

Ref. No. HZL/CLZS/ENV/43/2022-23

Date: 02.12.2022

To,

The Director (Industry - I) IA Division

Ministry of Environment, Forest &amp; Climate Change,

Indira Paryavaran Bhawan, Jor Bag Road,

New Delhi-110 003

**Subject:** Expansion within the existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 Back Pressure Turbine Generator, Recovery of Minor Metals & Installation of 5 DG Sets] at villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan)- **Reg. Submission of Final documents for obtaining Environmental Clearance**

- Ref.:**
1. MoEFCC File No. J-11011/279/2006-IA.II(I)
  2. Standard ToR Letter issued, dated 27<sup>th</sup> Sep., 2021

Respected Sir,

With reference to the aforesaid subject and above cited reference matter, we are herewith submitting the Final documents (Final EIA / EMP Report, PH Proceedings and all relevant documents) for obtaining Environmental Clearance of "Expansion within the existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 Back Pressure Turbine Generator, Recovery of Minor Metals & Installation of 5 DG Sets] at villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan)."

We request your good self to kindly consider our proposal for further proceedings.

Thanking You and with Regards,

For M/s Hindustan Zinc Limited



C Chandru

Chief Executive Officer – Smelters, HZL

Enclosure: as above

# FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT & ENVIRONMENTAL MANAGEMENT PLAN

FOR

## EXPANSION WITHIN THE EXISTING CHANDERIYA LEAD ZINC SMELTER COMPLEX

[Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II,  
Change in Product Mix in Pyro Unit on Total Metal Basis & Installation of 1 Lead Refinery,  
Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Sets]

At

Village : Putholi, Ajoliya Ka Khera & Biliya,  
Tehsil Gangrar & Chittorgarh,  
District Chittorgarh(Raj.).

Study Period: Post Monsoon season (Oct., to Dec., 2020) & October, 2021

Public Hearing Conducted on 20.07.2022

### PROJECT PROPONENT



**M/s. Hindustan Zinc Ltd.**  
**Chanderiya Lead Zinc Smelter**

Village: Putholi, Tehsil: Gangrar,  
District: Chittorgarh (Rajasthan) - 312 021  
Telephone No. 01472-254411/12, Mobile No. 9116134090  
E-Mail: manisha.bhati@vedanta.co.in  
Website: www.hzindia.com

### APPLICANT



**J.M. EnviroNet Pvt. Ltd.**

(Registered EIA Consultant Organization from NABET-QCI)  
Certificate No.: NABET/EIA/2023/SA 0172  
dated 16.08.2022, valid upto 07.08.2023  
Emaar Digital Greens, Tower – B, Unit No. 1517,  
Golf Course Ext. Road, Sector – 61, Gurugram (Haryana) – 122 011  
E-mail: jmenviro@hotmial.com  
NABL Approved Lab: JM EnviroLab Pvt. Ltd.  
(Certificate No.:TC-6821)



### Undertaking

I, **C. Chandru, Chief Executive Officer- Smelters of M/s Hindustan Zinc Limited** give this undertaking to the effect that the Standard ToRs prescribed by MoEFCC, New Delhi vide letter no. F. No. J-11011/279/2006-IA.II(I) dated 27.09.2021 for “Expansion within the existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 Back Pressure Turbine Generator, Recovery of Minor Metals & Installation of 5 DG Sets] at villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan)” have been compiled with, and the data submitted are factually correct.

Date: 2.12.2022

Place: Rajasthan

For and Behalf of Hindustan Zinc Limited



**C. Chandru**  
Chief Executive Officer - Smelters



25 years of success

# J.M. ENVIRONET PVT. LTD.

CIN No.:- U45201RJ1993PTC007449

## Undertaking

We, J.M. EnviroNet Pvt. Ltd. (JMEPL), having registered office at 403, 4<sup>th</sup> Floor, Jaipur Centre, B2 Bye-Pass, Tonk Road, Jaipur, Rajasthan, Environmental Consultant of M/s. Hindustan Zinc Limited for their Expansion within the existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 Back Pressure Turbine Generator, Recovery of Minor Metals & Installation of 5 DG Sets] at villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan) give this undertaking to the effect that this Final EIA / EMP Report has been prepared as per the ToR Letter prescribed by MOEFCC, New Delhi vide letter no. J-11011/279/2006-IA.II (I) dated 27.09.2021 & as per data / details provided by project proponent and the data submitted are factually correct.

Date: 30.11.2022

For & behalf of J.M. EnviroNet Pvt. Ltd.

Place: Gurgaon

  
Dr. Deepa Taneja  
Managing Director

### Regd. Office

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B2 Bye pass, Tonk Road, Jaipur-302018 (Rajasthan) India  
E-mail: [jmenviron@hotmail.com](mailto:jmenviron@hotmail.com) [www.jmenvironet.org](http://www.jmenvironet.org)

### Corporate Office

Emaar Digital Greens, Tower-B,  
Unit No.1517, Golf Course Ext. Road,  
Sector-61, Gurugram-122011 (Haryana) India



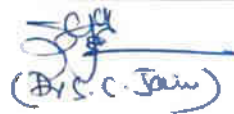

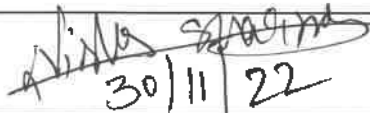
## DECLARATION OF ASSOCIATION IN THE FINAL EIA

MoEFCC File No.: J-11011/279/2006-IA.II (I)


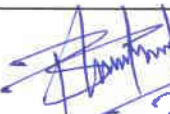



Declaration by Experts contributing to the Final EIA for Expansion in existing CLZS Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change In Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Sets] at villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan) by Hindustan Zinc Limited.

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


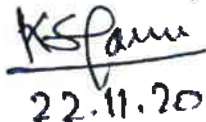
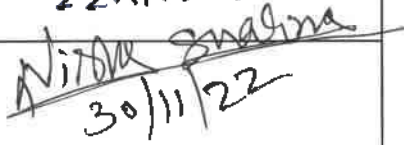






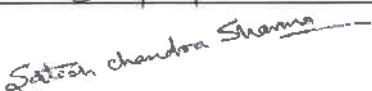



JM File no.: JMEPL/HZL/JM File No.722/EIA/Nov.,2022/Final 1

	Name	Period of Involvement	Signature and Date:
EIA coordinator:	Dr. Suresh Chandra Jain	March, 2020 to April, 2021	 (Dr. S. C. Jain)
	Mr. Khem Shankar Gour	May, 2021 to till date	 22.11.2022
TM	Ms. Nisha Sharma	March 2020 to till date	 30/11/22
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	May, 2021 to Nov., 2022	 22.11.2022
		Mr. Bhana Ram Jat	Sept., 2020 to April, 2021	 22/11/2022
		Dr. Jitendra Yadav	Till Nov.2020	 22/11/2022
2	WP*	FAE Mr. Khem Shankar Gour	May, 2021 to Nov., 2022	 22.11.2022
		Dr. Jitendra Yadav	Sept., 2020 to April, 2021	 22/11/2022

### DECLARATION OF ASSOCIATION IN THE FINAL EIA

S. No.	Functional areas	Name of the expert/s	Involvement (Period and task**)	Signature and date
3	SHW*	FAE Dr. Suresh Chandra Jain	Sept., 2020 to April, 2021	
		Mr. Khem Shankar Gour	May 2021 to Nov., 2022	
		Ms. Nisha Sharma (SW Only)	Sept., 2020 to Nov., 2022	
4	SE*	FAE Ms. Geetanjali Saini	Sept., 2020 to Nov., 2022	
5	EB*	FAE Dr. Karuna Sharma	Sept., 2022 to Nov., 2022	
		Mr. Jayant Solanki	Sept., 2020 to April, 2021	
6	HG*	FAE Mr. Kirti Prakash Agarwal	Sept., 2020 to Nov., 2022	
7	AQ*	FAE Dr. Jitendra Yadav	Sept., 2020 to Nov., 2022	
8	Noise*	FAE Ms. Nisha Sharma	Sept., 2020 to Nov., 2022	
		Mr. S.C Sharma	Till Oct., 2020	
9	LU*	FAE Mr. Kirti Prakash Agarwal	Sept., 2020 to Nov., 2022	
		Ms. Geetanjali Saini	Sept., 2020 to Nov., 2022	
10	RH*	FAE Dr. Suresh Chandra Jain	Sept., 2020 to Nov., 2022	



## DECLARATION OF ASSOCIATION IN THE FINAL EIA

\*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 in existing CLZS Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Sets] at villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan) by Hindustan Zinc Limited.

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

Signature:

Name:

Designation:

Name of the EIA consultant organization:

NABET Certificate no. & issue date:



Dr. Deepa Taneja

Managing Director

JM EnviroNet Pvt. Ltd.

NABET/EIA/2023/SA 0172 dated 16<sup>th</sup> Oct., 2022

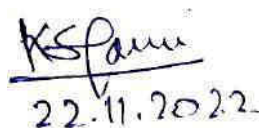
## Self - Certified Plagiarism Check Sheet

Title of EIA Report	Expansion within the existing Chanderiya Lead Zinc Smelter (CLZS) Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Sets] at villages Putholi, Ajoliya Ka Khera & Biliya, Tehsil Gangrar & Chittorgarh, District Chittorgarh (Rajasthan) by <b>M/s. Hindustan Zinc Limited.</b>
Name of Accredited Organization	J.M. EnviroNet Pvt. Ltd.
JMEPL Unique Identification Number	File No. JMEPL/HZL / 722 / EIA / Nov.,2022 / Draft1 (Copies Printed 20) / Final 1 (Copy No. 0)
MOEF/SEIAA File No. / Proposal No.	<b>Project</b> – MoEF&CC File No. IA-J-11011/279/2015-IA.II(I)
Name of EIA Co-ordinator (EC)	K.S. Gour
Name of the software	Paid plagiarism software –Plagiarism Checker X <a href="https://plagiarismcheckerx.com/">https://plagiarismcheckerx.com/</a>
Date of check	30.11.2022
Time of check	2:30 pm

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

I hereby certify that this EIA report has been evaluated using online software viz., **Plagiarism Checker X** (<https://plagiarismcheckerx.com/>). The report produced has been analysed by the system and based on it, I certify that the EIA Report produced in accordance with good scientific practice.

Date and Sign of EIA Co-ordinator:



Name of the EIA Co-ordinator:

K.S. Gour

Date and sign of Head of ACO:



Dr. Deepa Taneja (Managing Director)

Name of the EIA consultant organization

J.M. EnviroNet Pvt. Ltd.

