS	Stoppage of 100 D/F Pump	307.6	67.5

Following carbon emission reduction project, we have implemented on site in FY 2022-23

Unit Name	List of Activity	GJ	Emission Reduction Tco2
DZS	Cellhouse Current rating improvement from 6.79 to 7.1	33,680.60	2,495.70
DZS	STG generation increment from 6.6 to 6.8	250.6	18.6
DZS	Filterate Pump Removal to send filtrate through Gravity	418.2	31
DZS	Optimization of Mist evaporator system	3,462.90	256.6
DZS	ZE cooler motor rating reduction from 22 to 15 kw	311	23
DZS	300D Pump motor size reduction from 55KW to 5.5KW	10.7	0.8

Following carbon emission reduction project, we have implemented on site in FY 2023-24

Unit Name	List of Activity	Gj	Estimated GHG reduction tCo2e
DZS	Re-designing of reactor agitator from 75 to 55 KW motor 27 & 28	947	215.69
DZS	Installation of VFD in CT-1 Fan R-3	263	59.83
DZS	Practice of solar panel Cleaning from manual mode to automatic mode (1% increment in solar generation)	657	149.57
DZS	Rectifier-1 Efficiency improvement by 0.5%	1754	399.52
DZS	Cellhouse Current rating improvement from 7.02 to Year Average Rating of 7.28	43844	9986.79
DZS	STG generation increment from 6.4 to 6.8	9020	2054.59
DZS	Reduction of Motor KW at PH-2 from 30 to 15	237	53.92
DZS	ZE cooler motor rating reduction from 22 to 15 kw	1370	312.09

Carbon Sequestration through Greenbelt development

- Greenbelt development by planting new plants in Colony & Plant area every year.(As on FY 2022-23, 1,26,000 Nos in 76.76 Ha (41.84 %)
- Regular gap filling of plantation area.
- Existing Miyawaki plantation at site with Density 8000 nos/ acre i.e 20,000 nos/Ha.
- To increase the density of existing plantation area another 44000 nos of more plantation has been planned as per following.
    - FY 2023-24: 28000 Nos.
    - FY 2024-25: 8000 Nos.
    - FY 2025-26: 8000 Nos.

These projects will lead to carbon sequestration which will be quantified by the plant soon. The existing sequestration is 665.63 tco2,the above initiatives will contribute to a plantation of more than 1,70,000 no of trees. From which will 60925 nos of plantation will contribute towards carbon sequestration. According to reports a fully grown tree can sequester about 25kg of carbon per-day, which would result in the sequestration of 1765.53 tco2e.

5. GHG Reduction measures

Few of the things which could be done to reduce GHG emissions at ZSD are categorized under the following heads i.e., Behavioral Measure, Efficiency Measures, Fuel Replacement Measures and LongTerm Measures.

Governance

We have established Energy and carbon management community, who looks after governance for energy conservation, energy and carbon risk assessment, mitigation strategies and continual improvement in energy and carbon management. The committee plays a strategic role in all business decisions to ensure workplace safety, eliminating any potential damage to the environment, enhancing a commitment towards stakeholders, and maintaining our reputation etc.

Behavioral Measures

Behavioral changes are certain to be an important component in reducing greenhouse gas emissions (GHG) and combating climate change. There are few measures which could be circulated to employee through various engagement modes

- Switch off appliances – lights, fans, Air conditioners etc. when not in use.
- If leaving computer for a while, put it on stand-by. You'll be able to restart it quickly, and it'll take less energy than shutting it down and then restarting it.
- Awareness and training programs: Employee awareness trainings and workshops conducted to let everyone know that they're making changes to reduce your impact on the environment.
- Switch to public transportation, carpooling, biking, telecommuting and other innovative ways to save energy and reduce greenhouse gas emissions on your way to and from work.
- Annual maintenance of refrigerators, ACs, removal of blockages from air vents, replacing older light bulbs with energy-saving fluorescent bulbs.

Efficiency Measures

- Undertake energy audit (Internal Energy audit/brainstorming session – once in year & External energy audit – once in three year) on a regular basis to highlight major energy consuming sections and equipment's including. A well-conducted energy audit would reveal the areas of wastage of energy, and it would lead to suggestions for possible energy savings in all sectors. All operating units are certified ISO 50001 - Energy Management System
- Maintenance of air conditioners and similar equipment's should be done on a regular basis across corporate offices, units and guest houses. Outdated equipment's should be replaced with energy – efficient ones (Star rating).

Innovation

Innovative technologies are being implemented to automate and reduce manual errors in a process. This would improve collection of data and increase accuracy. This would help establish, a regular and up-to-date monitoring programme for air emissions (point and fugitive) arising from the operations. Across the business, we continue to pursue improvements to air quality management, focusing on emissions of particulate matter, SO2, NOx etc emitted by our operational activities

Lighting Management

- Replace dated air conditioners and fans.
- Replacing existing lights with CFL and LED.
- Maximizing the use of natural day light, wherever possible.
- Use of sensor-based lighting controls at selected locations i.e., washrooms and passageways.

Motor Management

- Avoid using motors at part loads (and avoid over-sized motors)
- Use of soft starters
- Replacement of old motors with high efficiency ones
- Sizing the motor to variable load
- Improving the input power quality
- Power factor correction by installing capacitors
- Speed control of induction motor
    - I. Multi-speed motors
    - II. Variable speed drives
    - III. New Direct current drives

Employee Commute & Business Travel

- Strategies for reduction
    - i. Increase % of employees using Mass Transit
    - ii. Encourage Carpooling/Bus Pooling
    - iii. Use of cleaner fuels for Buses and compliance to Euro 2 standards iv. Onsite emission and tyre pressure tests.
    - v. Encourage the use of net meetings, Video Conferencing and Telepresence

Green Computing

- Conversion of building as green building for the optimum utilization of natural resources
- Optimum utilization of the IT infrastructure through Server Consolidation and virtualization vi. Desktop level virtualization
- All CRT monitors to be replaced with LCD
- Green Procurement: All equipment to be energy star certified
- Green Data Centers vii. Evaluating the performance of all our current data centers.
    - viii. New data centers as per the latest technology and HVAC systems.

Fuel Switch/Replacement Measures

Switching to Cleaner Fuels

As evident , we can reduce emissions by substituting LPG from PNG in ZE section in ZSD plant. However, an assessment of materiality of emissions at the plant is required before evaluating reduction measures. The second way of reducing the emissions in this category is using solar heaters for pre heating the water. This technology is well established and is being used in other companies across India.

Reducing the amount of fuel combusted

With the huge amount of emissions generated by stationary combustion sources, reducing the amount of fuel that needs to be combusted even marginally can result in substantial reduction of CO_2e emissions. This can be achieved in the following ways:

- Implementing Waste Heat Recovery.
- Maximum Energy Utilization from Steam Generated.
- Revamping of turbine to increase energy efficiency in FY23-24.
- Improving the efficiency of combustion in boilers.

Long Term Measures

- A new independent vertical to be created for overall Climate Change Management & Sustainability Framework so that all the activities under this could be monitored, implemented and tracked.
- Investing in renewable i.e., solar, hydrogen, wind, bio – fuels. Separate assessment needs to be done for respective technologies for their technical and financial viability.
- Replacing conventional techniques of energy generation with new clean technology options i.e., gas base power
- Developing a low carbon strategy focusing on maximization of renewable energy use and ensuing optimum utilization of energy use during product manufacturing and distribution

Renewable Energy

We have installed 12MW capacity Solar plant & 72KW capacity Solar Roof Top Project at different locations of ZSD plant.

6. Knowledge, Awareness and Communication

Knowledge: -

Training for all staff will be carried out through the HR dept. according to training calendar. This will include

- Presentations to department management teams across ZSD.
- A series on short training sessions for existing staff to start the program.
- The inclusion of a climate change session within the ZSD.
- Inclusion of low carbon driving within the driver training program.
- Showing the video films on GHG emissions etc.

Awareness: -

General awareness rising will be carried out on rolling program. This will include

- Development of a carbon management web page on the Intranet, including a carbon foot printing tool for staff.
- An annual awareness events.
- Poster campaign.
- Development of Environmental Management Notice Boards within main Buildings.
- Displaying of the video clippings on GHG emission and Climate change.
- Displaying the posters and slogans for the GHG emissions.
- Reporting of carbon management to the carbon and energy Committee on monthly basis.

In line with the communication and awareness programs related to energy and climate change training to employees and business partners were provided across HZL, the topics included,

- GHG accounting, current status of GHG emissions
- GHG reporting at different standard (CDP, SBTi etc.)
- Awareness session on climate change & roadmap to net zero

Communication: -

Communication to Stakeholder

ZSD has defined Key Stakeholders as those individuals in the organization who can influence and motivate staff within their respective area of responsibility to ensure the program objectives are successfully delivered.
Those key stakeholders are generally senior members of staff responsible for significant teams and budgets but may also be individuals with specialist knowledge. The support and commitment of the key stakeholders is critical to the success of the program.

- Provision of data and expertise relating to sources of emissions for monitoring progress in future years.

- Identification of emissions reduction opportunities including project life cycle assessments and conformity with HZL's financial procedures.

ZSD also believes in communicating with relevant stakeholders especially local community in case of any potential impact on air quality and generate awareness on significant pollutants emitted from the operation (including their concentration and distribution).

Communicating this Carbon Management Plan

For this Carbon Management Plan to be effective it is essential that all stakeholders understand its strategic objectives, which are:

- To reduce the consumption of utilities, primarily electricity, fuel, gas and water
- To understand and quantify the potential to reduce consumption and waste
- To embed the principles of carbon management into the culture of ZSD route map and resourcing plan which will ensure that the strategy fully
- Establish a clear shared understanding of the Carbon Management Plan's vision and goals

Carbon Disclosure Project: - HZL is submitting the emission details with future mitigation strategy to Carbon Disclosure Project since 2008 and published since 2012. The CDP has disclosed the score based on the details submitted by other company's worldwide, achieved emission reduction, projects implemented, Projects under implementation and future strategy.

The trend of score shows our commitment towards sustainability and reduction in emission from our plants.

In 2019 HZL was awarded a **B** grade, in 2020 **A** grade, in 2021 B grade (in climate change category).

Sustainability report/ Annual reports: - We are communicating the details of our sustainable development through our sustainability report and annual report of company and group.

Sustainability policies (HZL) HZL Sustainability - Vedanta Sustainability Framework (hzlindia.com)

Integrated Annual report (HZL) HZL | Digital Integrated Report 2021-22 (hzlindia.com)

Environment management (HZL) HZL Sustainability - Annual Report 2021-22 (hzlindia.com)

Energy and climate change management policy (HZL) Policy - 2022.cdr (hzlindia.com)

Energy and climate change strategy (HZL) HZL_Energy_and_Climate_Strategy_2022.pdf (hzlindia.com)

Air emission Management (HZL) HZL_AIR_EMISSIONS_MANAGEMENT_2022.pdf (hzlindia.com)

World Earth Hour: - Earth Day is an annual event, celebrated on April 22, on which events are held worldwide in order to increase the awareness among people about the environment and to demonstrate support for environmental protection. It was first celebrated in 1970.

On this occasion, we appeal all to conserve natural resources like water, energy & others wherever possible and reduce individual consumptions.

Zinc Smelter Debari

We also organize the candle march to increase the awareness among people about the environment.

7. Legal and other requirement

Regulatory Requirements

In wake of the increasing concerns regarding climate change the governments all over the world are coming up with a number of regulations to promote the development of products which promote emissions reduction.

As the impacts of climate change become more direct, we are likely to see government resort to prescriptive regulation and statutory controls to ensure that mining companies take appropriate action on adaptation.

In line of the same Govt. of India has launched the RPO (renewable purchase obligations) and PAT scheme now forced all companies for the achieving the target required as per scheme.

It has been notified in January 2022, that PAT scheme is applicable to HZL.

The Details of the RPO obligation on the company for FY 21-22 is as; -

Total Obligated Energy on the company	: 363940.514 MWh
Solar Obligation	: 0
Non-Solar Obligation	: 0

After fulfillment of the RPO obligation with Generation from WHRB and solar generation.