NABET Certificate No. & Issue Date:

NABET/EIA/2023/SA 0172 dated 16.08.2020 and valid up to 07.08.2023



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## **ABBREVIATIONS**

AAQM	:	Ambient Air Quality Monitoring
AAQMS	:	Ambient Air Quality Monitoring Stations
AAS	:	Atomic Absorption Spectrometer
AERMOD	:	Atmospheric Dispersion Modelling
APCE	:	Air Pollution Control Equipment's
APM	:	Air Particulate Matter
AQC	:	Air Quenching Cooler
AMSL	:	Above Mean Sea Level
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
CSI	:	Cement Sustainability Initiative
CSR	:	Corporate Social Responsibility
CTE	:	Consent to Establish
CTO	:	Consent to Operate
D.G	:	Diesel Generator
DL	:	Detection Limit
DO	:	Dissolved Oxygen
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
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
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
MSDS	:	Material Safety Data Sheets
MT	:	Metric Tonne
MTPA	:	Million Tonnes Per Annum
MoEFCC	:	Ministry of Environment and Forest & Climate Change
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
NW	:	North West
NH	:	National Highway
NIDM	:	National Institute of Disaster Management
NOC	:	No Objection Certificate
NNW	:	North of Northwest
NO <sub>x</sub>	:	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
RDS	:	Respiratory Dust Sampler
RI	:	Rainfall Infiltration
RO	:	Reverse Osmosis
RSPM	:	Respirable Suspended Particulate Matter
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
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

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
$\mu\text{g}/\text{m}^3$	:	Micro gram per metre cube
$\mu\text{S}/\text{cm}$	:	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 <sup>3</sup>	:	Kilogram per Newton cubic metre
mg/Nm <sup>3</sup>	:	Milligram per Newton metre cube
m	:	Metre
mg/kg	:	Milligram per kilogram
mg/l	:	Milligram per Litre
mm	:	Millimeter
m <sup>3</sup> /hr	:	Meter cube per hour
m/s	:	Meter per second
sq. km	:	Square kilometer



F. No. J-11011/279/2006-IA.II(I)  
Government of India  
Ministry of Environment, Forest and Climate Change  
(Impact Assessment Division)

Indira Paryavaran Bhawan  
Jor Bagh Road, Aliganj,  
New Delhi – 110003

E-mail: r.sundar@nic.in  
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Dated: 27<sup>th</sup> September, 2021

To

**Shri. C. Chandru,**  
Chief Operating Officer Smelters and location head,  
M/s. Hindustan Zinc Ltd.,  
Chanderiya Lead Zinc Smelter Complex (CLZS), P.O. Putholi,  
District Chittorgarh, Rajasthan - 492001  
Email: [manisha.bhati@vedanta.co.in](mailto:manisha.bhati@vedanta.co.in)

Subject: Expansion within the existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Sets] by **M/s. Hindustan Zinc Ltd.** located at villages Putholi, Ajoliya Ka Khera & Biliya, Tehsil Gangrar & Chittorgarh, **District Chittorgarh, Rajasthan – Prescribing of Terms of Reference—** regarding.

Sir,

1. This has reference to online application of M/s. Hindustan Zinc Limited made vide proposal no. IA/RJ/IND/215163/2021 dated 05/09/2021 along with the application in prescribed format (Form-I), copy of Pre-Feasibility Report and proposed ToRs for undertaking detailed EIA study as per the EIA Notification, 2006 for the project mentioned above. The proposed project activity is listed at S. No. 3(a) Metallurgical industries (ferrous & non-ferrous) under Category "A" of the schedule of the EIA Notification, 2006 and is being appraised at Central Level.
2. The proposal cited above was considered by the Reconstituted Expert Appraisal Committee (REAC) of Industry 1 sector in its 44<sup>th</sup> meeting held on 13-14<sup>th</sup> September, 2021. The EAC proceedings of the said meeting is furnished as below.

**Details submitted by Project proponent**

3. The project of Hindustan Zinc Limited is located in Villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh, Rajasthan State is for Expansion within the existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Smelter Unit by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in

*Terms of Reference for project titled "Expansion within the existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Sets] by M/s. Hindustan Zinc Ltd. located at villages Putholi, Ajoliya Ka Khera & Biliya, Tehsil Gangrar & Chittorgarh, District Chittorgarh, Rajasthan"*

010



Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 Back Pressure Turbine Generator, Recovery of Minor Metals & Installation of 5 DG Sets].

4. Environmental site settings:

Environmental site settings.

S No	Particulars	Details	Remarks								
i.	Total land	335.89 ha The total area is under possession of M/s. Hindustan Zinc Ltd.	Present land use of the Complex is Industrial & it will remain same after the expansion. Only the intensity of land use will be increased.								
ii.	Existence of habitation & involvement of R&R, if any.	No existence of habitation & involvement of R&R.	-								
iii.	Latitude and Longitude of the project site	Chanderiya Lead Zinc Smelter complex - [all four corners] <table><tr><td>A</td><td>24°57'21.29"N, 74°38'34.39"E</td></tr><tr><td>B</td><td>24°58'21.03"N, 74°40'43.43"E</td></tr><tr><td>C</td><td>24°57'20.33"N, 74°38'37.46"E</td></tr><tr><td>D</td><td>24°58'35.69"N, 74°39'16.22"E</td></tr></table>	A	24°57'21.29"N, 74°38'34.39"E	B	24°58'21.03"N, 74°40'43.43"E	C	24°57'20.33"N, 74°38'37.46"E	D	24°58'35.69"N, 74°39'16.22"E	-
A	24°57'21.29"N, 74°38'34.39"E										
B	24°58'21.03"N, 74°40'43.43"E										
C	24°57'20.33"N, 74°38'37.46"E										
D	24°58'35.69"N, 74°39'16.22"E										
iv.	Elevation of the project site	154 m – 175m AMSL									
v.	Involvement of Forest land if any.	Nil	-								
vi.	Water body exists within the project site as well as study area	<b>Project site:</b> <ul style="list-style-type: none"><li>• Putholi Nala (Passing through the plant site)</li></ul> <b>Study area:</b> <ul style="list-style-type: none"><li>• Berach River (Adjacent in East direction from the Plant site)</li><li>• Gambhir Nadi (~4.0 km in South direction from the Plant site)</li><li>• Nagdika Nala (~8.5 km in NNE direction from the Plant site)</li><li>• Canal (~8 km in WNW direction from the Plant site)</li></ul>	The water bodies falling in the study area are seasonal.								
vii.	Existence of ESZ/ESA/national park/wildlife sanctuary/biosphere reserve/tiger	None (within the 10 km radius study area)									

Terms of Reference for project titled "Expansion within the existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Sets] by M/s. Hindustan Zinc Ltd. located at villages Putholi, Ajoliya Ka Khera & Biliya, Tehsil Gangrar & Chittorgarh, District Chittorgarh, Rajasthan"



S No	Particulars	Details	Remarks
	reserve/elephant reserve etc. if any within the study area		

5. The existing project was accorded concurrence letter initially for Pyro Plant vide no. J-11013/29/92-EI dated 03/06/1983; Production capacity of Pyro Plant was increased from 105000 TPA (Zn - 70,000 TPA + Pb - 35,000 TPA) to 140000 TPA (Zn - 105000 TPA + Pb - 35000 TPA) vide NOC obtained from RSPCB vide no. F.12 (Chittor-60) RPCB/Gr. III/19418 dated 05/03/2004. Environmental Clearance for {Hydro Plant} Zinc Smelter I (1,70,000 TPA Zinc Production)& CPP (154MW) vide F.No.J-11011/158/2003-IA.II(I) 31/03/2004; Environmental Clearance for Ausmelt Lead Smelter Plant (60,000 TPA) vide F.No.J-11011/17/2005-IA.II (I) 3/8/2005; Environmental Clearance for {Hydro Plant } Zinc Smelter II (2,10,000 TPA) and expansion of {Hydro Plant } Zinc Smelter I (From 1,70,000 TPA to 2,10,000 TPA) vide no J-11011/279/2006-IA.II(I) dated 06/12/2006; Environmental Clearance for Inclusion of Fumer Plant within the {Hydro Plant } Zinc Smelter II vide F.No.J-11011/279/2006-IA.II(I) 5/10/2015; Environment Clearance for Capacity Expansion in Hydro I & Hydro II Zinc Smelters (from 4,20,000 TPA to 5,04,000 TPA) through debottlenecking vide letter no. J-11011/279/2006-IA.II (I) dated 14/10/2020.
6. Current CTO for Pyro Plant has been accorded by Rajasthan State Pollution Control Board (RSPCB) vide Order no. 2020-2021 / HDF /3070 dated 08/06/2020 (valid upto 29/02/2024). CTO for Hydro-I Plant and CPP (154 MW) has been accorded by RSPCB vide Order No. 2019-2020/HDF/2859 dated 16/01/2020 (valid up to 31/08/2023). CTO for Hydro- II Plant & CPP (100 MW) has been accorded by RSPCB vide Order no. 2019-2020/HDF/2818 dated 18/12/2019 (valid up to 31/01/2024). CTO for Fumer Plant within existing Hydro -II plant was accorded by RSPCB vide Order no. 2020-2021/HDF/3009 dated 08/05/2020 (valid up to 31/03/2025). CTO for Ausmelt Lead Plant was accorded from RSPCB vide Order no. 2020-2021/HDF/3069 dated 05/06/2020 (valid upto 31/08/2023). CTO for installation of 2 D.G. Sets (2 x 8MW) was obtained from RSPCB vide Order no. 2020-2021 / HDF / 3068 dated 05/06/2020 (valid up to 30/04/2024). CTO for Township was obtained vide Order no. 2018-2019/CPM/5201 dated 23/05/2018.

7. Implementation status of the existing EC:

S No	Facilities	Unit	As per existing ECs	Implementation status as on 31/08/2021	Production as per CTOs
<b>A. Lead Zinc Smelter Unit (Pyro Plant)</b>					
1.	Refined Lead	TPA	35,000	35,000	35,000
2.	Refined Zinc	TPA	105,000	105,000	105,000
	Total	TPA	140,000	140,000	140,000
3.	Captive Power Plant	MW	90	Not installed	NA
<b>B. Hydro-I + Hydro-II Zinc Smelter Unit (Incl. Fumer plant) with Captive Power Plant</b>					
4.	Zinc (Hydro- I + II) with Fumer / Zinc Alloys and its Compounds	TPA	5,04,000	5,04,000 (Fumer Installed, Commissioning under progress)	5,04,000 (Fumer Installed, Commissioning under progress)

Terms of Reference for project titled "Expansion within the existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Sets] by M/s. Hindustan Zinc Ltd. located at villages Putholi, Ajoliya Ka Khera & Biliya, Tehsil Gangrar & Chittorgarh, District Chittorgarh, Rajasthan"



S No	Facilities	Unit	As per existing ECs	Implementation status as on 31/08/2021	Production as per CTOs
5.	Captive Power Plant with Hydro- I	MW	154 (2x77)	154 (2x77)	154 (2x77)
6.	Captive Power Plant with Hydro- II	MW	100	100	100
	DG- Hydro -I	KVA	1 x 750 1 x 1000	1 x 750 1 x 1000	1 x 750 1 x 1000
	Hydro-II	KVA	1 x 625 2 x 1250 1 x 125 2 x 9265	1 x 625 2 x 1250 1 x 125 2 x 9265	1 x 625 2 x 1250 1 x 125 2 x 9265
7.	WHRB	MWH	34.7 1x (9.4) 1x (4.3) 1x (21)	34.7 (9.4) 1x (4.3) 1x (21)	34.7 1x (9.4) 1x (4.3) 1x (21)
8.	Cadmium Metal/ Cadmium Sponge (equivalent metal) (By-product)	TPA	680	680	680
9.	Copper Cement/ Copper sulphate/ Copper matte/ (equivalent metal) (By product)	TPA	510	510	510
<b>C. Ausmelt Lead Smelter Plant</b>					
10.	Lead	TPA	60, 000	60, 000	60, 000

8. The unit configuration and capacity of existing and proposed project is given as below:

8. The unit configuration and capacity of existing and proposed project is given as below:									
S. No	Name of the facility	Unit	Existing		Additional		Total after expansion		Remarks
			Capacity	Configuration	Capacity	Configuration	Capacity	Configuration	
Lead Zinc Smelter Unit (Pyro Plant)									
1	Refined Lead	TPA	35,000	1 x 140,000	1,05,000	1x 140,000	140000	1 x 140,000	Change in product mix*
2	Refined Zinc	TPA	105,000		35,000		[Total Metal Basis]		
	Total	TPA	140,000		140,000 (Change in product mix only)		140,000 (Change in product mix only)		
3	DG	KVA	NIL	NIL	2875	1x625 1x1500 1x750	2875	1x625 1x1500 1x750	To be added
4	Zn-Cd Alloy / Cadmium Metal (on equivalent cadmium basis) (By-product)	TPA	375	1 x 375	222	1 x 222	597	1 x 597	Increase in production capacity
5	Copper Matte / Copper Metal (on equivalent	TPA	2100	1 x 2100	1238	1 x 1238	3338	1 x 3338	Increase in production capacity

Terms of Reference for project titled "Expansion within the existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Sets] by M/s. Hindustan Zinc Ltd. located at villages Putholi, Ajoliya Ka Khera & Biliya, Tehsil Gangrar & Chittorgarh, District Chittorgarh, Rajasthan"