Increasing Current Rating from 6.79 to 7.1 of Cell House

The Increasing Current rating of Cell House was big initiative in order to improve energy efficiency of cell house which is major energy consumption point of our plant.

This project has led to GHG emission saving of 2495.7 tCO2e this year(till jan'23).

8. Risk Management

The climate-related risks and opportunities the organization has identified over the short, medium, and long term. HZL identifies and assesses climate change risk through a formal monitoring process at the unit level and at the corporate level, which identifies and categorizes existing and emerging climate related risks and opportunities with respect to both Physical and Transitions risks. We have identified climate change associated risks and opportunities and its impact on employee health, the existing infrastructure, including the impact of on HZL's ecosystem and the business model. Climate Change risks management approach consists of an observation at present times and predicting the changes in the future.

8.1 Risk/Opportunity Assessment

Managing risk and identifying opportunities – How business is affected and in which ways? Failure to comply with emission norms could lead to negative/inevitable long-term impact on the environment and society, with imposition of levies/ fines, escalation in costs related to monitoring and

reporting, among others. Large-scale air emissions can cause serious impact on the environment and local communities. We continuously work towards reducing air emissions.
Progressiveness of companies in managing climate change impacts would determine their leadership position in industry. It's very important for organizations like ZSD to create a detailed plan for risk assessment & mitigation and opportunities identification. This would include

1. Hidden risks.
2. Opportunities in terms of new market or products, reduce costs of compliance etc.

Identification of Hidden Risks

The risks that company is facing due to climate change are as follow:

Physical Risks: As per our physical risk assessment for year 2020-2039, Hindustan Zinc is likely to face natural disasters like droughts, heat waves and increase in extreme weather conditions. These would impose challenges to mining operations. Climate change may cause or result in increase in extreme weather events and subsequent resource shortages, impacting overall cost of acquisition of resources from alternative sources.
The rising challenges of climate change and resource scarcity have put us on a path of transformation to a low carbon economy. Shifting to renewables and/ or low-carbon solutions where possible.

HZL has identified and categorized climate-related risks and opportunities over the short, medium, and long term with respect to both Physical (Increase in temperature, Drought, Floods, Extreme weather, Cyclonic pattern, wind speed etc) and Transitions risks (risks due to change in policy change, technological change, market change, financial resource raising, reputational etc).

Risk from Investors: Foreign Institutional Investors are seeking companies to disclose their carbon risks through Carbon Disclosure Project (CDP) and are increasingly becoming climate conscious and companies that do not work to reduce their emissions and contribute to climate change shall fail to attract investments. Given international nature as well as widely growing acceptability the disclosure through CDP, it is becoming a norm for progressive companies.

Reputational Risks

It is acknowledging that threats to reputation – whether real or perceived – can damage an image or brand. On the balance sheet, reputation value is considered as an intangible asset and is accounted for under 'goodwill' or 'intellectual capital'.

Policy & Regulatory Risk

We consume large amounts of energy due to the nature of our operational activities, logistics and transportation processes. That is why we seek new technologies and progress regarding sustainable energy generation. This can impact the overall market value of the products in the geographies with restrictions, thus impacting our revenues. As a result, we keep track of all transition risks and changes in regional Climate Change Policy.

Conclusion

Risk mitigation would be pivotal for climate leaders in any industrial sector. The lead in this area of climate change mitigation would be able to give significant competitive advantage. Not only it will reduce our exposure to these regulations but also provide chance to turn this risk into opportunities which is discussed next.

8.2 Opportunities Assessment

Climate change provides significant revenue generation opportunities. Contrary to conventional wisdom, these opportunities are beyond only carbon credit generation. Proactive actions towards climate leadership will surely be able to reap benefits from such opportunities

Some upcoming Projects: -

1. Re-designing of reactor agitator from 75 to 55 KW motor 27 & 28.
2. Installation of VFD in CT-1 Fan R-3.
3. Practice of solar panel Cleaning from manual mode to automatic mode (1% increment in solar generation).
4. Rectifier-1 Efficiency improvement by 0.5%.
5. Cellhouse Current rating improvement from 7.02 to Year Average Rating of 7.28.
6. STG generation increment from 6.4 to 6.8
7. Reduction of Motor KW at PH-2 from 30 to 15.
8. ZE cooler motor rating reduction from 22 to 15 kw

Benefits Management

There will be several indicators to measure both the quantitative and qualitative benefits of the Carbon Management Program.

Firstly, progress of project implementation will be reported to the Environmental Sustainability Steering committee

Relating to environmental sustainability these include:

1) % Energy generated
2) % Low carbon fuels used
3) Energy consumption per ton of metal
4) CO2 emissions (Scope 1&2)

Reporting and Evaluation

During the years following the formal adoption of the Carbon Management Plan in which carbon reduction projects will be put into operation, there will be regular updates on the Program targets and evaluation of the Program status. This will: -

- Ensure that carbon management is being implemented effectively
- Enable management to be improved and optimized where appropriate
- Provide data that can be used to update the emissions targets and program scheduling

References:-

1 World Business Council for Sustainable Development
2 TS 16- Energy and Carbon Management (VSF)
3 Intergovernmental Panel on Climate Change
4 carbon disclosure project- Driving sustainable economies

9. REVIEW

This Carbon Management Plan shall be periodically reviewed to determine its accuracy and relevance with regards to legislation, education, training, and technological changes. In all other circumstances, it shall be reviewed no later than 12 months since the previous review.

SSIL/14062019/HZL -18

Industrial Hygiene Quantitative Exposure Assessment

Date of Draft Report: August 04, 2019
Date of Final Report: January 16, 2020
Company's Name: Hindustan Zinc Ltd, Zinc Smelter Debari

Sure Safety
Complete Safety Solutions
42, A/B, Yoginagar Township, B/s. Zenith Tin, N.H. No. 8, Chhani, Vadodara, Gujarat

January 16, 2020

Dr. Sumeet Siroya
Sr. Medical Officer
HZL Ltd, Zinc Smelter Debari.
Udaipur

Subject: Industrial Hygiene Quantitative Exposure Assessment Report

Dear Dr. Sumeet Siroya,

Sure Safety (India) Ltd is pleased to provide you Industrial Hygiene Quantitative Exposure Assessment Report. The monitoring was conducted at HZL Ltd, Zinc Smelter Debari from 19th to 26th June, 2019.

We have taken all due considerations to follow standard procedures and used defined instruments for monitoring. Based on information, observations and result, we have given our conclusion and suggestions for sustenance and further improvement.

Wish Sure Safety (India) Ltd. will be involved in same or other IH&S related services for your organization!

Regards,

Nishith Dand
Managing Director

Index

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Sure Safety India Ltd. was approached by HZL Ltd., to conduct monitoring of Heat stress for their Debari smelter. Sure Safety India Ltd undertook and executed the project from 19th to 26th June, 2019.

Objective

The objective of the project was to:

- Quantify existing exposure of Heat stress to the employees with considering all control measures installed or provided at the plant area, provided by HZL Ltd, Zinc Smlelter Debari , from now on to be read as "site".

Summary

Based on the activities performed at respective locations, exposure assessment is made.

Results of two area heat stress samples are above The Indian Factories Act, 1948. Rest all location shave respective heat exposure below TLV.

5

Assumptions

Following assumptions/ limitations have been taken into account while conducting the exposure for area heat stress:

- The information provided by the site is accurate, complete, authentic and up to date. The same has been referred for preparing the report.
- All equipment's are operational at the best of their capabilities and same as on any other common working day.
- Uncertainty towards variation of job size, job duration and job work are not considered.
- All the people working at the respective areas are as on any other common working day.
- All the processes are same as on any other common working day.

Declaration

- The quantitative exposure assessment is made based on the area/ locations made available / considered by site.
- As per rules photography was not allowed and thus for this project photography was not conducted.
- The information gathered during quantitative exposure assessment will be restricted to site, premises and will not be shared with anyone else/ any other industry.
- This report provides insight towards existing exposure levels of area heat stress on the day, date and time when the monitoring was conducted.

Use of Report

The report is based upon the application of scientific principles and professional judgment and experience. Nothing contained in this report regarding the exposure levels, shall be used as the confirmative statements, data for either onset or existing occupational diseases within the work area. Professional judgment from the qualified occupational health physician should be acquired for the interpretation of the onset or existing occupational diseases, if any. This report does not provide any confirmatory base-data / base-line towards the health of the persons on which the exposure assessment was conducted.

Standards and Guidelines

Following standards and guidelines were followed to conduct the monitoring of area heat stress for comparing with suggested National Guidelines.

- The Indian Factories Act, 1948

Threshold Limit Values

Heat stress	30 °C

Sampling Procedure

Heat Stress sample Collection Procedure

- Sample collection was done based on job selection for monitoring. Pre calibrated WBGT meter were used for monitoring of Area Heat stress.
- Area Heat stress was collected by keeping the instrument in respective areas provided by site for minimum 20 minutes at around 1.5-meter height.
- For each sample, the equipment was allowed to stabilize completely for 20 minutes and then the readings were recorded on field.

We assure you with best of our services, and we strive to provide highest work quality to our clients. All the instruments used for exposure monitoring are regularly calibrated. The results, observations and suggestions for the Industrial Hygiene quantitative exposure assessment of heat stress are based on the activities being performed at plant site on the day of monitoring. However, in case of any clarification or further discussion, we would be happy to assist.

Quality Assurance

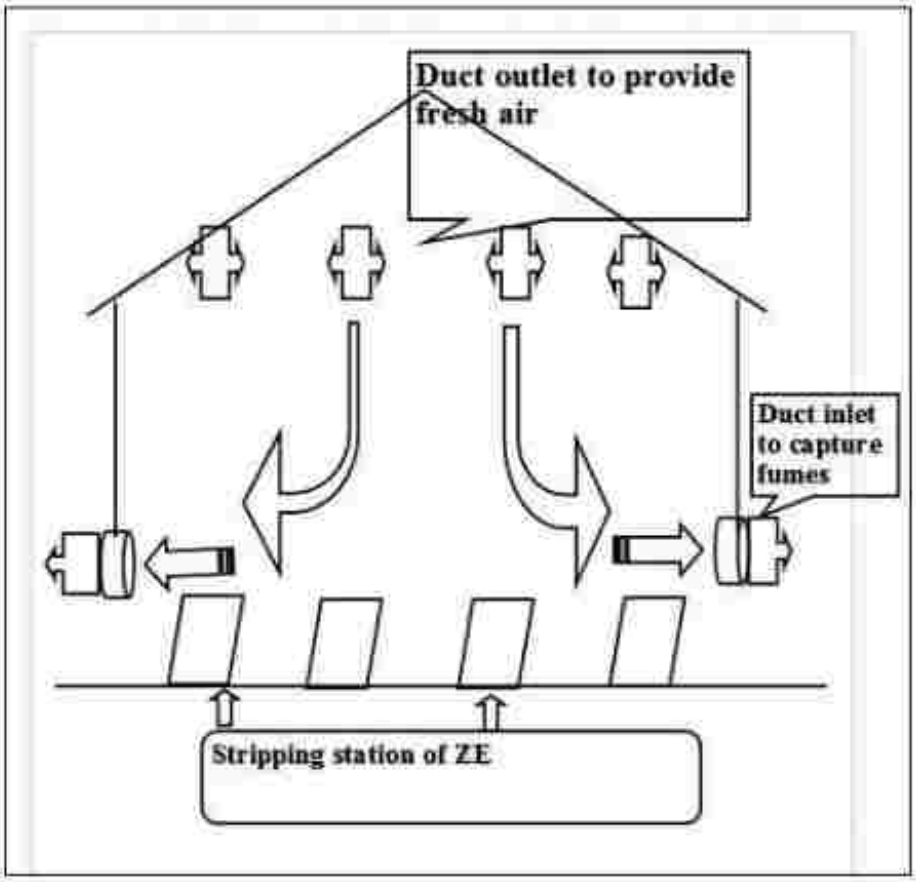
Heat Stress

Sr. No	Location	WBGT				
		Globe Temp.	Wet bulb Temp.	Dry bulb Temp.	WBGT	RH
		T_g (°C)	T_{nw} (°C)	T_a (°C)	(°C)	(%)
1.	Slag Grinding & Handling	32.7	25.3	32	27.5	58
2.	Melting & Casting (Near Kundice)	35.4	24.6	33.5	27.2	49
3.	Melting & Casting (Near stacking area)	36	25.2	34.1	27.8	49
4.	MCTP (Kiln first floor)	37.5	27.7	34	30.3	62
5.	MCTP (Jarosite drying area)	43.6	29	36	32.7	31
6.	Roaster-3	32.3	24.6	30.7	26.7	55

TLV is considered as 30 °C as per The Indian Factories Act, 1948

Heat Stress:

1. Increase number of the person for the task to cut half the heat exposure to the one person in one shift.
2. Give training to the supervisor and employees about the "Effects of Heat exposure" and "Health effect of Heat stress".
3. Provide adequate amounts of cool, portable drinking water near the work area and encourage workers to drink frequently.
4. Give sufficient time to the employees to acclimatize in this area where heat stress is high.
5. Check availability and feasibility to provide cooling towel or cooling jackets in high temperature area.



Ventilation design

Conclusion

Company management has taken step to conduct quantitative exposure assessment to know the present exposure of area heat stress to the persons in the plant. From inception of site, management is conscious to provide suitable technological solution for person health and safety.

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Appendix 1: Abbreviations

1. SSIL: Sure Safety (India) Ltd.
2. TLV: Threshold Limit Value

vedanta
transforming for good

HINDUSTAN ZINC
Zinc & Silver of India

TO WHOM IT MAY CONCERN

I, **Manas Tyagi, Dy. CEO – IBU Smelters, Hindustan Zinc Limited** give this undertaking that Hindustan Zinc Ltd. has proposed for Expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) through modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time at Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan)".

In line with the Ministry's O.M. dated 11th April, 2022 regarding grant of EC under para 7(ii) of EIA Notification, 2006, amended from time to time, the EIA/EMP Report has been prepared for "expansion of Zinc Smelter from 1,00,000 TPA to 1,40,000 TPA (in 2 phases) through modernization of process by installing new state-of-the-art with the latest technology equipment to improve efficiency" as per Standard TOR Points for carrying out the Environmental Impact Assessment (EIA) study.

In this connection, I hereby, undertake that Hindustan Zinc Limited (HZL) has filed a suit [Case Title: HZL vs Nandram & Ors. (Case No. 117/2024)] before SDO/SDM Court, Girwa, Udaipur against Nandram & 23 others under Rajasthan Tenancy Act, 1955 for mutation and correction of revenue records. That the land of the following appendices is situated in Revenue Village – Bichdi, Teh. Kurabad, Udaipur, and these land parcels were acquired by HZL but the revenue records as on date do not reflect the same. Details are enclosed with this undertaking as ***Annexure.***

Apart from the above, no other litigation pending against the project and/or any direction / order passed by any Court of Law against the project and / or land in which the project is existing and the unit has not received any notice under the Section 5 of Environment (Protection) Act, 1986 or relevant Sections of Air and Water Acts and that for any such litigation whatsoever, the sole responsibilities will be borne by the company.

Date: 18.09.2024

Place: Udaipur, Rajasthan

For and on behalf of M/s. Hindustan Zinc Limited

Manas Tyagi

(Dy. CEO – IBU Smelters, Hindustan Zinc Limited)

सेवामें,

माननीय न्यायालय उपखंड अधिकारी

गिर्वा, उदयपुर (राज0)

हिन्दुस्तान जिंक लिमिटेड (निगमित कम्पनी) जरिये अधिकृत अधिकारी शिल्पा नायर विधि अधिकारी पुत्री श्री सुरेन्द्र कुमार नायर, उम्र 28 वर्ष, पता–यशद भवन, स्वरूप सागर रोड उदयपुर (राज0)

.....वादी

बनाम

1. श्री नन्दराम पिता मगना जी डांगी, उम्र वयस्क, निवासी–ग्राम बिछडी, तहसील कुराबड, जिला उदयपुर (राज0)
2. श्री सत्तार खान पिता श्री हसन खान, उम्र बालिग, जाति मुसलमान, निवासी–ग्राम बिछडी, तहसील कुराबड, जिला उदयपुर (राज0)
3. श्री हीरालाल पिता श्री फतेहलाल जाति सालवी, उम्र बालिग, निवासी–ग्राम बिछडी, तहसील कुराबड, जिला उदयपुर (राज0)
4. श्रीमती गुणेशी पत्नी स्व. श्री डालू मेघवाल, उम्र बालिग, निवासी–बिछडी, तहसील कुराबड, जिला उदयपुर (राज0)
5. श्री बंशीलाल पिता डालू मेघवाल, उम्र वयस्क, निवासी–बिछडी, तहसील कुराबड, जिला उदयपुर (राज0)
6. श्री गांगा पुत्र डालू मेघवाल, उम्र वयस्क, निवासी–ग्राम बिछडी, तहसील कुराबड, जिला उदयपुर (राज0)
7. श्री लोगर पुत्र डालू मेघवल, उम्र वयस्क, निवासी–ग्राम बिछडी, तहसील कुराबड, जिला उदयपुर (राज0)
8. श्री किशन सिंह पिता भेरू सिंह राजपूत, उम्र बालिग, निवासी– कुडी, तहसील कुराबड, जिला उदयपुर (राज0)
9. श्रीमती खाटी बाई पत्नी सोहन सिंह राजपूत, उम्र बालिग, निवासी–कुडी, तहसील कुराबड, जिला उदयपुर (राज0)
10. श्री जय सिंह पिता भेरू सिंह जी राजपूत, उम्र बालिग, निवासी–कुडी, तहसील कुराबड जिला उदयपुर (राज0)
11. श्री डूले सिंह पिता सोहन सिंह जी राजपूत, उम्र बालिग, निवासी–कुडी, तहसील कुराबड जिला उदयपुर (राज0)
12. श्री दौलत सिंह पिता श्री भेरू सिंह जी राजपूत, उम्र बालिग, निवासी– कुडी, तहसील कुराबड जिला उदयपुर (राज0)
13. श्री रोड सिंह पिता श्री सोहन सिंह जी राजपूत, उम्र बालिग, निवासी–कुडी, तहसील कुराबड जिला उदयपुर (राज0)
14. श्री लक्ष्मण सिह पिता भेरू सिंह जी राजपूत, उम्र बालिग, निवासी–कुडी, तहसील कुराबड जिला उदयपुर (राज0)

15. श्री लाल सिह पिता भेरू सिंह जी राजपूत, उम्र बालिग, निवासी–कुडी, तहसील कुराबड जिला उदयपुर (राज0)
16. श्रीमती हमेरा बाई पत्नी भेरू सिंह जी राजपूत, उम्र बालिग, निवासी–कुडी, तहसील कुराबड जिला उदयपुर (राज0)
17. श्री बाबूलाल पिता मोती भील उम्र बालिग, निवासी–बिछडी, तहसील कुराबड, जिला उदयपुर (राज0)
18. मु. भूरी पुत्री पुरा जी भील, उम्र बालिग, निवासी–बिछडी, तहसील कुराबड, जिला उदयपुर (राज0)
19. मु. मांगी बाई पुत्री मोती भील उम्र बालिग, निवासी–बिछडी, तहसील कुराबड, जिला उदयपुर (राज0)
20. मु. लच्छु पुत्री पुरा जी भील, उम्र बालिग, निवासी–बिछडी, तहसील कुराबड, जिला उदयपुर (राज0)
21. श्रीमती लाली बाई पत्नी मोतीलाल भील, उम्र बालिग, निवासी–बिछडी, तहसील कुराबड, जिला उदयपुर (राज0)
22. राजस्थान राज्य जरिये तहसीलदार कुराबड, जिला उदयपुर (राज0)
23. राजस्थान राज्य जरिये तहसीलदार गिर्वा, जिला उदयपुर (राज0)
24. नगर विकास प्रन्यास, वर्तमान में उदयपुर विकास प्राधिकरण उदयपुर (राज0) जरिये अध्यक्ष एंव सचिव उदयपुर विकास प्राधिकरण, उदयपुर (राज0)

.....प्रतिवादीगण

प्रकरण सख्या /2024 राजस्व वाद

वाद अन्तर्गत धारा 88, 89, 91, 92 व 92–ए तथा धारा 188

राजस्थान काश्तकारी अधिनियम

उपरोक्त नामांकित वादी का वाद निम्न प्रकार प्रस्तुत है :–

1. यह कि वादी कम्पनी भारतीय कम्पनी अधिनियम के अन्तर्गत एक निगमित कम्पनी है जो खनिजो के उत्खनन एवं परिशोधन का व्यवसाय करती है। वादी कम्पनी का मुख्य कार्यालय यशद भवन, स्वरूप सागर रोड उदयपुर में अवस्थित हैं वादी कम्पनी की एक ईकाई जिंक स्मेल्टर देबारी तहसील गिर्वा, जिला उदयपुर में अवस्थित है। सुश्री शिल्पा नायर पुत्री श्री सुरेन्द्र कुमार नायर इस कम्पनी की उपविधि प्रभारी हैं जो इस प्रकरण के तथ्यो एवं परिस्थितियो एंव दस्तावेजो से परिचित है तथा कम्पनी के बोर्ड ऑफ डायरेक्टर ने दिंनाक 23/05/2023 को पावर ऑफ एटोर्नी निष्पादित कर कम्पनी के वाद करण हेतु इन्हे अधिकृत किया है तथा सुश्री शिल्पा नायर इस प्रकरण को हस्ताक्षरित एवं प्रमाणिकरण करने हेतु अधिकृत है।
2. यह कि राजस्व ग्राम बिछडी तहसील कुराबड जिला उदयपुर में निम्न परिशिष्टो की भूमि अविस्थित है जिसका विवरण निम्न प्रकार है :–

परिशिष्ट (1)

खाता सख्या	आराजी सख्या	रकबा
नई 184 पुरानी 157	76	0.1500
	77	0.0300
	78	0.1800
	79	0.0050
	80	0.0450
	81	0.0600
	82	0.1050
	83	0.0750
	86	0.3500
	87	0.4400
	88	0.3500
	89	0.3700
	90	0.5600

कुल किता 13 कुल रकबा 2.7200

परिशिष्ट (2)

खाता सख्या	आराजी सख्या	रकबा
नई 416 पुरानी 330	104	0.0100
	105	0.0150
	106	0.0100
	107	0.0150
	108	0.0200
	109	0.0550
	110	0.0250
	111	0.0600
	112	0.0150

113	0.0550
114	0.1800
115	0.2200
116	0.1900
117	0.0700
118	0.1500
119	0.1600
120	0.0150
121	0.0950
122	0.0300
123	0.0350
124	0.8300

कुल किता 21 कुल रकबा 2.2550

परिशिष्ट (3)

खाता सख्या	आराजी सख्या	रकबा
नई 439 पुरानी 355	125	0.2400

कुल किता 01 कुल रकबा 0.2400

परिशिष्ट (4)

खाता सख्या	आराजी सख्या	रकबा
नई 36 पुरानी 30	4671	2.0400

कुल किता 01 कुल रकबा 2.0400

उक्त भूमि राजस्व ग्राम देबारी तहसील कुराबड का अंश है।

परिशिष्ट (5)

खाता सख्या	आराजी सख्या	रकबा
नई 320 पुरानी 266	414	0.0650
	415	0.0900
	416	0.0500
	417	0.1000
	418	0.0850
	419	0.0350
	420	0.0600
	421	0.0500
	422	0.0400

कुल किता 9 कुल रकबा 0.5750

परिशिष्ट (6)

खाता सख्या	आराजी सख्या	रकबा
नई 1 पुरानी 1	103	0.0300

कुल किता 01 कुल रकबा 0.0300

परिशिष्ट (7)