S. No	Name of the facility	Unit	Existing		Additional		Total after expansion		Remarks
			Capacity	Configuration	Capacity	Configuration	Capacity	Configuration	
	copper basis) (By-product)								
6	Silver (on equivalent silver basis) (By-product)	TPA	74	1 x 74	728.29	1 x 728.29	802.29	1 x 802.29	Increase in production capacity
7	Sulphuric Acid (By-product)	TPA	1,76,000	1 x 1,76,000	47,505	1 x 47,505	2,23,505	1 x 2,23,505	Increase in production capacity
8	Antimony Slag/Antimony Trioxide(Sb <sub>2</sub> O <sub>3</sub> ) (on equivalent Antimony basis) (By-product)	TPA	NIL	NIL	992	1 x. 992	992	1 x. 992	To be added
9	Lead Oxide/Concentrate (by products)	TPA	NIL	NIL	20,000	1 x 20,000	20,000	1 x 20,000	To be added
10	Calomel/Mercury Sludge (on equivalent mercury basis) (By-product)	TPA	NIL	NIL	14.8	1 x 14.8	14.8	1 x 14.8	To be added
Hydro-I + Hydro-II Zinc Smelter Unit & Captive Power Plant (Combined Capacity)									
1.	Zinc (Hydro- I + II) / Zinc Alloys and its Compounds	TPA	5,04,000	2 x 2,52,000	1,26,000	1 x 1,26,000	6,30,000	2 x 2,52,000 1 x 1,26,000	Increase in Production Capacity
Hydro I									
2.	Captive Power Plant	MW	154	2x77	36	2x18	190	2x95	Increase in Production Capacity
3.	DG	KVA	1750	1 x 750 1 x 1000	NIL	Nil	1750	1 x 750 1 x 1000	No change
4.	WHRB	MW	9.4	1 x 9.4	Nil	Nil	9.4	1 x 9.4	No change
5.	Back Pressure Turbine Generator	MW	NIL	Nil	6	1 x 6	6	1 x 6	To be added
6.	DG FGD	KVA	NIL	Nil	500	1 x 500	500	1 x 500	To be added
7.	Cadmium Metal/Cadmium Sponge (equivalent metal) (By-product)	TPA	680	1 x 680	NIL	NIL	680	1 x 680	No change
8.	Copper Cement/Copper sulphate/Copper matte/ (equivalent metal) (By product)	TPA	510	1 x 510	NIL	NIL	510	1 x 510	No change
9.	Low grade lead concentrate (By-product)	TPA	30,000	1 x 30,000	NIL	NIL	30,000	1 x 30,000	No change
10.	Sulphuric Acid (By-product)	TPA	3,07,774	1 x 3,07,774	Nil	Nil	3,07,774	1 x 3,07,774	No change
11.	Calomel (Mercury Chloride) (By-product)	TPA	20	1 x 20	NIL	NIL	20	1 x 20	No change

Terms of Reference for project titled "Expansion within the existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Sets] by M/s. Hindustan Zinc Ltd. located at villages Putholi, Ajoliya Ka Khera & Biliya, Tehsil Gangrar & Chittorgarh, District Chittorgarh, Rajasthan"



S. No	Name of the facility	Unit	Existing		Additional		Total after expansion		Remarks
			Capacity	Configuration	Capacity	Configuration	Capacity	Configuration	
12.	Sodium Chloride (By-product)	TPA	250	1 x 250	Nil	Nil	250	1 x 250	No change
13.	Sodium Sulphate (By-product)	TPA	1250	1* 1250	Nil	Nil	1250	1* 1250	No change
<b>Hydro II</b>									
1.	Captive Power Plant	MW	100	1 x 100	NIL	Nil	100	1 x 100	No Change
2.	DG	KVA	12,515	1 x 625 2 x 1250 1 x 125 2 x 9265	750	1 x 750	13,265	1 x 625 2 x 1250 1 x 125 2 x 9265 1 x 750	Additional DG to be installed
3.	WHRB	MW	25.3	1 x 4.3 1 x 21	1	1 x 1	26.3	1 x 5.3 1 x 21	Increase in power generation
4.	Cadmium Metal/ Cadmium Sponge (equivalent metal) (By-product)	TPA	680	1 x 680	NIL	NIL	680	1 x 680	No change
5.	Copper Cement/ Copper sulphate/ Copper matte/ (equivalent metal) (By product)	TPA	510	1 x 510	NIL	NIL	510	1 x 510	No change
6.	Lead Silver Cake (By-product)	TPA	16000	1 x 16000	16000	1 x 16000	32000	1 x 32000	Increase in production capacity
7.	Copper Speiss/ Copper Residue (By-product)	TPA	700	1 x 700	500	1 x 500	1200	1 x 1200	Increase in production capacity
8.	Sulphuric Acid (By-product)	TPA	307774	1 x 307774	Nil	Nil	307774	1 x 307774	No change
9.	Calomel (Mercury Chloride) (By-product)	TPA	20	1 x 20	NIL	NIL	20	1 x 20	No change
10.	Sodium Chloride (By-product)	TPA	250	1 x 250	Nil	Nil	250	1 x 250	No change
11.	Sodium Sulphate (By-product)	TPA	1250	1 x 1250	Nil	Nil	1250	1 x 1250	No change
<b>Ausmelt Lead Smelter Plant</b>									
1.	Lead	TPA	60,000	1 x 60,000	NIL	NIL	60,000	1 x 60,000	No Change
2.	Sulphuric Acid (By-product)	TPA	50500	1 x 50500	NIL	NIL	50500	1 x 50500	No Change
3.	Copper Sulphate (By-product)	TPA	7920	1 x 7920	NIL	NIL	7920	1 x 7920	No Change
4.	Silver (on equivalent silver basis) (By-product)	TPA	94.71	1 x 94.71	NIL	NIL	94.71	1 x 94.71	No Change
5.	Zinc Rich Dust (By-product)	TPA	6600	1 x 6600	NIL	NIL	6600	1 x 6600	No Change
<b>Minor Metal Recovery Unit</b>									
1.	Lead Bullion / Lead Silver Cake / Lead Cake/Low Grade Lead Cake	TPA	NIL	NIL	8873	1 x 8873	8873	1 x 8873	To be added

Terms of Reference for project titled "Expansion within the existing Chanduriya Lead Zinc Smelter Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Sets] by M/s. Hindustan Zinc Ltd. located at villages Putholi, Ajoitya Ka Khera & Biliya, Tehsil Gangrar & Chittorgarh, District Chittorgarh, Rajasthan"



S. No	Name of the facility	Unit	Existing		Additional		Total after expansion		Remarks
			Capacity	Configuration	Capacity	Configuration	Capacity	Configuration	
	/ Low Grade Lead Material (on Equivalent metal basis )								
2.	Cadmium Sponge/ Cadmium Metal/ Low Grade Cadmium (on Equivalent metal basis)	TPA	NIL	NIL	3050	1 x 3050	3050	1 x 3050	To be added
3.	Cobalt / Cobalt Concentrate (on Equivalent metal basis )	TPA	NIL	NIL	50	1 x 50	50	1 x 50	To be added
4.	Ni cake / Ni Compounds (on Equivalent metal basis )	TPA	NIL	NIL	30	1 x 30	30	1 x 30	To be added
5.	Zn So4 Solution (on Equivalent metal basis)	TPA	NIL	NIL	2781	1 x 2781	2781	1 x 2781	To be added
6.	CuSO4 Solution/ Copper Cement/ CU Matte (on Equivalent metal basis )	TPA	NIL	NIL	2436	1 x 2436	2436	1 x 2436	To be added

\*In Pyro Plant, Change in Product Mix has been proposed on total Metal basis i.e. 1,40,000 TPA (Refined Lead or Refined Zinc or Product Mix of both Metals).

9. The details of the raw material requirement for the proposed project along with its source and mode of transportation is given as below:

Mode of transportation is given as below:								
S. No.	Raw Material	Unit	Quantity			Source	Distance	Mode of Transport
			Existing	Additional	Total After expansion			
Zinc Lead Smelter Unit (Pyro Plant+ Ausmelt)								
1.	Zinc concentrate	TPA	199500	58000	257500	HZL mines- RA, SK &Zawar mines	~200 km	Through Trucks
2.	Lead concentrate	TPA	138500	196500	335000	HZL mines- RA, SK &Zawar mines	~200 km	Through Trucks
3.	Coke	TPA	100000	NIL	100000	Indigenous /imported	~1500 km	Through Rail / Trucks
4.	Lime Stone	TPA	45000	NIL	45000	Nearby Mines	~250 km	Through Trucks
5.	Iron ore /Iron Oxide	TPA	30000	NIL	30000	Mines Jabalpur	~1000 km	Through Trucks
6.	Zinc Oxide /Zinc Dust	TPA	NIL	50000	50000	Market/ HZL Smelters	~ 200 km	Through Trucks

Terms of Reference for project titled "Expansion within the existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Sets] by M/s. Hindustan Zinc Ltd. located at villages Putholi, Ajoliya Ka Khera & Biliya, Tehsil Gangrar & Chittorgarh, District Chittorgarh, Rajasthan"



S. No.	Raw Material	Unit	Quantity			Source	Distance	Mode of Transport
			Existing	Additional	Total After expansion			
	/Zinc Bearing material/ Zinc Dross					Approx. / From authorised recyclers		
7.	Lead Oxide / Lead Silver Cake / Low Grade Lead Material / Lead Bearing Outsourced Secondaries	TPA	Nil	50000	50000	Market/ HZL Smelters Approx./ From authorised recyclers	~ 200 km	Through Trucks
8.	Silica	MT	3600	NIL	3600	Nearby Mines	~150 km	Through Trucks
9.	Coal/ Coke	MT	1500	NIL	1500	Indigenous /imported	~1500 km	Through Rail / Trucks
10.	Dolomite	MT	1700	NIL	1700	Nearby Mines	~150 km	Through Trucks
Hydro I & Hydro-II Zinc Smelter Unit (Incl. Fumer plant) and CPP								
1.	Zinc concentrate	TPA	698458	NIL	698458	HZL mines- RA, SK &Zawar mines	~200 km	Through Trucks
2.	Calcine (ZnO)	TPA	337990	8916	346906	HZL Smelters	~200 km	Through Trucks
3.	Zinc Dross/ Ash/ Zinc bearing waste	TPA	15000	NIL	15000	Market/ HZL Smelters Approx./ From authorised recyclers	~200 km	Through Trucks
4.	Aluminium Metal	TPA	4800	NIL	4800	Market	~200 km	Through Trucks
5.	Magnesium Metal	TPA	60	NIL	60	Market	~200 km	Through Trucks
6.	Copper Metal	TPA	600	NIL	600	Market	~200 km	Through Trucks
7.	Limestone for FGD	TPA	NIL	131465	131465	Nearby Mines	~200 km	Through Trucks
8.	Zinc Cathode	TPA	NIL	200000	200000	HZL Smelter	~200 km	Through Trucks
9.	RZO	TPA	NIL	45000	45000	HZL Smeiter	~200 km	Through Trucks
Minor Metal Recovery Unit								

Terms of Reference for project titled "Expansion within the existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Sets] by M/s. Hindustan Zinc Ltd. located at villages Putholi, Ajoliya Ka Khera & Biliya, Tehsil Gangrar & Chittorgarh, District Chittorgarh, Rajasthan"



S. No.	Raw Material	Unit	Quantity			Source	Distance	Mode of Transport
			Existing	Additional	Total After expansion			
10.	PF Cake	TPA	NIL	8800	8800	HZL Smelter	Captive / 200 km,	Through Trucks
11.	Cadmium Sponge	TPA	NIL	4000	4000	HZL Smelter	Captive / 200 km,	Through Trucks
12.	Copper Matte	TPA	NIL	3500	3500	HZL Smelter	Captive / 200 km,	Through Trucks
13.	Cobalt Cake	TPA	NIL	2000	2000	HZL Smelter	Captive / 200 km,	Through Trucks
14.	Copper Dross	TPA	NIL	12000	12000	HZL Smelter	Captive / 200 km,	Through Trucks
15.	Coal	TPA	NIL	1480	1480	HZL Smelter	Approx. 1500kms	Through Trucks
16.	Zinc Dust	TPA	NIL	2210	2210	HZL Smelter	Captive / 200 km,	Through Trucks
17.	Sulphuric Acid	TPA	NIL	6500	6500	HZL Smelter	Captive / 200 km,	through pipeline; through Tankers

10. Existing Water requirement for the project is 38570 KLD. After the expansion project, 500 KLD additional water will be required for the Minor Metal Unit which will be sourced from RO permeate water from ETP. Therefore, no additional Fresh Water will be required for the proposed expansion project. The water is being / will be sourced from Gosunda Dam (Fresh Water) & Proposed STP Chittorgarh/ Udaipur/ other proposed STP's (Recycled Water).