खाता सख्या	आराजी सख्या	रकबा
नई 465 पुरानी 1	102	0.0100
	128	0.0550
	129	0.1000
	95	0.0200
	64	0.2500
	21	0.0350

कुल किता 06 कुल रकबा 0.4700

3. यह कि उपरोक्त वर्णित परिशिष्टो की भूमिया आदिकाल में इसके खातेदार जो की प्रतिवादीगण एवं इनके पूर्वहितधारी थी, के नाम राजस्व अभिलेखो में अंकित चली आ रही थी।
4. यह कि वादी कम्पनी पूर्व में मेटल कोर्पोरेशन आर्फ इण्डिया के नाम से जानी जाती थी किन्तु राष्ट्रीय औद्योगिकरण की नितियो एवं केन्द्र सरकार के निर्देशो के अनुरूप इस कम्पनी का पश्चात्वर्ती नाम हिन्दुस्तान जिंक लिमिटेड कर दिया गया तथा उक्त कम्पनी पुर्णरूपेण भारत सरकार अर्थात् केन्द्र सरकार के नियंत्रण में चली गई तथा तत्समय उक्त कम्पनी शत् प्रतिशत राजकीय भागीदारी का उपक्रम बन गई।
5. यह कि कम्पनी द्वारा सीशा तथा जस्ता का उत्पादन एवं परिशोधन किया जाता था जिसकी एक ईकाई जिंक स्मेल्टर राजस्व ग्राम देबारी, बिछडी, साकरोदा व आस पास के अन्य गांव जो की तहसील गिर्वा के भाग थे, की भूमियो पर विधिवत् रूप से स्थापित की गई। विदित रहे उक्त कम्पनी तत्समय राजपत्रित कम्पनी थी तथा इसका सम्पूर्ण लाभांश सरकार को प्राप्त होता था।
6. यह कि उक्त संयत्र कई वर्षो से जिंक स्मेल्टर के नाम से संचांलित होता रहा था किन्तु औद्योगिकरण के विस्तार के चलते कम्पनी को अतिरिक्त भूमियो की आवश्यकता पडी तथा कई भूमिया सरकार के माध्यम से अवाप्त की गई। उक्त भूमिया आस पास के गावो की भूमियो में से इनके खातेदारो से अवाप्त की गई तथा उन्हे विधि सम्मत् मुआवजा प्रदान कर दिया गया।
7. यह कि वाद वर्णित परिशिष्ट सख्या (1) से (7) की भूमिया भी विपक्षीगण एंव उनके पूर्व हितधारी जो इन भूमियो के खातेदार थे, से अवाप्त कर ली गई तथा मुआवजा प्रदान कर उक्त भूमियो को कम्पनी ने अपने आधिपत्य में ले लिया तथा इस पर विभिन्न कार्य प्रारम्भ कर दिया।
8. यह कि उक्त वर्णित भूमियां वर्ष 1988 से ही वादी कम्पनी के आधिपत्य में चली आ रही है तथा उक्त भूमियां एकचक होकर वादी कम्पनी के उपयोग उपभोग में आ रही है तथा इन भूमियो को संरक्षित करने के लिए वादी कम्पनी ने इन भूमियो के बाहर अपनी बाउण्ड्रीवाल भी बना रखी है उक्त बाउण्ड्रीवाल लगभग 25 वर्ष पूर्व निर्मित की गई थी जिसकी पुष्टि गुगल मेप से व अन्य फोटोग्राफ तथा दस्तावेजो से होती है कि उक्त भूमिंया वादी

कम्पनी के आधिपत्य में एवं निरन्तर उपयोग उपभोग में चली आ रही है वादी कम्पनी ने इन भूमियो के अधिकांश हिस्से पर वृक्षारोपण व अन्य कई वानस्पतिक उपयोग कर रखे है तथा उक्त भूमिंया सम्पूर्णरूपेण विगत 30 वर्षो से भी अधिक समय से कम्पनी के आधिपत्य में चली आ रही है।

9. यह कि यंहा यह तथ्य उल्लेखनीय है कि उक्त भूमियों का मुआवजा भी इसके काश्तकारो द्वारा प्राप्त कर लिया गया है तथा एतद संबधी सूचनाऐं तत्समय के राजस्व अधिकारीयो को प्रदान कर दी गई थी व उक्त भूमिंया वादी कम्पनी के नाम राजस्व अभिलेखो में अंकित करने का निर्देश भी सम्यक सरकार द्वारा प्रदान कर दिया गया।

10. यह कि इतने वर्षो में कई परिस्थितियो में परिवर्तन हुऐ तथा कम्पनी का सरकारी नितियो अनुरूप विनिवेश हुआ तथा कम्पनी का कुछ हिस्सा इसके विनिवेश धारक द्वारा प्राप्त कर इसका प्रबंधन प्राप्त किया एवं इस विनिवेश की कार्यवाही के दौरान कई दस्तावेज उदयपुर मुख्य कार्यालय से दिल्ली विनिवेश मंत्रालय तक लाये ले जाये गये तथा कई दस्तावेज दिल्ली विनिवेश मंत्रालय तथा उद्योग मंत्रालय में रखे रहे। इस दौरान कम्पनी में उत्पादन परिशोधन विक्रय विपणन व अन्य कार्य निरन्तर चलते रहे।

11. यह कि अभी इसी दौरान वादी कम्पनी को कुछ समय पूर्व उपखण्ड अधिकारी गिर्वा, उदयपुर के न्यायालय से एक सम्मन प्राप्त हुआ उक्त सम्मन जिस मुकदमें के संबंध में प्राप्त हुआ उस मुकदमें का अनवान नन्दराम बनाम हिन्दुस्तान जिंक लि. प्रकरंण सख्या 75/2023 अंकित थे।

12. यह कि उक्त अनुसार प्रकरण में पेशी 27/03/2024 अंकित थी जिस पर वादी कम्पनी द्वारा उपस्थिति देकर इस प्रकरण की प्रति प्राप्त की गई तो उक्त प्रति को पढने से ज्ञात आया की प्रतिवादी सख्या 1 ने इस वाद मे वर्णित परिशिष्ट (1) की भूमियो को अपने आधिपत्य की बताते हुऐ निषेधाज्ञा की मांग की है।

13. यह कि उक्त प्रकरण की प्रति पठन करने के उपरान्त वादी कम्पनी ने अपने अभिलेखो का अध्ययन किया और अवाप्त शुदा भूमि तथा आधित्पयशुदा भूमि का अपने अभिलेखो से मिलान किया तो ज्ञात आया की राजस्व अधिकारीयो की उदासीनता के कारण तत्समय उक्त वर्णित भूमिंया राजस्व अभिलेखो में वादी कम्पनी के नाम अंकित होनी रह गई है तथपि उक्त वर्णित भूमियां वादी कम्पनी के आधिपत्य में चली आ रही है।

14. यह कि राजस्व अधिकारीयो की उदसीनता के कारण उक्त भूमिंया वादी कम्पनी के नाम अंकित नहीं हो पाई जिसका हश्र

यह हुआ की जो भूमिया इसके खातेदारो के नाम राजस्व अभिलेखे में अंकित थी उन्ही के नाम अंकित रह गई व जो भूमिंया बिलानाम थी एवं जिनका अकन सम्बंधित परिशिष्ठ में अंकित हैं वे भूमियां वादी कम्पनी के आधिपत्य में होते हुऐ भी मात्र बिलानाम अंकित होने के कारण नगर विकास प्रन्यास के नाम अंकित हो गई है।

15. यह कि उक्त प्रविशिष्ठिया मात्र राजकोषीय प्रविशिष्टिया हैं तथा विधि यह प्रवत करती है कि जमाबंदी व खातेदारी की प्रविशिष्टिया मात्र राजकोषीय प्रविशिष्टिया है तथा ये आधिपत्य अथवा खातेदारी की किसी भी प्रकार से पुष्टि नही करती है न ही किसी प्रकार के अधिकारो का समापन करती है। विदित रहे इन भूमियो जिनका वर्णन परिशिष्ट (1) से (7) में किया गया है वे स्वयं राज्य सरकार द्वारा अवाप्त की जाकर वादी कम्पनी को सुपुर्द की गई है तथा वादी कम्पनी का आधिपत्य इनके द्वारा पुष्ट किया गया है वादी कम्पनी के आधिपत्य की पुष्टि पुराने कई फोटोग्राफ, गुगल मेप, सुपर इम्पोज नक्शे तथा राष्ट्रीकृत ऐजेन्सी (एन.आर.एस.सी.) नेशनल रिमोट सेंसिंग ऐजेन्सी द्वारा उपलब्ध कराये गये नवीन तथा पुराने नक्शो से भी होती है।

16. यह कि उक्त प्रकरण उक्त वर्णित भूमिंया जिनका वर्णन परिशिष्ट 1 से 7 में किया गया है, वादी कम्पनी को अवाप्ति से विधि सम्मत् रूप से प्राप्त हुई है साथ ही इन भूमियो को वादी कम्पनी का विगत 30 वर्षो से भी अधिक समय से आधिपत्य चला आ रहा हैं प्रतिवादीगण ने आज दिंनाक तक न तो उक्त भूमियो का किसी भी प्रकार से उपयोग किया है न ही विगत 30 वर्षो में एक सेकण्ड के लिए भी एक इंच भूमि पर भी प्रतिवादीगण का कब्जा रहा है। प्रतिवादीगण का वादग्रस्त भूमियो पर कोई अधिकार नही है तथा उक्त वर्णित भूमिया वादी कम्पनी के आधिपत्य में चली आ रही है जिस पर वादी कम्पनी की बाउण्ड्रीवाल भी बनी हुई है उक्त बाउण्ड्रीवाल इतनी उंची है कि प्रतिवादीगण द्वारा कभी कब्जा किया जाना संभव ही नहीं है न ही उनका कब्जा है न उन्होने इस भूमि का उपयोग उपभोग किया है न कभी कृषि की है न लगान ही जमा कराया है अर्थात् नाम मात्र के लिए उक्त भूमिंया प्रतिवादीगण के नाम खातेदारी में अंकित है जो मात्र राजस्व अधिकारीयो की उदासीनता का परिणाम है। यदि इस संबंध में राजस्व अधिकारीयो यथा पटवारी, तहसीलदार से मौके की स्थिति व रिकार्ड का अवलोकन कराया जाकर रिपोर्ट मंगवाई जाती है तो स्थिति स्वंय में ही स्पष्ट हो जावेगी।

17. यह कि उक्त कारण से परिशिष्ट (1) से (7) में अंकित भूमियो को वादी कम्पनी के खातेदारी एवं आधिपत्य की भूमि होने की घोषणा

कराई जानी आवश्यक है तथा एतद् अनुसार राजस्व अभिलेखो में अंकन कराया जाना तथा एतद् संबंधी निषेधाज्ञा भी पारित कराई जानी आवश्यक है जिस हेतु यह वाद आप श्रीमान के समक्ष प्रस्तुत है।

18. यह कि पूर्ववर्ती वाद मात्र एक खातेदार द्वारा प्रस्तुत किया गया है किन्तु वादी कम्पनी की अन्य कई भूमिंया भी इस विवादन में समाहित है तथा उक्त प्रकरण मात्र निषेधाज्ञा का है जिसमें काउन्टर वाद से प्रयोजन की पूर्ति नहीं हो सकती है तथा घोषणा व निषेधाज्ञा के लिए सभी खातेदारो को संयोजित करते हुऐ घोषणा व निषेधाज्ञा का यह वाद प्रस्तुत करना आवश्यक है।

19. यह कि भूमिधारी की हैसियत से तहसीलदार कुराबड व तहसीलदार गिर्वा को पक्षकार बनाया गया है साथ ही नगर विकास प्रन्यास को भी पक्षकार बनाया गया है।

20. यह कि वाद हेतुक दिंनाक 27/03/2024 को उत्पन्न हुआ जब नन्दराम द्वारा प्रेषित कराये गये सम्मन की प्रति प्राप्त हुई एंव एतद् पश्चात् इस वाद का पठन करने के उपरान्त वस्तु स्थिति की जानकारी होने के कारण निरन्तर उत्पन्न हो रहा है।

21. यह कि वादग्रस्त भूमियां राजस्व ग्राम बिछडी व देबारी में अवस्थित है जिनका कुछ हिस्सा तहसील गिर्वा तथा कुछ हिस्सा तहसील कुराबड में अवस्थित है तथा दो तहसीलो के सीमांत ग्राम में भूमिया अवस्थित होने के कारण उक्त वाद आप श्रीमान के समक्ष प्रस्तुत किया जा रहा है तथापि विधि अनुसार सक्षम उपखण्ड अधिकारी अथवा उपजिला कलेक्टर महोदय को उक्त प्रकरण सुनाई हेतु अन्तरित करने का अधिकार आप श्रीमान को प्राप्त होने से प्रकरण आप श्रीमान के समक्ष प्रस्तुत है।

22. यह कि वाद मुल्यांकन 50,000/—अक्षरे पचास हजार रूपया कायम किया जाकर नियत न्याय शुल्क पर वाद प्रस्तुत है।

23. यह कि वाद अन्दर मयाद प्रस्तुत है।

अतः प्रार्थना है कि :—

क. की वादी कम्पनी के पक्ष में एवं प्रतिवादीगण के विरूद्ध घोषणा की डिक्री पारित फरमाई जाकर इस आशय की घोषणा की डिक्री पारित फरमाई जावे की परिशिष्टि 1 से 7 में वर्णित भूमियो के वादी कम्पनी खातेदार है तथा उनके खातेदारी अधिकारो की घोषणा कराई जावे तथा वादी कम्पनी के आधिपत्य की भूमिंया जो वादी कम्पनी के बाउण्ड्रीवाल के अन्दर स्थित है, का अंकन राजस्व अभिलेखो यथा जमाबंदी, नक्शा ट्रेस एवं अन्य अनुसाझीं दस्तावेजो में अंकित कराया जावे।

ख. की वादी कम्पनी के पक्ष में एंव प्रतिवादीगण के विरूद्ध निषेधाज्ञा की डिक्री इस आशय की पारित कराई जावे की वाद वर्णित भूमियों अथवा इसके किसी भी हिस्से में प्रतिवादीगण कोई हस्तक्षेप नहीं करे न राजस्व अभिलेखो में हुऐ त्रुटिपूर्ण अंकन के आधार पर इस वाद मं वर्णित भूमियो अथवा इसके किसी भी हिस्से को रहन, बैह, बक्षीस नहीं करे न इन भूमियो पर प्रतिवादीगण कोई निर्माण करे न इस पर कोई भार या देयता ही कारित करे न अपने ऐजेन्ट, नोकर, प्रतिनिधि समुनुदेशिति आदी से ही करावे।

ग. की यदि विवादन काल में प्रतिवादीगण मौके एवं रिकार्ड की वस्तुस्थिति को परिवर्तित कर दे तो वाद से पूर्व की स्थिति प्रत्यास्थापित कराई जावे।

घ. की वाद व्यय व अन्य अनुतोष जो की प्रकरण के तथ्यो एवं परिस्थितियो को देखते हुऐ तथा धारा 209 एल.आर.एक्ट के तहत माननीय न्यायालय आवश्यक एवं उचित समझे प्रदान कराई जावे।

स्थान :– उदयपुर

दिंनाक :–

हस्ताक्षर

।। सत्यापन ।।

मैं शिल्पा नायर अधिकृत हस्ताक्षरकर्ता हिंदूस्तान जिंक लिमिटेड यशद भवन, स्वरूपसागर रोड, उदयपुर (राज0) सत्यापित करता हूँ कि उपरोक्त दावे में वर्णित समस्त कथन मेरे निजी ज्ञान एवं विश्वास से सही होकर सत्य है।

स्थान :– उदयपुर

दिंनाक :–

हस्ताक्षर

सेवामें,

माननीय न्यायालय उपखंड अधिकारी

गिर्वा, उदयपुर (राज0)

हिन्दुस्तान जिंक लि. **बनाम** नन्दराम **वगैरा**

प्रकरण सख्या /**2024** राजस्व वाद

|| शपथ पत्र ||

मैं शिल्पा नायर अधिकृत हस्ताक्षरकर्ता हिंदूस्तान जिंक लिमिटेड यशद भवन, स्वरूपसागर रोड, उदयपुर (राज0) राजस्थान शपथपूर्वक निवेदन करती हूं कि :–

1. मैं शपथपूर्वक निवेदन करती हूँ कि मेरे द्वारा प्रस्तुत वाद अन्तर्गत धारा 88, 89, 91, 92 व 92–ए तथा धारा 188 राजस्थान काश्तकारी अधिनियम का अभिन्न अंग है जिसमें वर्णित समस्त तथ्यो को सही होना स्वीकार करते हुए इस शपथ पत्र के माध्यम से यहां पुनः दोहराती हूँ।

स्थान :– उदयपुर
दिंनाक :–

हस्ताक्षर

|| सत्यापन ||

मैं शिल्पा नायर अधिकृत हस्ताक्षरकर्ता हिंदूस्तान जिंक लिमिटेड यशद भवन, स्वरूपसागर रोड, उदयपुर (राज0) सत्यापित करती हूँ कि उक्त शपथ पत्र में वर्णित समस्त तथ्य मेरे निजी ज्ञान के अनुसार सही होकर सत्य है।

स्थान :– उदयपुर
दिनांक:–

हस्ताक्षर

सेवामें,

माननीय न्यायालय उपखंड अधिकारी

गिर्वा, उदयपुर **(राज0)**

हिन्दुस्तान जिंक **लि.** **बनाम** नन्दराम **वगैरा**

प्रकरण सख्या /**2024** राजस्व वाद

।। **वादी** कम्पनी **का** रजिस्टर्ड पता ।।

हिन्दुस्तान **जिंक लिमिटेड** (**निगमित** कम्पनी) **जरिये अधिकृत** अधिकारी

शिल्पा नायर विधि **अधिकारी पुत्री श्री सुरेन्द्र कुमार नायर, उम्र 28 वर्ष,**

पता–यशद भवन, **स्वरूप सागर** रोड उदयपुर (राज0)

स्थान :– **उदयपुर**

दिंनाक :– हस्ताक्षर

सेवामें,

माननीय न्यायालय उपखंड अधिकारी

गिर्वा, उदयपुर (राज0)

हिन्दुस्तान जिंक लि. बनाम नन्दराम वगैरा

प्रकरण सख्या /2024 राजस्व वाद

प्रार्थना पत्र अन्तर्गत आदेश 5 नियम 20 सपठित धारा 151 सी.पी.सी.

उपरोक्त नामांकित प्रार्थी का विनम्र निवेदन निम्न प्रकार है :–

1. यह कि वादी कम्पनी ने हस्तगत वाद वास्ते घोषणा एवं निषेधाज्ञा का प्रस्तुत किया है जिसमें कुलिया प्रतिवादी सख्या 1 से 24 है।
2. यह कि प्रकरण में प्रतिवादीगण की सख्या भी अधिक है तथा जमाबंदी अनुसार उनकी सकुनुत भी स्पष्ट नहीं है जिससे प्रकरण में तामिल होना अत्यन्त दुष्कर है।
3. यह कि उक्त कारण से प्रकरण में व्यक्तिगत तामिल के बजाय प्रकाशन के माध्यम से तामिल कराया जाना आवश्यक है तथा सम्मन स्थानीय समाचार उदयपुर एक्सप्रेस अथवा दैनिक नवज्योति में प्रकाशित कराया जाने का आदेश प्रदान कराया जाना आवश्यक हैं
4. यह कि सभी प्रतिवादीगण का सयुक्त सम्मन टंकित करा साथ प्रस्तुत है जिसे प्रकाशन हेतु जारी कराया जाना आवश्यक है। वादी कम्पनी प्रकाशन का व्यय वहन करने हेतु तत्पर एवं तैयार है।

अतः प्रार्थना है कि सलग्न सम्मन प्रकाशित किये जाने एवं समाचार पत्र में छपवाये जाने का आदेश प्रदान कराया जावे।

स्थान :– उदयपुर

दिंनाक :–

हस्ताक्षर

वादपदों के स्थिरिकरण के लिए प्रतिवादी को सम्मन

(आदेश 5 नियम 1 व 5 व्यवहार प्रकिया संहिता)

माननीय न्यायालय उपखंड **अधिकारी**

गिर्वा, उदयपुर **(राज0)**

हिन्दुस्तान जिंक लि. बनाम नन्दलाल वगैराह

.....**वादी** .....प्रतिवादीगण

वाद संख्या /2024

प्रेषितः–

1. श्री नन्दराम पिता मगना जी डांगी, उम्र वयस्क, निवासी–ग्राम बिछडी, तहसील कुराबड, जिला उदयपुर (राज0)
2. श्री सत्तार खान पिता श्री हसन खान, उम्र बालिग, जाति मुसलमान, निवासी–ग्राम बिछडी, तहसील कुराबड, जिला उदयपुर (राज0)
3. श्री हीरालाल पिता श्री फतेहलाल जाति सालवी, उम्र बालिग, निवासी–ग्राम बिछडी, तहसील कुराबड, जिला उदयपुर (राज0)
4. श्रीमती गुणेशी पत्नी स्व. श्री डालू मेघवाल, उम्र बालिग, निवासी– बिछडी, तहसील कुराबड, जिला उदयपुर (राज0)
5. श्री बंशीलाल पिता डालू मेघवाल, उम्र वयस्क, निवासी–बिछडी, तहसील कुराबड, जिला उदयपुर (राज0)
6. श्री गांगा पुत्र डालू मेघवाल, उम्र वयस्क, निवासी–ग्राम बिछडी, तहसील कुराबड, जिला उदयपुर (राज0)
7. श्री लोगर पुत्र डालू मेघवल, उम्र वयस्क, निवासी–ग्राम बिछडी, तहसील कुराबड, जिला उदयपुर (राज0)
8. श्री किशन सिंह पिता भेरू सिंह राजपूत, उम्र बालिग, निवासी– कुडी, तहसील कुराबड, जिला उदयपुर (राज0)
9. श्रीमती खाटी बाई पत्नी सोहन सिंह राजपूत, उम्र बालिग, निवासी–कुडी, तहसील कुराबड, जिला उदयपुर (राज0)
10. श्री जय सिंह पिता भेरू सिंह जी राजपूत, उम्र बालिग, निवासी– कुडी, तहसील कुराबड जिला उदयपुर (राज0)
11. श्री डूले सिंह पिता सोहन सिंह जी राजपूत, उम्र बालिग, निवासी– कुडी, तहसील कुराबड जिला उदयपुर (राज0)
12. श्री दौलत सिंह पिता श्री भेरू सिंह जी राजपूत, उम्र बालिग, निवासी– कुडी, तहसील कुराबड जिला उदयपुर (राज0)
13. श्री रोड सिंह पिता श्री सोहन सिंह जी राजपूत, उम्र बालिग, निवासी–कुडी, तहसील कुराबड जिला उदयपुर (राज0)
14. श्री लक्ष्मण सिह पिता भेरू सिंह जी राजपूत, उम्र बालिग, निवासी– कुडी, तहसील कुराबड जिला उदयपुर (राज0)
15. श्री लाल सिह पिता भेरू सिंह जी राजपूत, उम्र बालिग, निवासी– कुडी, तहसील कुराबड जिला उदयपुर (राज0)
16. श्रीमती हमेरा बाई पत्नी भेरू सिंह जी राजपूत, उम्र बालिग, निवासी– कुडी, तहसील कुराबड जिला उदयपुर (राज0)