Permissions for drawl of water obtained for CLZS Complex are obtained as under:

- Letter reg. allocation of water (1500 MCFT) from Gosunda Dam obtained from Energy Dept., Govt. of Rajasthan vide letter no. F 2(28)Energy/86-IV/ dated 19/11/1994.
- Agreement signed between Municipal Corporation Udaipur, Urban Improvement Trust, Udaipur and Hindustan Zinc Ltd. on 09/05/2021 for supply of treated water from Proposed STP (20 MLD) at Udaipur .
- 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.
- Agreement between Nagar Parishad, Chittorgarh and Hindustan Zinc Ltd. on 05/01/2021 for supply of Treated water (3000 KLD) from STP at Chittorgarh.

11. The power requirement for the project is estimated as 308 MW, which will be available from the captive power plant/WHRB/ Solar Panels/AVVNL/Fumer/BPTG.
12. The capital cost of the project is Rs. 786 Crores and the capital cost for environment protection measures is proposed as Rs. 118.35 Crores. The total employment generation after the proposed expansion project will be 3279.
13. A Show Cause Notice was issued to the M/s. Hindustan Zinc Ltd by MOEF&CC, New Delhi

*Terms of Reference for project titled "Expansion within the existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Sets] by M/s. Hindustan Zinc Ltd. located at villages Putholi, Ajoliya Ka Khara & Biliya, Tehsil Gangrar & Chittorgarh, District Chittorgarh, Rajasthan"*



vide letter J-11011/279/2006-IA.II (I) dated 06/04/2021 under Section 5 of Environment (Protection) Act, 1986 for violation of provisions of under EIA Notification, 2006. Reply of the same was submitted to MOEF&CC, New Delhi vide letter HZL/CLZS/ENV/38/2021-22 dated 19/04/2021. After detailed deliberation as per the personal hearing held on 05/08/2021, the Show Cause Notice has been withdrawn by MOEF&CC, New Delhi vide letter dated 31/08/2021.

14. Name of the EIA consultant: M/s J.M. EnviroNetPvt. Ltd. [Sl. No. 42, List of ACOs with their Certificate / Extension Letter no. Rev. 13, August 09, 2021].
15. Proposed Terms of Reference (Baseline data collection period: **Post Monsoon October-December, 2020**):

December, 2020).

S. No.		Environment Attributes	Sampling Frequency	Remarks (Parameters covered)
		No. of Stations		
A. Air				
a.	Meteorological	Plant Site	Daily	Wind Speed, Wind Direction, Humidity, Temperature, Rainfall
b.	Ambient Air Quality	9	One Season Study (Twice a week)	PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>x</sub> , CO, Lead, Nickel.
			Once in a study period	O <sub>3</sub> , NH <sub>3</sub> , Benzene, Benzo(a)pyrene (BaP)-Particulate phase only, Arsenic, Zinc
B. Noise				
a.	Noise Environment	9	Once in the Study Period	Leq Day time & Leq Night Time
C. Water				
a.	Ground Water	8	Once in the Study Period	pH (at 25°C), Colour, Turbidity, Odour, Taste, Total Hardness as CaCO <sub>3</sub> , Calcium as Ca, Alkalinity as CaCO <sub>3</sub> , Chloride as Cl, Cyanide as CN, Magnesium as Mg, Total Dissolved Solids, Sulphate as SO <sub>4</sub> , Fluoride as F, Nitrate as NO <sub>3</sub> -N, Iron as Fe, Aluminum as Al, Boron, Phenolic Compounds, Anionic Detergents as MBAS, Hexa Chromium as Cr <sup>+6</sup> , Chromium as Cr, Zinc as Zn, Copper as Cu, Manganese as Mn, Cadmium as Cd, Lead as Pb, Arsenic as As, Mercury as Hg, Sodium as Na, Potassium as K, Phosphate as PO <sub>4</sub> , Nickel, Conductivity, Total Suspended Solid

Terms of Reference for project titled "Expansion within the existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Sets] by M/s. Hindustan Zinc Ltd. located at villages Putholi, Ajoliya Ka Khera & Biliya, Tehsil Gangrar & Chittorgarh, District Chittorgarh, Rajasthan"



S. No.		Environment Attributes	Sampling Frequency	Remarks (Parameters covered)
		No. of Stations		
b.	Surface Water	5	Once in the Study Period	pH (at 25°C), Colour, Turbidity, Odour, Total Hardness as CaCO <sub>3</sub> , Calcium as Ca, Alkalinity as CaCO <sub>3</sub> , Chloride as Cl, Residual free, Chlorine, Cyanide as CN, Magnesium as Mg, Total Dissolved Solids, Sulphate as SO <sub>4</sub> , Fluoride as F, Nitrate as NO <sub>3</sub> , Iron as Fe, Aluminum as Al, Boron, Phenolic Compounds, Anionic Detergents as MBAS, Hexa Chromium as Cr <sup>+6</sup> , Zinc as Zn, Copper as Cu, Manganese as Mn, Lead as Pb, Selenium as Se, Arsenic as As, Mercury as Hg, Phosphate as PO <sub>4</sub> , Total Suspended Solid, Biochemical oxygen demand, Chemical oxygen demand, Sodium as Na, Potassium as K, Conductivity, Nickel, Dissolve Oxygen
D. Land				
a.	Soil Testing	8 Sampling Locations	Once in the Study Period	pH (at 25°C) (1:2.5 soil water suspension), Conductivity (1:2 soil water sus), Soil Texture, Colour, Water holding capacity, Bulk density, Soluble Chloride, Exchangeable Calcium, Exchangeable Sodium, Available Potassium, Organic matter, Exchangeable Magnesium as Mg, Available Nitrogen as N, Available Phosphorus, Total Zinc as Zn, Total Manganese as Mn, Total Chromium as Cr, Total Lead as Pb, Total Cadmium as Cd, Total Copper as Cu, Organic Carbon, SAR Value
b.	Land Use / Land Cover	10 km radius Study Area	Once in the Study Period	Land use/ Land Cover Map by Satellite Imagery
E. Biological				
a.	Aquatic	Fauna & Flora	Once in the Study Period	10 km radius Study Area
b.	Terrestrial			

Terms of Reference for project titled "Expansion within the existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 3 DG Sets] by M/s. Hindustan Zinc Ltd. located at villages Putholi, Ajoliya Ka Khera & Biliya, Tehsil Gangrar & Chittorgarh, District Chittorgarh, Rajasthan"



S. No.	Environment Attributes	Sampling Frequency	Remarks (Parameters covered)
	No. of Stations		

F. Socio-economic Parameters

#### Observations of the Committee

16. The EAC noted the following:

- Terms of Reference is being sought for expansion of zinc smelter complex.
- No additional water shall be taken as make up for expansion. 500 KL/Hr. requirement shall be met from RO water.
- Fertilizer plant is an interlinked project coming up adjacent to the zinc smelter complex.

#### Recommendations of the Committee

17. After deliberations, the Committee recommended the project proposal for prescribing following specific ToRs for undertaking detailed EIA and EMP study in addition to the generic ToR enclosed at Annexure-1 read with additional ToRs at Annexure-2:

- One-month Ambient Air Quality (AAQ) data shall be collected additionally at locations near old stations and new location selected / corrected based on wind rose.
- No additional water shall be taken as make up for proposed expansion. 500 KL/Hr. requirement shall be met from RO water.
- Action plan for green belt development covering 37% of the project area shall be submitted. Tree density in the existing green belt shall be increased from present 1200 trees per ha to 2500 trees per ha by gap filling.
- Fertilizer plant is an interlinked project at project site. Cumulative impact assessment shall be carried out by integrating following units under implementation:
  - Activities proposed under the proposed expansion of Chanderiya Lead Zinc Smelter Complex.
  - Proposed Ammonium Phosphate Fertilizer Complex of 1.02 MTPA (2x 0.51 MTPA)
  - Capacity expansion from 4,20,000 to 5,04,000 TPA in Hydro-I and Hydro-II Zinc Smelter through debottlenecking within the CLZS Complex
  - Fumer Plant within the CLZS Complex as per EC issued vide F.No.J-11011/279/2006-IA.II(I) 5/10/2015.
- Risk assessment shall be done for expansion project and the Disaster Management Plant for existing plant shall be upgraded to include new units/products.
- SO<sub>2</sub> emissions from H<sub>2</sub>SO<sub>4</sub> plant shall be < 1 kg/t of acid.
- Acid mist from H<sub>2</sub>SO<sub>4</sub> plant shall be < 30 mg/Nm<sup>3</sup>.
- Action plan for rain water harvesting shall be submitted.
- Action plan for the stock piles with impervious floor, provision of garland drains and catch pits to trap run off material shall be submitted.
- Action plan to reduce the fugitive emissions from the plant shall be furnished.
- The project proponent shall submit action plan for reuse/ recycling of entire wastewater after treatment.
- Action plan to limit the dust emission from all the stacks below 30 mg/Nm<sup>3</sup> shall be furnished.

#### Decision of MoEF&CC

18. The undersigned is directed to inform that Ministry of Environment, Forest and Climate

*Terms of Reference for project titled "Expansion within the existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Sets] by M/s. Hindustan Zinc Ltd. located at villages Putholi, Ajoliya Ka Khera & Biliya, Tehsil Gangrar & Chittorgarh, District Chittorgarh, Rajasthan"*



Change has examined the proposal in accordance with the Environment Impact Assessment (EIA) Notification, 2006 & further amendments thereto and after accepting the recommendations of the Expert Appraisal Committee (Industry-1) hereby decided to accord above-said specific ToRs, in addition to the standard ToRs and Sector Specific ToRs as enclosed at Annexure I read with additional ToRs at Annexure-2 for carrying out detailed EIA/EMP for the above project.

19. It is requested that the draft EIA Report may be prepared in accordance with the above-mentioned specific ToRs and enclosed generic ToRs and additional ToRs and thereafter further necessary action including conduct of public consultation may be taken for obtaining Environment Clearance in accordance with the procedure prescribed under the EIA Notification, 2006 as amended.
20. The ToRs are valid for a period of four years from date of issue of this letter as per the Ministry's Notification S.O. 751 (E) dated 17/02/2020.
21. This issue with the approval of the Competent Authority.

  
(Sundar Ramanathan)  
Scientist 'E'

**Copy to:-**

1. The Secretary, Department of Environment, Government of Rajasthan, Secretariat, Jaipur.
2. Regional Officer, Ministry of Environment, Forest and Climate Change, Integrated Regional Office, A- 209 & 218, Aranya Bhawan, Mahatma Gandhi Road, Jhalana Institutional Area, Jaipur - 304002
3. The Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi-110032.
4. The Chairman, Rajasthan State Pollution Control Board, 4, Institutional area, Jhalana, Doongri, Jaipur.
5. The Member Secretary, Central Ground Water Authority, A-2, W3, Curzon Road Barracks, K.G. Marg, New Delhi-110001.
6. The District Collector, Chittorgarh District, Rajasthan.
7. Guard File/Record File/Monitoring File.
8. MoEF&CC website

  
(Sundar Ramanathan)  
Scientist 'E'

*Terms of Reference for project titled "Expansion within the existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Sets] by M/s. Hindustan Zinc Ltd. located at villages Putholi, Ajoliya Ka Khera & Biliya, Tehsil Gangrar & Chittorgarh, District Chittorgarh, Rajasthan"*



**GENERIC TERMS OF REFERENCE (ToR) IN RESPECT OF INDUSTRY SECTOR**

**1. Executive Summary**

**2. Introduction**

- i. Details of the EIA Consultant including NABET accreditation
- ii. Information about the project proponent
- iii. Importance and benefits of the project

**3. Project Description**

- i. Cost of project and time of completion.
- ii. Products with capacities for the proposed project.
- iii. If expansion project, details of existing products with capacities and whether adequate land is available for expansion, reference of earlier EC if any.
- iv. List of raw materials required and their source along with mode of transportation.
- v. Other chemicals and materials required with quantities and storage capacities
- vi. Details of Emission, effluents, hazardous waste generation and their management.
- vii. Requirement of water, power, with source of supply, status of approval, water balance diagram, man-power requirement (regular and contract)
- viii. The project proponent shall furnish the requisite documents from the competent authority in support of drawl of ground water and surface water and supply of electricity.
- ix. Process description along with major equipment and machineries, process flow sheet (Quantitative) from raw material to products to be provided
- x. Hazard identification and details of proposed safety systems.
- xi. Expansion/modernization proposals:
  - a. Copy of all the Environmental 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, Forest and Climate Change as per circular dated 30<sup>th</sup> May, 2012 on the status of compliance of conditions stipulated in all the existing environmental clearances including Amendments shall be provided. In addition, status of compliance of Consent to Operate for the ongoing /existing operation of the project from SPCB/PCC shall be attached with the EIA-EMP report.
  - b. In case the existing project has not obtained environmental clearance, reasons for not taking EC under the provisions of the EIA Notification 1994 and/or EIA Notification 2006 shall be provided. Copies of Consent to Establish/No Objection Certificate and Consent to Operate (in case of units operating prior to EIA Notification 2006, CTE and CTO of FY 2005-2006) obtained from the SPCB shall be submitted. Further, compliance report to the conditions of consents from the SPCB shall be submitted.

**4. Site Details**

- i. Location of the project site covering village, Taluka/Tehsil, District and State, Justification for selecting the site, whether other sites were considered.
- ii. A toposheet of the study area of radius of 10km and site location on 1:50,000/1:25,000 scale on an A3/A2 sheet. (including all eco-sensitive areas and environmentally sensitive places)
- iii. Co-ordinates (lat-long) of all four corners of the site.

*Terms of Reference for project titled "Expansion within the existing Chandertiya Lead Zinc Smelter Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Sets] by M/s. Hindustan Zinc Ltd. located at villages Putholi, Ajoltya Ka Khara & Biliya, Tehsil Gangrar & Chintorgarh, District Chittorgarh, Rajasthan"*



- iv. Google map-Earth downloaded of the project site.
- v. Layout maps indicating existing unit as well as proposed unit indicating storage area, plant area, greenbelt area, utilities etc. If located within an Industrial area/Estate/Complex, layout of Industrial Area indicating location of unit within the Industrial area/Estate.
- vi. Photographs of the proposed and existing (if applicable) plant site. If existing, show photographs of plantation/greenbelt, in particular.
- vii. Land use break-up of total land of the project site (identified and acquired), government/private - agricultural, forest, wasteland, water bodies, settlements, etc shall be included. (not required for industrial area)
- viii. A list of major industries with name and type within study area (10km radius) shall be incorporated. Land use details of the study area
- ix. Geological features and Geo-hydrological status of the study area shall be included.
- x. Details of Drainage of the project upto 5km radius of study area. If the site is within 1 km radius of any major river, peak and lean season river discharge as well as flood occurrence frequency based on peak rainfall data of the past 30 years. Details of Flood Level of the project site and maximum Flood Level of the river shall also be provided. (mega green field projects)
- xi. Status of acquisition of land. If acquisition is not complete, stage of the acquisition process and expected time of complete possession of the land.
- xii. R&R details in respect of land in line with state Government policy.

**5. Forest and wildlife related issues (if applicable):**

- i. Permission and approval for the use of forest land (forestry clearance), if any, and recommendations of the State Forest Department. (if applicable).
- ii. Land use map based on High resolution satellite imagery (GPS) of the proposed site delineating the forestland (in case of projects involving forest land more than 40 ha).
- iii. Status of Application submitted for obtaining the stage I forestry clearance along with latest status shall be submitted.
- iv. The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, the project proponent shall submit the map duly authenticated by Chief Wildlife Warden showing these features vis-à-vis the project location and the recommendations or comments of the Chief Wildlife Warden-thereon.
- v. Wildlife Conservation Plan duly authenticated by the Chief Wildlife Warden of the State Government for conservation of Schedule I fauna, if any exists in the study area.
- vi. Copy of application submitted for clearance under the Wildlife (Protection) Act, 1972, to the Standing Committee of the National Board for Wildlife.

**6. Environmental Status**

- i. Determination of atmospheric inversion level at the project site and site-specific micro-meteorological data using temperature, relative humidity, hourly wind speed and direction and rainfall.
- ii. AAQ data (except monsoon) at 8 locations for PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub>, CO and other parameters relevant to the project shall be collected. The monitoring stations shall be based CPCB guidelines and take into account the pre-dominant wind direction, population zone and sensitive receptors including reserved forests.

*Terms of Reference for project titled "Expansion within the existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Sets] by M/s. Hindustan Zinc Ltd. located at villages Putholi, Ajoliya Ka Khera & Biliya, Tehsil Gangrar & Chittorgarh, District Chittorgarh, Rajasthan"*



- iii. Raw data of all AAQ measurement for 12 weeks of all stations as per frequency given in the NAQPM Notification of Nov. 2009 along with – min., max., average and 98% values for each of the AAQ parameters from data of all AAQ stations should be provided as an annexure to the EIA Report.
- iv. Surface water quality of nearby River (60m upstream and downstream) and other surface drains at eight locations as per CPCB/MoEF&CC guidelines.
- v. Whether the site falls near to polluted stretch of river identified by the CPCB/MoEF&CC.
- vi. Ground water monitoring at minimum at 8 locations shall be included.
- vii. Noise levels monitoring at 8 locations within the study area.
- viii. Soil Characteristic as per CPCB guidelines.
- ix. Traffic study of the area, type of vehicles, frequency of vehicles for transportation of materials, additional traffic due to proposed project, parking arrangement etc.
- x. Detailed description of flora and fauna (terrestrial and aquatic) existing in the study area shall be given with special reference to rare, endemic and endangered species. If Schedule-I fauna are found within the study area, a Wildlife Conservation Plan shall be prepared and furnished.
- xi. Socio-economic status of the study area.

## 7. Impact Assessment and Environment Management Plan

- i. Assessment of ground level concentration of pollutants from the stack emission based on site-specific meteorological features. In case the project is located on a hilly terrain, the AQIP Modelling shall be done using inputs of the specific terrain characteristics for determining the potential impacts of the project on the AAQ. Cumulative impact of all sources of emissions (including transportation) on the AAQ of the area shall be well assessed. Details of the model used and the input data used for modelling shall also be provided. The air quality contours shall be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any.
- ii. Water Quality modelling – in case, if the effluent is proposed to be discharged in to the local drain, then Water Quality Modelling study should be conducted for the drain water taking into consideration the upstream and downstream quality of water of the drain.
- iii. Impact of the transport of the raw materials and end products on the surrounding environment shall be assessed and provided. In this regard, options for transport of raw materials and finished products and wastes (large quantities) by rail or rail-cum road transport or conveyor-cum-rail transport shall be examined.
- iv. A note on treatment of wastewater from different plant operations, extent recycled and reused for different purposes shall be included. Complete scheme of effluent treatment. Characteristics of untreated and treated effluent to meet the prescribed standards of discharge under E (P) Rules.
- v. Details of stack emission and action plan for control of emissions to meet standards.
- vi. Measures for fugitive emission control
- vii. Details of hazardous waste generation and their storage, utilization and disposal. Copies of MOU regarding utilization of solid and hazardous waste shall also be included. EMP shall include the concept of waste-minimization, recycle/reuse/recover techniques, Energy conservation, and natural resource conservation.
- viii. Proper utilization of fly ash shall be ensured as per Fly Ash Notification, 2009. A

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detailed plan of action shall be provided.

- ix. Action plan for the green belt development plan in 33 % area i.e. land with not less than 1,500 trees per ha. Giving details of species, width of plantation, planning schedule etc. shall be included. The green belt shall be around the project boundary and a scheme for greening of the roads used for the project shall also be incorporated.
- x. Action plan for rainwater harvesting measures at plant site shall be submitted to harvest rainwater from the roof tops and storm water drains to recharge the ground water and also to use for the various activities at the project site to conserve fresh water and reduce the water requirement from other sources.
- xi. Total capital cost and recurring cost/annum for environmental pollution control measures shall be included.
- xii. Action plan for post-project environmental monitoring shall be submitted.
- xiii. Onsite and Offsite Disaster (natural and Man-made) Preparedness and Emergency Management Plan including Risk Assessment and damage control. Disaster management plan should be linked with District Disaster Management Plan.

#### **8. Occupational health**

- i. Details of existing Occupational & Safety Hazards. What are the exposure levels of above mentioned hazards and whether they are within Permissible Exposure level (PEL). If these are not within PEL, what measures the company has adopted to keep them within PEL so that health of the workers can be preserved,
- ii. Details of exposure specific health status evaluation of worker. If the workers' health is being evaluated by pre-designed format, chest x rays, Audiometry, Spirometry, Vision testing (Far & Near vision, colour vision and any other ocular defect) ECG, during pre-placement and periodical examinations give the details of the same. Details regarding last month analysed data of abovementioned parameters as per age, sex, duration of exposure and department wise.
- iii. Annual report of health status of workers with special reference to Occupational Health and Safety.
- iv. Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers.

#### **9. Corporate Environment Policy**

- i. Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report.
- ii. Does the Environment Policy prescribe for standard operating process / procedures to bring into focus any infringement / deviation / violation of the environmental or forest norms / conditions? If so, it may be detailed in the EIA.
- iii. What is the hierarchical system or Administrative order of the company to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions? Details of this system may be given.
- iv. Does the company have system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the company and / or shareholders or stakeholders at large? This reporting mechanism shall be detailed in the EIA report

#### **10. Details regarding infrastructure facilities such as sanitation, fuel, restroom etc. to be provided to the labour force during construction as well as to the casual workers including truck drivers**

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- during operation phase.
11. To address the Public Hearing issues, provisions contained under Ministry's Office Memorandum vide F.No. 22-65/2017-IA.III dated 30/09/2020 shall be complied.
  12. Any litigation pending against the project and/or any direction/order passed by any Court of Law against the project, if so, details thereof shall also be included. Has the unit received any notice under the Section 5 of Environment (Protection) Act, 1986 or relevant Sections of Air and Water Acts? If so, details thereof and compliance/ATR to the notice(s) and present status of the case.
  13. A tabular chart with index for point wise compliance of above ToRs.
  14. The ToRs prescribed shall be valid for a period of three years for submission of the EIA-EMP reports along with Public Hearing Proceedings (wherever stipulated).