17. श्री बाबूलाल पिता मोती भील उम्र बालिग, निवासी–बिछडी, तहसील कुराबड, जिला उदयपुर (राज0)
18. मु. भूरी पुत्री पुरा जी भील, उम्र बालिग, निवासी–बिछडी, तहसील कुराबड, जिला उदयपुर (राज0)
19. मु. मांगी बाई पुत्री मोती भील उम्र बालिग, निवासी–बिछडी, तहसील कुराबड, जिला उदयपुर (राज0)
20. मु. लच्छु पुत्री पुरा जी भील, उम्र बालिग, निवासी–बिछडी, तहसील कुराबड, जिला उदयपुर (राज0)
21. श्रीमती लाली बाई पत्नी मोतीलाल भील, उम्र बालिग, निवासी–बिछडी, तहसील कुराबड, जिला उदयपुर (राज0)
22. राजस्थान राज्य जरिये तहसीलदार कुराबड, जिला उदयपुर (राज0)
23. राजस्थान राज्य जरिये तहसीलदार गिर्वा, जिला उदयपुर (राज0)
24. नगर विकास प्रन्यास, वर्तमान में उदयपुर विकास प्राधिकरण उदयपुर (राज0) जरिये अध्यक्ष एंव सचिव उदयपुर विकास प्राधिकरण, उदयपुर (राज0)

चूंकि वादीगण ने आपके विरूद्व वाद **पत्र नकल** संलग्न के लिए एक वाद संस्थिति किया है। अतः आपको एतद् द्वारा आहुत किया जाता है कि आप या तो स्वयम् ऐसे या अभिवक्ता जो कि सम्यकरूपेण अनुदिष्ट हो व वाद सम्बन्धी सर्व सारवान प्रश्नों के उत्तर देने में समर्थ हो या जिसके साथ ऐसा कोई व्यक्ति हो जो कि ऐसे सब प्रश्नों के उत्तर देने में समर्थ हो के द्वारा दिनांक.....को दिवस .....बजे दावे का उत्तर देने हेतु इस न्यायालय में उपस्थिति हो और आगे आपको एतद् द्वारा यह भी निर्देश दिया जाता है कि उस दिन आप अपनी प्रतिरक्षा का लिखित कथन पेश करे और उसी दिन वे सब प्रलेख जो आपके आधिपत्य या अधिकार में हो व जिन पर आप अपना प्रतिरक्षा या प्रतिपादन या प्रतिदावा आधारित करते हो, भी प्रस्तुत करें तथा जहां आप किसी अन्य प्रलेख जो आपके आधिपत्य या अधिकार में हो या न हो पर अपनी प्रतिरक्षा या प्रतिपादन या प्रतिदावा के समर्थ में साक्ष्य के रूप में भरोसा रखते हो, उन प्रलेखों को अपने लिखित कथन के साथ उपाबद्ध की जाने वाली सूची में प्रविष्ट करें।

सूचित रहे कि पूर्णवर्णित दिवस को आपके द्वारा अपनी उपस्थिति में व्यक्तिक्रम होने पर कथित वाद आपकी अनुपस्थिति में सुना व अवधारित किया जावेगा।

आज दिनांक.....को मेरे हस्ताक्षर व न्यायालय की मुद्रा के अधीन जारी किया गया।

हस्ताक्षर

सूचनाः
1. यदि आपको यह शंका हो कि आपके साक्षी अपनी इच्छा से उपस्थित नहीं होगे तो आप किसी साक्षी को उपस्थित होने हेतु विवश करने के लिए और किसी ऐसे प्रलेख को प्रस्तुत कराने हेतु जिसे कि प्रस्तुत कराने हेतु साक्षी को समाहुत करने के लिए आपको अधिकार है आप न्यायालय से सम्मन जारी करा सकते है।
2. यदि आप दावे को स्वीकारोक्त करते हो तो आप दावे के व्यय सहित धन इस न्यायालय में जमा करावे ताकि ऐसी अज्ञाप्ति जो कि आपके स्वयं के या आपकी सम्पत्ति या दोनो के खिलाफ हो, निष्पादन से परिवर्जित हो जाय।
3. प्रतिवादी अपने जवाबदावे के साथ दावे से सम्बन्धित समस्त दस्तावेज पेश करे।
4. प्रतिवादी अपना जवाब दावा 30 दिन के भीतर पेश करें।

सेवामें,

माननीय न्यायालय उपखंड अधिकारी

गिर्वा, उदयपुर (राज0)

हिन्दुस्तान जिंक **लि.** **बनाम** **नन्दराम वगैरा**

प्रकरण सख्या /2024 **राजस्व** वाद

प्रार्थना पत्र **अन्तर्गत आदेश 6 नियम 17 सपठित धारा 151 सी.पी.सी.**

उक्त अनवान प्रकरण में वादी की ओर से विनम्र निवेदन निम्न प्रकार है :–

1. यह कि वादी द्वारा हस्तगत वाद अन्तर्गत धारा 88, 89, 91, 92 व 92–ए तथा धारा 188 राजस्थान काश्तकारी अधिनियम आप न्यायालय में प्रस्तुत किया गया था जिस पर दिंनाक 06/06/2024 को जांच का आदेश पारित किया गया था।
2. यह कि दौराने जांच ज्ञात आया है कि सहवन से वाद में संलग्न परिशिष्ट में आबादी एवं गैर कृषि आराजीयात का भी अंकन हो गया है जिस वजह से उक्त वाद जांच के दोरान दर्ज नही हो पाया है।
3. यह कि हस्तगत प्रार्थना पत्र के साथ संशोधित वाद जिसमें मात्र कृषि भूमियों का ही उल्लेख है, प्रस्तुत है जिसे अभिलेख पर लिया जाकर हस्तगत वाद दर्ज किये जाने का आदेश पारित कराया तथा संशोधित वाद अभिलेख पर लिया जाना आवश्यक है। वादी पूर्ववर्ती वाद में उल्लेखित आबादी आराजीयात के संबंध मे इस न्यायालय से कोई अनुतोष याचित नहीं कर रहा है तथा सम्यक न्यायालय में इस संबंध में पृथक से प्रकरण प्रस्तुत करने का अनुतोष चाहता है जिसकी स्वंतंत्रता प्रदान कराई जानी आवश्यक है।
4. यह कि प्रार्थना पत्र का मुल्यांकन 100/–रूपया किया जाकर नियत न्याय शुल्क पर प्रस्तुत है।

अतः प्रार्थना है कि संशोधित वाद अभिलेख पर लिया जाकर प्रकरण में विपक्षीगण के नोटिस जारी कराये जानरे का आदेश प्रदान कराया जावे।

स्थान :– उदयपुर

दिनांक :–

हस्ताक्षर

कार्यालय उप वन संरक्षक, उदयपुर

वन भवन परिसर, मोहता पार्क के सामने, चेतक सर्कल, उदयपुर–313001
E-mail:- dcf.udpr.forest@rajasthan.gov.in Phone/Fax:-(0294)2429239

क्रमांक–एफ( )20सूत्रीय/उवसं/2021–22/5686 दिनांक– 17/8/21

–: बैठक कार्यवाही विवरण :–

दिनांक 17/08/2021 को सायः 05.30 बजे जिला कलक्टर सभागार में श्रीमान् जिला कलक्टर महोदय की ओर से मुख्य कार्यकारी अधिकारी, जिला परिषद, उदयपुर की अध्यक्षता में 20 सूत्रीय कार्यक्रम के तहत उदयपुर जिले में वन विभाग, अन्य राजकीय विभाग एवं स्वयं सेवी संस्थाओं द्वारा वर्ष 2021–22 में किये जाने वाले पौधारोपण हेतु लक्ष्यों के निर्धारण बाबत् एक बैठक का आयोजन किया गया।

उप वन संरक्षक, उदयपुर द्वारा समस्त उपस्थित अधिकारीगणों व स्वयं सेवी संस्थाओं के प्रतिनिधिगणों का स्वागत किया गया।

अध्यक्ष महोदय द्वारा बैठक प्रारम्भ की जाकर गत वर्ष 2020–21 के दौरान विभिन्न विभागों एवं स्वयं सेवी संस्थाओं को आवंटित लक्ष्यों एवं उनकी उपलब्धियों की चर्चा की गई। इस वर्ष हेतु राज्य सरकार से 20 सूत्रीय कार्यक्रम के अन्तर्गत वन भूमि एवं अन्य राजकीय भूमि पर वृक्षारोपण तथा उस क्षेत्र में लगाये जाने वाले पौधों का लक्ष्य **5280** है0 क्षेत्र में **34.32** लाख आवंटित किया गया। उक्त आवंटन को वन विभाग के अतिरिक्त विभिन्न स्वयंसेवी संस्थाओं एवं राजकीय विभागों हेतु पौधारोपण/बीजारोपण के लक्ष्यों का निर्धारण किया गया।

सहायक वन संरक्षक, झाडोल द्वारा उदयपुर जिले में वन विभाग की ओर से इस वर्ष किये जाने वाले वृक्षारोपण/बीजारोपण की जानकारी उपलबध कराई गई, जो निम्नानुसार है:–

क सं.	विभाग/संस्था का नाम	हैक्टेयर	वृक्षारोपण	बीजारोपण/कटिंग रोपण	योग
1	2	3	4	5	6
1	उप वन संरक्षक, उदयपुर	1600.93	431108	521766	952874
2	उप वन संरक्षक, उदयपुर (उत्तर)	1424.114	356800	567146	923946
3	उप वन संरक्षक, प्रतापगढ़	150.00	30000	30000	60000
4	उ.व.स. वन्य जीव, उदयपुर	481.30	95000	135800	230800
	योगः–	**3656.344**	**912908**	**1254712**	**2167620**

बैठक में उपस्थित विभिन्न विभागों के प्रतिनिधियों से चर्चा कर वर्ष 2021 में वृक्षारोपण हेतु निम्नानुसार लक्ष्य रखा गया।

क. सं.	विभाग	हैक्टेयर	वर्ष 2020–21 हेतु निर्धारित लक्ष्य
1	पुलिस विभाग		3000
2	जिला परिषद,		280000
3	नगर विकास प्रन्यास		25000
4	जल संसाधन विभाग		5000
5	चिकित्सा विभाग		7000

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6	प्रदुषण नियन्त्रण मण्डल		25000
7	राजस्थान आवासन मण्डल		2000
8	शिक्षा विभाग,(प्रा.) शिक्षा		100000
9	शिक्षा विभाग,(मा.) शिक्षा		60000
10	उप निदेशक, कृषि विभाग		175000
11	नगर निगम, उदयपुर		20000
12	पी.डब्ल्य.डी, उदयपुर		25000
13	खान एवं भू–विज्ञान विभाग		125000
14	रेलवे		25000
15	सहकारी समितियां		2500
16	रीको		20000
17	स्थानिय निकाय विभाग		5000
18	पशुपालन विभाग		12000
19	म. प्र. कृषि विश्वविधालय		5000
20	आर एस.एम.एम		15000
21	एन.एच.ए.आई.		50000
22	राज. राज्य भारत स्काउट् गाईड		15000
	योग	**1540.76**	**1001500**

वृक्षारोपण एवं पर्यावरण संरक्षण में स्थानिय संस्थाओं की भागीदारी सुनिश्चित करने हेतु निम्नानुसार पौधारोपण के लक्ष्य आवंटित करने का निर्णय लिया गया।

क.सं.	स्वयंसेवी संस्था / अन्य	हैक्टेयर	वर्ष 2021–22 हेतु निर्धारित लक्ष्य
1	हिन्दुस्तान जिंक लिमिटेड		59730
2	सेवा मन्दिर		80000
3	एफ.ई.एस.		90000
4	आलोक शिक्षण संस्थान		500
5	बायफ रिड़मा		7000
6	विधा भवन, उदयपुर		2000
7	एन.सी.सी.		5000
8	बी. एस.एफ.		1500
9	नेहरू युवा केन्द्र		2000
10	भूमि विकास बैंक		150
11	जावर ग्रप ऑफ माईन्स		15000
	योग	**404.43**	**262880**
	महायोग	**5601.534**	**3432000**

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अध्यक्ष महोदय द्वारा यह निर्देश प्रदान किये गये कि उदयपुर जिले की विभिन्न नर्सरियों में पौधों की उपलब्धता हेतु संबंधित विभाग / संस्था अपना मांग पत्र कार्यालय उप वन संरक्षक, उदयपुर, चेटक सर्कल उदयपुर को प्रस्तुत करे ताकि उन्हें नियमानुसार पौधे उपलब्ध कराये जाने की कार्यवाही की जा सके।