**The following general points shall be noted:**

- i. All documents shall be properly indexed, page numbered.
- ii. Period/date of data collection shall be clearly indicated.
- iii. Authenticated English translation of all material in Regional languages shall be provided.
- iv. The letter/application for environmental clearance shall quote the MOEF&CC file No. and also attach a copy of the letter.
- v. The copy of the letter received from the Ministry shall be also attached as an annexure to the final EIA-EMP Report.
- vi. The index of the final EIA-EMP report must indicate the specific chapter and page no. of the EIA-EMP Report
- vii. While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MOEF&CC vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry shall also be followed.
- viii. The consultants involved in the preparation of EIA-EMP report after accreditation with Quality Council of India (QCI)/National Accreditation Board of Education and Training (NABET) would need to include a certificate in this regard in the EIA-EMP reports prepared by them and data provided by other organization/Laboratories including their status of approvals etc. Name of the Consultant and the Accreditation details shall be posted on the EIA-EMP Report as well as on the cover of the Hard Copy of the Presentation material for EC presentation.
- ix. ToRs' prescribed by the Expert Appraisal Committee (Industry) shall be considered for preparation of EIA-EMP report for the project in addition to all the relevant information as per the 'Generic Structure of EIA' given in Appendix III and IIIA in the EIA Notification, 2006. Where the documents provided are in a language other than English, an English translation shall be provided. The draft EIA-EMP report shall be submitted to the State Pollution Control Board of the concerned State for conduct of Public Hearing. The SPCB shall conduct the Public Hearing/public consultation, district-wise, as per the provisions of EIA notification, 2006. The Public Hearing shall be chaired by an Officer not below the rank of Additional District Magistrate. The issues raised in the Public Hearing and during the consultation process and the commitments made by the project proponent on the same shall be included separately in EIA-EMP Report in a separate chapter and summarized in a tabular chart with financial budget (capital and revenue) along with time-schedule of implementation for complying with the commitments made. The final EIA report shall be submitted to the Ministry for obtaining environmental clearance.

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**ANNEXURE-2**

*Terms of Reference for project titled "Expansion within the existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Sets] by M/s. Hindustan Zinc Ltd. located at villages Putholi, Ajoliya Ka Khera & Biliya, Tehsil Gangrar & Chittorgarh, District Chittorgarh, Rajasthan"*



**ADDITIONAL ToRs FOR**  
**METALLURGICAL INDUSTRY (FERROUS AND NON-FERROUS)**

1. Complete process flow diagram describing each unit, its processes and operations, along with material and energy inputs & outputs (material and energy balance).
2. Emission from sulphuric acid plant and sulphur muck management.
3. Details on installation of Continuous Emission Monitoring System with recording with proper calibration system
4. Details on toxic metals including fluoride emissions
5. Details on stack height.
6. Details on ash disposal and management
7. Complete process flow diagram describing process of lead/zinc/copper/ aluminium, etc.
8. Details on smelting, thermal refining, melting, slag fuming, and Waelz kiln operation
9. Details on Holding and de-gassing of molten metal from primary and secondary aluminium, materials pre-treatment, and from melting and smelting of secondary aluminium
10. Details on toxic metal content in the waste material and its composition and end use (particularly of slag).
11. Trace metals in waste material especially slag.
12. Plan for trace metal recovery
13. Trace metals in water

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## Executive Summary

Executive summary of the report in about 8-10 pages incorporating the following:

- i. Project name and location (Village, Dist, State, Industrial Estate (if applicable)
- ii. Products and capacities. If expansion proposal, then existing products with capacities and reference to earlier EC.
- iii. Requirement of land, raw material, water, power, fuel, with source of supply (Quantitative)
- iv. Process description in brief, specifically indicating the gaseous emission, liquid effluent and solid and hazardous wastes. Materials balance shall be presented.
- v. Measures for mitigating the impact on the environment and mode of discharge or disposal.
- vi. Capital cost of the project, estimated time of completion
- vii. Site selected for the project – Nature of land – Agricultural (single/double crop), barren, Govt./private land, status of is acquisition, nearby (in 2-3 km.) water body, population, with in 10km other industries, forest, eco-sensitive zones, accessibility, (note – in case of industrial estate this information may not be necessary)
- viii. Baseline environmental data – air quality, surface and ground water quality, soil characteristic, flora and fauna, socio-economic condition of the nearby population
- ix. Identification of hazards in handling, processing and storage of hazardous material and safety system provided to mitigate the risk.
- x. Likely impact of the project on air, water, land, flora-fauna and nearby population
- xi. Emergency preparedness plan in case of natural or in plant emergencies
- xii. Issues raised during public hearing (if applicable) and response given
- xiii. CSR plan with proposed expenditure.
- xiv. Occupational Health Measures
- xv. Post project monitoring plan

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### Point - wise Compliance of ToR

Point-wise compliance to the ToR points issued by MoEFCC, New Delhi vide letter no. J-11011/279/2006-IA.II(I) dated 27<sup>th</sup> September, 2021 for Expansion within the existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Sets] at villages Putholi, Ajoliya Ka Khera & Biliya, Tehsil Gangrar & Chittorgarh, District Chittorgarh(Raj.)

ToR Point No.	ToR Point	Compliance	Ref. in EIA/EMP Report
<b>Generic ToRs in respect of Industry Sector</b>			
1.	<b>Executive Summary</b>	Executive Summary of the project has been incorporated in this EIA/EMP Report.	Executive Summary, Page no. 47-66
2.	<b>Introduction</b>		
i.	Details of the EIA Consultant including NABET accreditation.	The consultant engaged in this project is J.M. EnviroNet Pvt. Ltd., which is a NABET accredited environmental consultant having its corporate office in Gurugram (Haryana). Details of the consultant including NABET accreditation has been incorporated in this EIA/EMP Report.	Chapter - 12, Page no. 438-439
ii.	Information about the project proponent.	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. Hindustan Zinc Limited (HZL) is an India-based company, which is engaged in the mining and smelting of Zinc, Lead and Silver metal in India. Details reg. the same has been incorporated in this EIA/EMP Report.	Chapter - 1, Section 1.2.2, Page no. 81-82
iii.	Importance and benefits of the project.	Importance of this project has been given in this EIA/EMP Report. A separate chapter on Project benefits has also been prepared and incorporated in this EIA/EMP Report.	Chapter - 1, Section 1.3.2, Page no.83-84 Chapter - 8, Section 8.2 Page no. 382-384
3.	<b>Project Description</b>		
i.	Cost of project and time of	Total Cost   Rs. 786 Crores	Chapter - 10,

ToR Point No.	ToR Point	Compliance		Ref. in EIA/EMP Report
	completion.	of Project		Section 10.9, Page no.422-423
		Time of Completion	36 months (after getting all the statutory clearances and approvals) Detailed activity-wise plan has been incorporated in this EIA/EMP Report.	Chapter - 2, Section 2.6, Page no.119
ii.	Products with capacities for the proposed project.	Details of product with capacities for the proposed expansion project have been incorporated in this EIA/ EMP report.		Chapter - 1, Table 1.2, Page no. 67-82
iii.	If expansion project, details of existing products with capacities and whether adequate land is available for expansion, reference of earlier EC if any.	<p>Details of existing products with capacities have been incorporated in this EIA/EMP Report.</p> <p>Total plant area is 335.89 ha and the proposed expansion will be done within the existing plant premises; therefore, no additional land will be required for the expansion project.</p> <p>Details of the Environmental Clearances obtained so far from MoEFCC, New Delhi for the existing Plant are given as under:</p> <ol style="list-style-type: none"> <li>1. Concurrence letter for Pyro Plant vide no. J-11013/29/92- EI dated 03.06.1983</li> <li>2. EC letter for Hydro-I plant vide no. J-11011/158/2003- IA.II(I) dated 31.03.2004</li> <li>3. EC letter for Ausmelt lead plant vide no. J-11011/17/2005- IA.II(I) dated 03.08.2005</li> <li>4. EC letter for Hydro-II plant vide no. J-11011/279/2006- IA.II(I) dated 06.12.2006</li> <li>5. EC letter for Inclusion of Fumer plant with Hydro-II Plant vide no. J-11011/279/2006-IA.II(I) dated 05.10.2015</li> <li>6. EC letter from Hydro I &amp; II (combined) vide no. J-11011/279/2006-IA.II(I) dated 14.10.2020</li> </ol> <p>Copies of the EC letter have been enclosed along with this EIA/EMP Report.</p>		<p>Chapter - 2, Table 2.1, Page no. 85</p> <p>Chapter - 1, Table 1.2, Page no. 67-82</p> <p><b><u>Annexure 1</u></b></p>
iv.	List of raw materials required and their source	List of raw materials required, their source along with their mode of transportation has been incorporated in this		Chapter - 2, Section 2.5.1,

ToR Point No.	ToR Point	Compliance				Ref. in EIA/EMP Report	
	along with mode of transportation.	EIA/EMP Report.				Page no. 101-103	
v.	Other chemicals and materials required with quantities and storage capacities.	The details of chemicals and materials required with quantities and storage capacities have been incorporated in this EIA/EMP Report.				Chapter - 2, Table 2.4 Page no. 93-100	
vi.	Details of Emission, effluents, hazardous waste generation and their management.	Details of the Emission, effluents, hazardous waste generation as well as their management have been incorporated in this EIA / EMP Report.				Chapter - 2, Section 2.10.4, Page no. 170-172	
vii.	Requirement of water, power, with source of supply, status of approval, water balance diagram, man-power requirement (regular and contract)	Particular		Total requirement		Chapter - 2, Section -2.5.3.1, Page no. 112-114	
		Water(KLD)		39070			
		Particulars	Quantity			Source	Chapter - 2, Section - 2.5.4, Page no. 115-116
			Existing	Additional *	Total after expansion		
		Water requirement (KLD)	38570	500	39070	Gosunda Dam (Captive) / Proposed STP Chittorgarh / Udaipur/ other proposed STP's (Recycled Water)	
		Power Requirement (MW)	260	48	308	Captive Power Plant/WHRS/ Solar Panels /AVVNL/BPTG	
					Chapter - 2, Section - 2.5.5, Page no. 116-		



ToR Point No.	ToR Point	Compliance					Ref. in EIA/EMP Report
		Steam Requirement (TPH)	1210.4	5	1215.4	CPP 1, CPP 2, CPP 3 WHRB 1, WHRB 2, Roof Top Solar panels, Fumer/State Grid (AVVNL)/New Boiler	117-  Chapter - 2, Section - 2.5.6, Page no. 117-118
		Manpower requirement (Numbers)	2919	360	3279	Local/Outside	
		<p>*No Additional Fresh Water will be required for the proposed expansion project.</p> <p><b>Status of Approval of water:</b></p> <ul style="list-style-type: none"> <li>Letter reg. allocation of water (1500 MCFT) from Gosunda Dam obtained from Energy Dept., Govt. of Rajasthan vide letter no. F 2(28)Energy/86-IV/ dated 19.11.1994.</li> <li>Agreement signed between Municipal Corporation Udaipur, Urban Improvement Trust, Udaipur and Hindustan Zinc Ltd. on 09.05.2021 for supply of treated water from Proposed STP (20 MLD) at Udaipur.</li> <li>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.</li> <li>Agreement between Nagar Parishad, Chittorgarh and Hindustan Zinc Ltd. on 05.01.2021 for supply of Treated water (3000 KLD) from STP at Chittorgarh.</li> </ul> <p><i>Details of the same along with the water balance are enclosed herewith this EIA/EMP Report.</i></p>					<b><u>Annexure 6a, 6b, 6c, 6d</u></b>
viii.	The project proponent shall	Details regarding source and status of approval for surface					Chapter - 2,