वन विभाग की ओर से समस्त विभाग / संस्थाओं को उदयपुर जिले की विभिन्न नर्सरियों में वितरण हेतु उपलब्ध **6.725** लाख पौधों की नर्सरीवार सूची उपलब्ध करायी गई ताकि वे अपनी सुविधानुसार नजदीकी पौधशाला से वांछित पौधे प्राप्त कर सकें। वन विभाग की विभिन्न पौधशालाओं में फलदार छायादार सजावटी औषधीय पौधे आदि उपलब्ध है।

अध्यक्ष महोदय द्वारा निदेशित किया गया कि वर्षा प्रारम्भ होने से पूर्व पौधारोपण किये जाने हेतु चिन्हित स्थलों पर अग्रिम कार्यवाही यथा–खड्डे खुदाई, पौधों की सुरक्षा आदि की व्यवस्था पूर्व से ही सुनिश्चित कर ली जावें ताकि वर्षा प्रारम्भ होते ही उनमें पौधे रोपित किये जा सके। साथ ही पौधों की नियमित देखभाल एवं उनकी जीवितता सुनिश्चित करने के निर्देश सम्बन्धित संस्थाओं / विभागों को दिये गये।

पौधारोपण किये जाने उपरान्त प्रत्येक माह की 15 तारीख एवं 1 तारीख को लक्ष्यों के विरूद्ध उपलब्धि की सूचना उप वन संरक्षक, उदयपुर कार्यालय को अथवा **Email-dcf.udpr.forest@rajasthan.gov.in** पर सम्बन्धित संस्था / विभाग की सूचना समय पर प्रेषित किया जाना कार्यालयाध्यक्ष का उत्तरदायित्व होगा। विभिन्न विभागों के उपस्थित अधिकारियों की गत बैठक की प्रति

इस मानसुन में अधिकतम पौधारोपण करने व अन्य को भी इस कार्य हेतु प्रेरित के आव्हान के साथ बैठक सधन्यवाद समाप्त हुई।

(मुकेश सैनी)
उप वन संरक्षक
उदयपुर

क्रमांक–एफ( )20 सूत्रीय / उवस / 2021–22 / 5687–5718, दिनांक–

प्रतिलिपि निम्न को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित है–

1. निजी सहायक, जिला कलक्टर, उदयपुर।
2. जिला पुलिस अधीक्षक, उदयपुर।
3. मुख्य कार्यकारी अधिकारी, जिला परिषद्, उदयपुर।
4. उप वन संरक्षक, उदयपुर (उत्तर) / वन्य जीव / प्रतापगढ / वि.का.म. उदयपुर।
5. अधीक्षण अभियन्ता, जल संसाधन विभाग, चेटक सर्कल, सहेली मार्ग, उदयपुर।
6. संयुक्त निदेशक, पशुपालन विभाग, चेटक सर्कल, उदयपुर।
7. उपायुक्त, राजस्थान आवासन मण्डल, सेक्टर–11, उदयपुर।
8. आयुक्त नगर निगम, उदयपुर।
9. सचिव, नगर विकास प्रन्यास उदयपुर।
10. परियोजना निदेशक, एन.एच.ए.आई पंचवटी, उदयपुर।
11. अधिशाषी अभियन्ता (महानरेगा), जिला परिषद्, उदयपुर।
12. मुख्य चिकित्सा एवं स्वास्थ्य अधिकारी, "स्वास्थ्य भवन" बडी, उदयपुर।
13. जिला शिक्षा अधिकारी, (प्रारम्भिक) शिक्षा, मधुवन, उदयपुर।

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14. जिला शिक्षा अधिकारी, (माध्यमिक) शिक्षा, उदयपुर।
15. अधिशाषी अभियन्ता, सार्वजनिक निर्माण विभाग, (PWD) उदयपुर।
16. उप निदेशक, कृषि विभाग, जिला परिषद, उदयपुर।
17. खनि अभियन्ता, खान एवं भू–विज्ञान विभाग, गोवर्धन विलास, उदयपुर।
18. मुख्य प्रबन्धक, हिन्दुस्तान जिंक लिमिटेड, 'यशद भवन' स्वरूप सागर, उदयपुर।
19. अध्यक्ष, सेवा मन्दिर, उदयपुर।
20. उप महा प्रबन्धक, रीको, मादडी इण्डस्ट्रीयल एरिया, उदयपुर।
21. उपरजिस्ट्रार, सहकारी समिति उदयपुर।
22. ग्रुप कमाण्डेट, एन.सी.सी. चेटक सर्कल, उदयपुर।
23. टिम लिडर एफ0ई0एस0 न्यू अहिंसापुरी फतहपुरा, उदयपुर।
24. प्रिन्सीपल, आलोक शिक्षण संस्थान, सेक्टर–11, उदयपुर।
25. बायफ (रिड़मा) बायफ भवन, सामुदायिक भवन के पास, 100 फिट रोड हि. म. से.–14, उदयपुर।
26. सहा.राज्य संगठन आयुक्त, राज.राज्य भारत स्काउट गाईड सुरजपोल उदयपुर।
27. रजिस्ट्रार महा. प्रताप कृषि एवं प्रौधोगिकी विश्वविधालय, युनि. केम्पस, उदयपुर।
28. प्रबन्धक, विधा भवन सोसाईटी, उदयपुर।
29. सहा. प्रबन्धक, आर.एस.एम.एम. उदयपुर
30. क्षेत्रीय अधिकारी, प्रदुषण नियन्त्रण मण्डल, मादडी औधोगिक क्षैत्र, उदयपुर।
31. वरिष्ठ भूजल वैज्ञानिक, भूजल विभाग, भुवाणा, उदयपुर।
32. जावर ग्रुप ऑफ माईन्स, उदयपुर

उप वन संरक्षक
उदयपुर

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ESG Initiative | World Water day Celebration 22nd March 2024-

Community visit & awareness session

ESG Initiative | World Environment day Celebration- Community-05th June 2024

ESG Initiative | World Environment day Celebration- Community-05th June 2024

HINDUSTAN ZINC
Zinc & Silver of India

NOC from State Wetland Authority - jmenwro@jmenvironet.org - Google Chrome

mail.google.com/mail/u/0/popout?ver=1ojkna2w2rvde&msg=%23msg-f%3A1816233480442285473&attid=0.1

Subject: NOC from State Wetland Authority

Pradeep Singh <Pradeep.Singh@hindzinc.co.in>

Thu, Oct 24, 10:03 AM

To,

The Nodal Officer,
Rajasthan State Wetland Authority,
Room No. 7317, 3rd Floor, Food Building,
Secretariat, Jaipur

Subject: Application for obtaining No Objection Certificate (NOC) for "Proposed Expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) through modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time at Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan)" from which Udai Sagar Lake is located ~ 1 km in SSW direction

Ref.: 1. MoEF&CC Proposal No.: IA/RJ/IND1/488353/2024, MoEF&CC File No. J-11011/479/2006-IA-II(I)
2. 67th EAC (Industry 1) meeting held on 16.10.2024 (Agenda item no. 67.14)

Sir,

With reference to above subject matter, we would like to bring to your kind notice that M/s. Hindustan Zinc Limited has an existing Debari Zinc Smelter plant at Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan), established in year 1968. The Udai Sagar Lake is ~ 1 km away in SSW direction from the plant site.

HZL has proposed the project "Proposed Expansion of Zinc Smelter (1,00,000 TPA to 1,20,000 TPA) through modernization within the existing premises of Debari Zinc Smelter under clause 7(ii) of EIA Notification 2006 amended from time to time at Villages: Debari and Bichhri, Tehsil: Girwa, District: Udaipur (Rajasthan)"

In this connection, the said the project was considered in the 67th meeting of EAC (Industry I), MOEFCC, New Delhi held on 16.10.2024, where the committee asked to obtain the NOC from the Rajasthan State Wetland Authority for the Udai Sagar Lake located at ~ 1 km in SSW direction from the plant site. MoM of the meeting is enclosed as **Annexure 1** (please refer pages 478-481 and can also be accessed on https://parivesh.nic.in/uploads/1100332/35_1729667100384.pdf) and provided below for ready reference.

> 7. It is reported that Udai Sagar Lake (-1.0 km, SSW) has been listed as Wetland by State Wetland Authority, Rajasthan, and 3 seasonal nallahas are passing through the plant site.

which have run off water from the nearby hill in west direction during rains only. The EAC noted that the Hon'ble Supreme Court has directed in many cases for wetlands conservation, and considering the same, the Committee advised PP to obtain NOC from the State Wetland Authority. PP shall prepare and provide details about the wetland conservation plan.

In this regard we would like to bring to your kind notice that the Udai Sagar Lake is ~ 1 km away in SSW direction from the plant site. As per the Rajasthan State Wetland Authority's List of Identified Wetlands in Rajasthan, the Udai Sagar Lake is an identified wetland mentioned on S.No. 442. The Udai Sagar Lake is geographically separated from the plant site by Panwan Reserve Forest (hill area) and located in upstream of the project site. Hence, there is no chance of any contamination of lake due to the existing plant & proposed expansion project. No wastewater is being/ will be discharged outside the plant as we are maintaining Zero Liquid Discharge. Waste water generated after expansion will also be treated and utilized internally within plant site. We are/will be taking all the necessary mitigation measures to conserve the Udai Sagar Lake environment. The proposed expansion project will be carried out within the existing plant premises and no additional land will be acquired.

In this connection we request your good self to kindly issue the No Objection Certificate (NOC) for the proposed expansion project by M/s. Hindustan Zinc Limited proposed in the existing plant site from which Udai Sagar Lake is ~ 1 km away in SSW direction. Map showing the presence of Udai Sagar Lake and KML file of the project site have been enclosed as **Annexure 2** and **Annexure 3** respectively.

Enclosure:
Annexure 1 : Minutes of 87th Meeting of the Expert Appraisal Committee of Industry-1 Sector Projects held from 14/10/2024 to 18/10/2024
Annexure 2 : Map showing distance of plant site from Udai Sagar Lake
Annexure 3 : KML file of the project site

Regards,

Pradeep Singh
Chief HSE & Sustainability

M +91-9829733447

Hindustan Zinc Limited
Yashad Bhawan, Udaipur-313 004,
Rajasthan, INDIA. T: +91-294-6604000-03
www.hzlindia.com

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Mass balance of toxic elements such as Cadmium (Cd), Nickel (Ni), & Mercury (Hg)

1. Mass Balance of Cadmium (Cd) & Nickel (Ni):

During 1st step of Leaching that is Neutral Leaching along with Zinc Oxide all other oxides of Cu, Cd, Co & Ni also got leached and carry along with Zinc sulphate solution in the form of sulphates. The solution coming out from Neutral Leaching is called as Neutral overflow. The neutral overflow solution contains several impurities like copper, cadmium, cobalt and nickel. The impurities enhance or impeded the electrolytic winning of zinc as far as these impurities have not been completely removed during the ferric hydroxide purification in the neutral leaching plant. Before the solution can be sent to the electro winning these impurities have to be removed in the purification plant.

The purification of the neutral overflow solution will be carried out in two steps.

- Hot purification for the removing of copper, cadmium, cobalt and nickel as major impurities.
- Second step or polishing step to ensure top quality of the purified solution.

To improve the precipitation of the impurities, the filter cake from the polishing step is recycled to the hot purification step.

The last tank of the hot purification cascade is the pump tank. Under normal pro-cess conditions, the solution goes from this tank via the centrifugal pumps. The parallel chamber filter presses separate the cemented impurities and the excess of zinc dust from the zinc sulphate solution.

The enrichment plant is designed to recover as much as possible of the zinc from the hot purification filter press cake and to keep all other unwanted impurities in the cake. The amount of treated cake will depend on the impurities content of the calcine leached in the leaching section. The enrichment cake also called as purification waste cake is being recycled through registered recyclers.

The hot purification cake treated with spent electrolyte and recovered Zinc only in the form of Zinc Sulphate. During this process very small part of Cadmium also got dissolve in the form of cadmium sulphate. This enrichment filtrate after filtration through filter press contains Zinc and Cadmium in sulphate forms. The enrichment filtrate then fed to jarosite section where along with iron, cadmium also got precipitate as jarosite and report in Jarosite cake.

FG	120000						
Recovery	0.968						
Zn in Calcine	0.568						
Calcine Quantity	218120						
Cd IN	%	0.24			Ni IN	PPM	45.5
Cd IN	MT	525			Ni IN	MT	10
Cd OUT	MT	525			Ni OUT	MT	10
	UOM	**Cd**	**Quantity MT**			**Ni**	
In Zinc Ingot	ppm	5	120000	0.6		0	0.000
Jarosite	%	0.0356	105756	38		0.0012	1
ETP Cake	%	0.1434	6789	10		0.0031	0
Anode Mud	%	0	1599	0		0	0
Cooler Cake	%	0	1221	0		0	0
PF cake	%	19	2511	477		0.34	9

	MT			525			10

2. **Mass balance of toxic elements such as mercury (Hg):**

Mercury (Hg) is volatile in nature and during Roasting the Hg travels through SO_2 gas.

For the production of sulphuric acid with a low mercury content, the so-called Norzinc Mercury Removal Process (Calomel Process) is in foreseen.

This process allows removal of metallic mercury vapours from SO_2-gases upstream of sulphuric acid plants. The ingress of mercury into the sulphuric acid is prevented and a safe and reliable production of a sulphuric acid with low mercury contents is achieved.

In the Mercury Removal Process, Calomel (Hg_2Cl_2) is produced.

Process is as follows: Gaseous metallic mercury (Hg-0) in the SO_2-gas reacts with mercury chloride ($HgCl_2$, resp. Hg^{++}) dissolved in a reaction liquid and forms a solid mercury chloride compound (Hg_2Cl_2), the so-called Calomel.

Calomel is removed from the reaction liquid circuit by liquid/solid separation in a settling tank. For the storage of excess liquid which is bleeded form the plant the so-called Zinc-Dusting Tank is installed.

For production and the storage of the high concentrated reaction agent (strong solution), the installation of a chlorination tank and a storage tank is foreseen.

Process Description:

The Norzink Process for the removal of mercury from SO_2- gases, is a continuously operated wet chemical process installed upstream of the drying tower of a sulphuric acid plant.

The main reaction equation is:

Hg (0) (gaseous) + $HgCl_2$ (dissolved as complex) Hg_2Cl_2 (solid)

This reaction happens in a reaction tower. The gas enters the reaction tower from the bottom and flows through a packing. The packing is irrigated with the reaction liquid. The reaction agent is mercury chloride dissolved in a acidic aqueous solution. The gas flows upstream in counter-current flow to the downwardly flowing liquid. The above-described chemical reaction happens in the packing. A packing is used, which provides a high specific surface, has a reasonably low pressure drop, but also is resistive against blockages.

In the exit section of the tower, very efficient droplet elimination systems are installed. These systems shall eliminate particle and mist carry-over.

Concentrate quantity	593919				
Hg IN	ppm	30.63			
	MT	**18.192**			
Hg Out					
	UOM		Quantity		Hg in MT
Calcine	ppm	11.70	MT/Annum	522500	0.61
Acid	ppm	2.0	MT/Annum	498500	0.10
ETP-Cake (PPM)	ppm	290.3	MT/Annum	6789	0.20
Calomel Generation	%	82.47%	MT/Annum	20.95	17.28

					18.183

*****

SPENT ELECTROLYTE MANAGEMENT PLAN

In the tank house zinc from the purified solution ($ZnSo_4$) is deposited as metallic zinc (Zn) on the aluminium cathodes. This cathode zinc is then removed from the cathodes and sent to the melting and casting plant where the cathodes are melted and cast to Zinc ingots.

The tank house consists of the following main plant sections and or equipment:

- Electrolyte circulation systems consisting of:
  - Electrolytic cells, each equipped with
  - Electrolyte return launder system (one for each cell row)
  - Concrete electrolyte circulation tanks each equipped with:
    - Horizontal centrifugal circulation pumps
    - Horizontal centrifugal spent electrolyte pumps
  - Atmospheric cooling towers
  - Electrolyte feed launder system (one for each cell row)
  - Cell cleaning system

Warm electrolyte (38°C) overflowing from the cells belonging to one cell row is collected in the electrolyte return launder. This spent electrolyte flows by gravity to the circulation tank-feeding box. The circulation tank-feeding box is an integrated tank compartment of the circulation tank, which is separated from the circulation tank by a wide overflow weir. Spent electrolyte required in the leaching plant will be drawn from this circulation tank-feeding box with the pumps. The excess electrolyte will overflow from the feeding-tank box into the circulation tank. A controlled amount of purified neutral solution is continuously added to the circulation tank to raise the zinc content in the electrolyte.

Dissociated elements: $ZnSO_4 \rightarrow SO_4^{2-} + Zn^{2+}$

Reaction ions: $Zn^{2+} + 2e^- \rightarrow Zn^0$

General formula: $ZnSO_4 + H_2O \rightarrow H_2SO_4 + Zn + \frac{1}{2} O_2$

During above reaction the Zn get deposited on the aluminium cathode and a spent electrolyte get generated. The oxygen, which is liberated at the anode, will oxidize Mn-ions from the electrolyte to MnO_2.

$MnSO_4 + \frac{1}{2} O_2 + H_2O \rightarrow MnO_2 + H_2SO_4$

Further, the spent electrolyte generated at tank house is recycled to Leaching & Purification to enrich the Zinc content. The Leaching & Purification enrich the Zinc in spent electrolyte by almost 110 gpl and after purification sent to tank house.

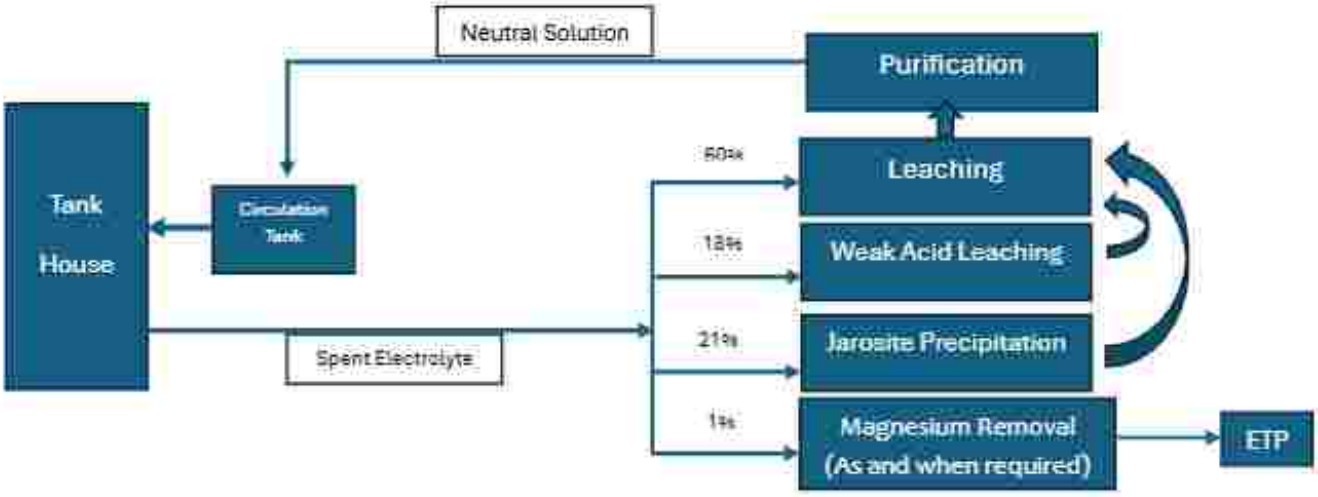
In Leaching and Purification

- The main acid bearing solution, which are used to leach the calcine added into the neutral leach step, is the spent electrolyte from tank house with approx. 180 g/l free H_2SO_4. Here the Zinc in the form of Zinc Oxide get leached and converted into Zinc Sulphate solution.
- The feed to neutral leaching 2 that is in Weak Acid Leaching section is the underflow from neutral leaching 1 and spent electrolyte. Here, the leftover Zinc Oxide is leached with spent electrolyte.

- The spent acid is added into the Jarosite section into the first conversion tank to leach the Zn which is in the form of Zinc Ferrite, the addition is maintained sp as to keep the acidity coming from the last conversion tank in operation at the level of 30 - 40 g/l
- Part of spent electrolyte (1% of volume) is fed into the first precipitation tank Magnesium Removal section to bleed out the magnesium and the liquor further sent to ETP

After leaching, the Zinc Sulphate along with impurities like Cu, Cd & Co fed to Purification section. The Zinc dust is added to the purification tanks. All the impurities were replaced by Zinc by cementation process. The slurry then fed to filter press and the clear Neutral solution with negligible impurities fed to Tank house.

All the storage tanks, reaction tanks, cells, launders and the pumping tanks in the tank house as well as the Leaching and Purification are placed overhead. The complete floor of both the plants is PVC with acid proof brick lined to avoid any ground contamination. The complete system of electrolyte transfer is closed loop and transferred through pipes and launders. All the storage tanks, pumping tanks are equipped with level transmitters and monitored through DCS.



SCS **SCS ENVIRO SERVICES PRIVATE LIMITED**

7, KESAR VIHAR, OPPOSITE KHATU SHYAMJI TEMPLE,
RAMNAGARIYA ROAD, JAGATPURA,
JAIPUR-302017, RAJASTHAN (INDIA)
CIN NO.: U74140RJ2013PTC042216

Sample ID No.: SCS/W/20240829/06	**Date of Registration: 29.08.2024**
Report No. SCS/HZL/W/20240829/06	**Date of Report: 10.09.2024**

TEST REPORT

Name of Client : M/s. Hindustan Zinc Limited, Zinc Smelter, Debari
Address Client : Village: Debari, Udaipur-313024, Rajasthan
Date of Sampling : 29.08.2024
Date of start of testing : 02.09.2024
Date of end of testing : 10.09.2024
Details of Sample : **ETP Cake / Sludge**
Sample submitted by : SCS Representative

S. No.	Parameter	Results	Protocol
1	Silver as Ag	33 PPM	SW 846 7760A
2	Aluminium as Al	14,580 PPM	SW 846 7020
3	Arsenic as As	116 PPM	SW 846 7060A
4	Calcium as Ca	1,85,700 PPM	SW 846 7140
5	Cadmium as Cd	1,434 PPM	SW 846 7130
6	Cobalt as Co	23 PPM	SW 846 7200
8	Chromium as Cr	36 PPM	SW 846 7190
9	Copper as Cu	369 PPM	SW 846 7210
10	Iron as Fe	48,500 PPM	SW 846 7380
11	Magnesium as Mg	25,820 PPM	SW 846 7450
12	Manganese as Mn	8,545 PPM	SW 846 7460
13	Sodium as Na	3,955 PPM	SW 846 7770
14	Nickel as Ni	31 PPM	SW 846 7520
15	Phosphorus P	1,522 PPM	IS 3025 Part 31
16	Lead Pb	7,212 PPM	SW 846 7420
17	Antimony as Sb	217 PPM	SW 846 7040
18	Zinc as Zn	81,030 PPM	SW 846 7950
19	Mercury	270.5 PPM	SW 846 7471A

Per pro SCS Enviro Services Pvt. Ltd.,

Dr. D. S. Parihar
(Technical Manager)
Authorised Signatory

SCS ENVIRO SERVICES PVT. LTD. JAIPUR

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- This report in full or in part, shall not be used for advertising or as evidence in any court of law.
- This report cannot be reproduced without the written permission of the director.
- The sample will be destroyed after 15 days from the date of issue of the test report.
- The liability of the laboratory is limited to the invoiced amount.
- All disputes are subjected to Jaipur jurisdiction.

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