ToR Point No.	ToR Point	Compliance	Ref. in EIA/EMP Report
	furnish the requisite documents from the competent authority in support of drawl of ground water and surface water and supply of electricity	Water drawl from Gosunda Dam and power supply are given in the EIA/EMP Report.	Section 2.5.3.1 Page no. 112-114
ix.	Process description along with major equipment and machineries, process flow sheet (quantitative) from raw material to products to be provided.	Process description along with major equipment and machineries has been incorporated in this EIA/EMP Report. Process flow sheet (quantitative) from raw material to products / mass balance has also been incorporated in this EIA/EMP Report.	Chapter - 2, Section 2.7, Page no. 119-159 Chapter - 2, Figure 2.7, Page no. 156
x.	Hazard identification and details of proposed safety systems.	Hazard identification and details of safety systems adopted has been incorporated in this EIA/EMP Report.	Chapter - 7, Section 7.4.1, Page no. 357-358
xi.	Expansion / modernization proposals:		
a)	Copy of all the Environmental Clearance(s) including Amendments thereto obtained for the project from MOEF/SEIAA shall be attached as an Annexure. A certified copy of the latest Monitoring Report of the regional office of the Ministry of Environment and Forests as per circular dated 30 <sup>th</sup> May, 2012 on the status of compliance of conditions stipulated in all the existing environmental clearances	<p>Details of the Environmental Clearances obtained from MOEFCC, New Delhi so far for the existing Chanderiya Lead Zinc Smelter Complex have been obtained from MoEFCC, New Delhi. Copy of the same has been enclosed with this EIA/EMP Report.</p> <p>The latest certified compliance Report of the conditions stipulated in the all the existing EC Letters has been obtained from RO, MOEFCC, Jaipur vide letter dated 27.08.2022 for the existing complex.</p> <p>A query letter has been raised by RO, MOEFCC, Jaipur vide letter dated 07.10.2022 regarding non compliance of 2 EC conditions.</p> <p>Action taken report w.r.t. of S.C. 16 of EC letter dated 03.06.1983 and G.C. i of EC letter dated 14.10.2020, has been submitted to RO, MEOFCC, Jaipur via letter dated 04.11.2022. Copy of the same has been enclosed with this EIA/EMP</p>	<p>Chapter 1, Section 1.2.1 (A), Page 67-71 <b><u>Annexure 1</u></b></p> <p><b><u>Annexure 2A</u></b></p> <p><b><u>Annexure 2B</u></b></p> <p><b><u>Annexure 2C</u></b></p>

ToR Point No.	ToR Point	Compliance	Ref. in EIA/EMP Report
	including Amendments shall be provided. In addition, status of compliance of Consent to Operate for the ongoing/ existing operation of the project from SPCB shall be attached with the EIA-EMP report.	Report. Point wise compliance of the conditions stipulated in the CTOs obtained from RSPCB for the existing complex have been enclosed with this EIA/EMP Report.	<b><u>Annexure 4h</u></b>
b)	In case the existing project has not obtained environmental clearance, reasons for not taking EC under the provisions of the EIA Notification 1994 and /or EIA Notification 2006 shall be provided. Copies of Consent to Establish/No Objection Certificate and Consent to Operate (in case of units operating prior to EIA Notification 2006, CTE and CTO of FY 2005 - 2006) obtained from the SPCB shall be submitted. Further, Compliance report to the conditions of consents from the SPCB shall be submitted.	Not applicable; as Environmental Clearance, has already been obtained for the existing plant.	-
<b>4.</b>	<b>Site Details</b>		
i.	Location of the project site covering village, Taluka/Tehsil, District and State, Justification for selecting the site, whether	Plant site is located at the revenue land of Villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan). Location map showing the plant site along with village, tehsil, district, and state has been incorporated in this EIA/EMP Report.	Chapter - 2, Section 2.3, Figure -2.1, Page no. 86-87



ToR Point No.	ToR Point	Compliance	Ref. in EIA/EMP Report
	other sites were considered.	No alternative site has been considered for the proposed expansion project; as the same will be done within the existing plant premises.	
ii.	A Toposheet of the study area of radius of 10 km and site location on 1:50,000/ 1:25,000 scale on an A3/A2 sheet (including all eco-sensitive areas and environmentally sensitive places).	Map showing plant site and 10 km radius study area on Toposheet of 1:50,000 scale has been incorporated in this EIA/EMP Report.	Chapter - 3, Figure 3.1, Page no.175
iii.	Co-ordinates (lat-long) of all four corners of the site.	Map showing corner Co-ordinates of the plant site are given in this EIA/EMP Report.	Chapter - 2, Figure no. 2.2, Page no.88
iv.	Google map-Earth downloaded of the project site.	Google Earth downloaded map of the plant site is given in this EIA/EMP Report.	Chapter - 2, Figure no. 2.3, Page no.89
v.	Layout maps indicating existing unit as well as proposed unit indicating storage area, plant area, greenbelt area, utilities etc. If located within an industrial area/Estate/Complex, layout of Industrial Area indicating location of unit within the Industrial area/Estate.	Plant Layout showing existing unit as well as proposed unit, storage area, green belt area, other utilities etc. is incorporated in this EIA/EMP Report.  Existing plant is not located in industrial area/ Estate/ Complex.	Chapter - 2, Figure -2.4, Page no. 91
vi.	Photographs of the proposed and existing (if applicable) plant site. If existing, show photographs of plantation/ greenbelt, in particular.	Photographs showing the existing plant site and existing greenbelt / plantation have been incorporated in this EIA/EMP Report.	Chapter - 2, Figure -2.5, Page no. 92

ToR Point No.	ToR Point	Compliance	Ref. in EIA/EMP Report
vii.	Land use break-up of total land of the project site (identified and acquired), government / private - agriculture, forest, wasteland, water bodies, settlements, etc. shall be included (not required for industrial area).	Existing CLZS complex area is 335.89 ha and same is already under the possession of the company. Proposed expansion will be done within the existing complex premises.  Land use break-up of total land of the plant site has been incorporated in this EIA/EMP Report.	Chapter 2, Section 2.3.3, Page No.90
viii.	A list of major industries with name and type within study area (10 km radius) shall be incorporated.  Land use details of the study area.	Details of the industries falling within the study area have been given in the Final EIA/EMP Report.  Land use details of the study area have also been incorporated in this EIA/EMP Report.	Chapter - 3, Table 3.1(a), Page no. 174  Chapter - 3, Figure 3.2(b), Page no.183
ix.	Geological features and Geo-hydrological status of the study area shall be included.	Details regarding Geological features and Geo-hydrological status of the study area have been given in Hydro-geological Study Report incorporated in this EIA/EMP Report.	Chapter 3, Section 3.6.3 Page no.192-193 Fig. No. 3.5 (B), Page no.196 Chapter - 7, Section 7.3, Page no. 357-364
x.	Details of Drainage of the project up to 5 km radius of study area. If the site is within 1 km radius of any major river, peak and lean season river discharge as well as flood occurrence frequency based on peak	Map showing drainage of the plant site and 5 km radius study area has been incorporated in this EIA/EMP Report.  Berach River flows adjacent to the plant site in East direction. Details regarding peak and lean season river discharge, flood occurrence frequency in past 30 years and flood levels have been incorporated in this EIA / EMP Report.	Chapter - 3, Section 3.6.3, Page no.193-199 & Figure No. 3.6(a), Page No. 197

ToR Point No.	ToR Point	Compliance	Ref. in EIA/EMP Report
	rainfall data of the past 30 years. Details of Flood Level of the project site and maximum Flood Level of the river shall also be provided (mega green field projects).		
xi.	Status of acquisition of land. If acquisition is not complete, stage of the acquisition process and expected time of complete possession of the land.	Existing CLZS complex area is 335.89 ha and same is already under the possession of the company. Proposed expansion will be done within the existing complex premises. Therefore, no additional land is required for the expansion project.  Land documents have been incorporated in this EIA/EMP Report.	Chapter 2, Section 2.3.3, Page No.90-91  <b><u>Annexure 7</u></b>
xii.	R & R details in respect of land in line with state Government policy.	As the proposed expansion will be done within the existing plant premises, which is already in possession of the company, Therefore, no R&R is applicable for the proposed expansion project.	-
<b>5.</b>	<b>Forest and Wildlife related issues (if applicable)</b>		
i.	Permission and approval; for the use of forest land (forestry clearance), if any, and recommendations of the State Forest Department (if applicable)	No forest land is involved in the plant site; thus, no such permission / approval is required.	-
ii.	Land use map based on High resolution satellite imagery (GPS) of the proposed site delineating the forestland (in case of projects involving forest land more than 40 ha)	No forest land is involved in the proposed expansion project.	-
iii.	Status of Application submitted for obtaining the	No forest land is involved in the plant site; thus, no Forest Clearance is required.	-

ToR Point No.	ToR Point	Compliance	Ref. in EIA/EMP Report
	stage I forestry clearance along with latest status shall be submitted.		
iv.	The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animal; the project proponent shall submit the map duly authenticated by Chief Wildlife Warden showing these features vis-a-vis the project location and the recommendations or comments of the Chief Wildlife Warden - thereon.	No National Parks, Wildlife Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animal; exist within 10 km radius of the plant site.  Letter from DCF, Wildlife, Chittorgarh vide letter no. No.F()Survey/DCF/WL/2021-22/2709 dated 26.04.2022 regarding no National Park & Sanctuary falling within 10 km radius study area of plant site, has been enclosed herewith this EIA/EMP Report.	<b><u>Annexure 10 C</u></b>
v.	Wildlife Conservation Plan duly authenticated by the Chief Wildlife Warden of the state government for conservation of schedule I fauna, if any exists in the study area.	List of flora and fauna existing within the study area has been authenticated by DFO, Chittorgarh vide letter No. F()survey/DFC/2022-23/5600 dated 18.08.2022; further amended regarding List of Fauna vide letter No. F()survey/DFC/2022-23/7233 dated 19.10.2022. The same has been enclosed herewith with this EIA/EMP report.  As per the authenticated list, total 6 schedule I species i.e., <i>Panthera pardus</i> (Leopard), <i>Prionailurus rubiginosus</i> (Rusty Spotted Cat), <i>Gyps bengalensis</i> (White-rumped Vulture), <i>Falco jugger</i> (Laggar Falcon), <i>Pavo cristatus</i> (Indian Peafowl), <i>Varanus bengalensis</i> (Bengal Monitor lizard) found within the study area during survey.  Wildlife conservation plan for the above species along with <i>Hystrix indica</i> (Indian Crested Porcupine) & <i>Semnopithecus entellus</i> (Bangal Hanuman Langur) has been prepared and submitted to DCF, Chittorgarh for authentication from CWW, Chittorgarh vide letter no. HZL/CLZS/43/2022-23 dated	Chapter 3, Section 3.6.13, Page no. 226-234 <b><u>Annexure 10 A &amp; B</u></b>          Chapter 4, Section 4.11, Page no. 281



ToR Point No.	ToR Point	Compliance	Ref. in EIA/EMP Report
		10.11.2022. The Copy of the same is enclosed herewith with this EIA/EMP report	<b><u>Annexure 10 D</u></b>
vi.	Copy of application submitted for clearance under the Wildlife (Protection) Act, 1972, to the Standing Committee of the National Board for Wildlife.	Not applicable.	-
<b>6.</b>	<b>Environmental Status</b>		
i.	Determination of atmospheric inversion level at the project site and site-specific micro-meteorological data using temperature, relative humidity, hourly wind speed and direction and rainfall.	<p>Details of atmospheric inversion level and Site-specific micro-meteorological data collected during Post Monsoon Season (Oct. to Dec., 2020) have been incorporated in this EIA/EMP Report.</p> <p>Hourly meteorological data has been enclosed with the EIA/EMP Report.</p> <p>Details regarding rainfall have been given in EIA/EMP Report.</p>	<p>Chapter - 3, Section 3.6.6, Page no.199-203</p> <p><b><u>Annexure - 8</u></b></p> <p>Chapter - 3, Section 3.6.5, Page no.198-199</p>
ii.	AAQ data (except monsoon) at 8 locations for PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>x</sub> , CO and other parameters relevant to the project shall be collected.  The monitoring stations shall be based CPCB guidelines and take into account the pre-dominant wind direction, population zone and sensitive receptors including reserved forests.	<p>AAQ monitoring was carried out at 9 locations for PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub> and CO during Post Monsoon Season (Oct. to Dec., 2020) and at 13 locations during additional one month (Oct., 2021) study within 10 km radius study area.</p> <p>The monitoring stations were selected taking into account the predominant wind, population zone and sensitive receptors including reserved forests.</p> <p>Detail of the same has been incorporated in this EIA/EMP Report.</p>	Chapter - 3, Section 3.6.9, Page 203-213

ToR Point No.	ToR Point	Compliance	Ref. in EIA/EMP Report
iii.	Raw data of all AAQ measurement for 12 weeks of all stations as per frequency given in the NAQQM Notification of Nov. 2009 along with- min., max., average and 98% values for each of the AAQ parameters from data of all AAQ stations should be provided as an annexure to the EIA Report.	Detailed AAQM Tables for Post Monsoon Season (Oct. to Dec., 2020) as well as additional one month (Oct., 2021) have been enclosed with this EIA/EMP Report.	Chapter 3, Section 3.6.9, Page 203-213 <b><u>Annexure – 9A &amp; 9B</u></b>
iv.	Surface water quality of nearby River (60m upstream and downstream) and other surface drains at eight locations as per CPCB/MoEFCC guidelines.	There is / will be no discharge of waste water in nearby water bodies. Zero Liquid Discharge (ZLD) is being maintained & will be adopted. Surface water quality of the 10 km study area has been assessed for 5 locations; details of the same have been incorporated in this EIA/EMP Report.	Chapter - 3, Section 3.6.11.1, Page no. 217-219
v.	Whether the site falls near to polluted stretch of river identified by the CPCB / MoEFCC.	Plant site does not fall near to polluted stretch of river identified by the CPCB / MoEFCC. Details have been incorporated in this EIA /EMP Report.	Chapter - 4, Section 4.9, Page no. 276-277
vi.	Ground water monitoring at minimum at 8 locations shall be included.	Ground water monitoring was carried out at eight locations in the study area during Post Monsoon Season (Oct. to Dec., 2020); details of the same have been incorporated in this EIA/EMP Report.	Chapter - 3, Section 3.6.11.2, Page no. 219-222
vii.	Noise levels monitoring at 8 locations within the study area.	Noise level monitoring was carried out at eight locations in the study area during Post Monsoon Season (Oct. to Dec., 2020); details of the same have been incorporated in this EIA/EMP Report.	Chapter - 3, Section 3.6.10, Page no. 213-216
viii.	Soil Characteristics as per CPCB guidelines.	Soil sampling was carried out for eight locations in the study area during Post Monsoon Season (Oct. to Dec., 2020); details of the same have been incorporated in this EIA/EMP Report.	Chapter - 3, Section 3.6.12, Page no. 222-226

**JM Environet Pvt. Ltd.**

ToR Point No.	ToR Point	Compliance	Ref. in EIA/EMP Report
	concentration of pollutants from the stack emission based on site-specific meteorological features. In case the project is located on hilly terrain characteristics for determining the potential impacts of the project on the AAQ. Cumulative impact of all sources of emissions (including transportation) on the AAQ of the area shall be well assessed. Details of the model used and the input data used for modeling shall also be provided. The air quality contours shall be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any.	<p>emissions has been assessed for the proposed expansion project by using AERMOD Version 10.2.1 dispersion model. Point, area &amp; line source have been considered for prediction; details (including model input) are incorporated in this EIA/EMP Report.</p> <p>Impact of existing sources within the study area, has been considered in the baseline monitoring results.</p> <p>Cumulative impact assessment has been carried out for the proposed expansion project as per the Project Specific TOR point no. 4.</p> <p>The project site is not located on a hilly terrain.</p> <p>Isopleths showing air quality contours plotted on location map have also been incorporated in this EIA/EMP Report.</p>	<p>Section 4.7, Page No. 252-269</p> <p>Chapter - 4, Figure 4.1, 4.2, 4.3, 4.4 and 4.5 Page no. 265-269</p>
ii.	Water Quality modeling- in case, if the effluent is proposed to be discharged in to the local drain, then Water Quality Modeling study should be conducted for the drain water taking into consideration the upstream and downstream quality of water of the drain.	<p>No effluent is discharged from the plant as the plant site is/ will be based on Zero Liquid discharge.</p> <p>Therefore, water quality modeling study is not required.</p> <p>Same has been shown in water balance diagram given in this EIA/EMP Report.</p>	<p>Chapter 2, Section 2.5.3.1, Page no. 112-114</p>



ToR Point No.	ToR Point	Compliance	Ref. in EIA/EMP Report
iii.	Impact of the transport of the raw materials and end products on the surrounding environment shall be assessed and provided. In this regard, options for transport of raw materials and finished products and wastes (large quantities) by rail or rail-cum road transport or conveyor-cum-rail transport shall be examined.	Details regarding impact of the transport of the raw materials and end products on the surrounding environment has been assessed and suggested mitigation measures have been incorporated in this EIA / EMP Report.  Options to transport raw materials, finished products and wastes (large quantities) by rail or rail-cum road transport or conveyor-cum-rail transport shall be explored as per requirement.	Chapter - 4, Section 4.14, Page no. 287-290
iv.	A note on treatment of wastewater from different plant operations, extent recycled and reused for different purposes shall be included. Complete scheme of effluent treatment. Characteristics of untreated and treated effluent to meet the prescribed standards of discharge under E (P) Rules.	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. At present we are treating average 7598m <sup>3</sup> or less effluent per day while we have treatment facility for 12600m <sup>3</sup> /d so increment if any in waste water will be treated in existing system.  Total wastewater generated from CLZS complex is /will be 7598 KLD (1500 KLD Pyro, 450 KLD Ausmelt, 3296 KLD H-I & 2352 KLD H-II), which is being/will be treated in two existing ETPs (8400 KLD and 4200 KLD, respectively). The Treated trade effluent is being/will be used for Slag Granulation and Lime slurry preparation and remaining treated trade effluent is being /will be further treated through three stage reverse osmosis (R.O.) plants and R.O. permeate is being/will be recycled/ reused in the process within the premises. RO reject is being evaporated in solar evaporation pond and also used for spraying on waste disposal area; Multiple Effect Evaporator (MEE/MVR) Plant is already in operation at site. Blow down water from CPP is being/will be	Chapter - 2, Section 2.10.2, Page no. 169-170

ToR Point No.	ToR Point	Compliance	Ref. in EIA/EMP Report
		<p>treated in neutralization pit and further reused in dust suppression.</p> <p>Domestic Waste water generated from the office toilets is being/will be treated in existing STP (1000 KLD) and treated water is being /will be used in process/Plantation.</p> <p>Details of ETP and STP have been incorporated in this EIA/EMP Report.</p>	
v.	Details of stack emission and action plan for control of emissions to meet standards.	<p>Existing and Proposed stack emission details have been incorporated in the EIA/EMP Report.</p> <p>Efficient Air Pollution Control Equipment (APCE) have been/will be installed for the control of emissions from all the sources within the prescribed limit.</p> <p>Details of the same have been incorporated in this EIA/EMP Report.</p>	<p>Chapter - 4, Table 4.6, Page no.256-261</p> <p>Chapter - 2, section.2.10.1.1, Page no. 167-169</p>
vi.	Measures for fugitive emission control.	Measures to control of fugitive emission have been incorporated in this EIA/EMP Report.	<p>Chapter - 4, Section 4.7, Page no. 252-254</p>
vii.	Details of hazardous waste generation, and their storage, utilization and disposal. Copies of MOU regarding utilization of solid and hazardous waste shall also be included. EMP shall include the concept of waste-minimization, recycle/ reuse/ recover techniques, Energy conservation, and natural resource conservation.	<p>Details of hazardous waste generation, storage, utilization and disposal have been incorporated in this EIA/EMP Report.</p> <p>Concept of waste - minimization, recycle/ reuse / recover techniques, Energy conservation and natural resource conservation has been included in the EMP and details reg. the same have been incorporated in this EIA/EMP Report.</p>	<p>Chapter - 2, Section 2.10.4, Page no. 170-172</p> <p>Chapter - 10, Section 10.5, Page no. 400-401</p>

ToR Point No.	ToR Point	Compliance	Ref. in EIA/EMP Report
viii.	Proper utilization of fly ash shall be ensured as per Fly Ash Notification, 2009. A detailed plan of action shall be provided.	Fly ash generated from CPP is being / will be sold to cement plants and brick manufacturing units. Details are given in this EIA/EMP Report.	Chapter - 10, Section 10.4, Table No. 10.2 Page no. 399-400
ix.	Action plan for the greenbelt development plan in 33 % area i.e. land with not less than 1,500 trees per ha. Giving details of species, width of plantation, planning schedule etc. shall be included. The greenbelt shall be around the project boundary and a scheme for greening of the roads used for the project shall also be incorporated.	Out of the total plant area of 335.89 ha, 37.21% (i.e. 125.02 ha) has already been developed under greenbelt / plantation. The same will be maintained and enhanced by doing gap plantation to achieve the plantation density @2500/ha for proposed expansion. Action Plan for increasing the density of greenbelt via gap plantation has been incorporated in this EIA / EMP Report.	Chapter - 10, Section 10.7, Page no. 407-411
x.	Action plan for rainwater harvesting measures at plant site shall be submitted to harvest rainwater from the roof tops and storm water drains to recharge the ground water and also to use for the various activities at the project site to conserve fresh water and reduce the water requirement from other sources.	Details of the rainwater harvesting measures existing as well as proposed for the expansion project, have been given in Hydro-geological Report incorporated in this EIA/EMP Report.	Chapter 7, section 7.3, page 357-364 Chapter 10, Section 10.6.3, Page no. 402-404
xi.	Total capital cost and recurring cost/annum for	Cost for Environmental Protection Measures: ❖ Capital Cost: Rs. 120.05 Crores	Chapter - 10, Section 10.9,



ToR Point No.	ToR Point	Compliance	Ref. in EIA/EMP Report
	environmental pollution control measures shall be included.	❖ Recurring Cost: Rs. 15.14 Crore / Annum Detailed breakup of cost has been included in this EIA/EMP report.	Page no. 422-423
xii.	Action plan for post-project environmental monitoring shall be submitted.	Action plan for post-project environmental monitoring has been incorporated in this EIA/EMP report.	Chapter - 6, Section 6.2.2, Page no. 302-304
xiii.	Onsite and Offsite Disaster (natural and Man-made) Preparedness and Emergency Management Plan including Risk Assessment and damage control. Disaster management plan should be linked with District Disaster Management Plan.	Onsite and Offsite Disaster (natural and Man-made) Management & Emergency Preparedness Plan including Risk Assessment and damage control has been incorporated in this EIA/EMP Report.	Chapter - 7, Section 7.4 Page no. 364-381
<b>8.</b>	<b>Occupational health:</b>		
i.	Details of existing Occupational & Safety Hazards. What are the exposure levels of above mentioned hazards and whether they are within Permissible Exposure level (PEL). If these are not within PEL, what measures the company has adopted to keep them within PEL so that health of the workers can be preserved.	Details regarding Occupational and Safety Hazards along with exposure level have been incorporated in this EIA/EMP Report.  Exposure levels of all the hazards are within Permissible Exposure level.	Chapter - 10, Section 10.8, Page no.411-421
ii.	Details of exposure specific health status evaluation of worker. If the workers'	Details of exposure specific health status evaluation of workers along with analyzed data of various parameters conducted have been given in this EIA/EMP Report.	Chapter - 10, Section 10.8, Page no.411-421

ToR Point No.	ToR Point	Compliance	Ref. in EIA/EMP Report
	health is being evaluated by pre-designed format, chest x rays, Audiometry, Spirometry, Vision testing (Far & Near vision, colour vision and any other ocular defect) ECG, during pre-placement and periodical examinations give the details of the same. Details regarding last month analyzed data of abovementioned parameters as per age, sex, duration of exposure and department wise.	Pre-placement and periodical examinations of the employees are being done.  Current practices will be followed; details of the same are incorporated in this EIA/ EMP Report.  Details regarding last analyzed data of above-mentioned parameters have been incorporated in this EIA/EMP Report.	
iii.	Annual report of health status of workers with special reference to Occupational Health and Safety.	Annual sample report of health status of worker with special reference to Occupational Health and Safety has been enclosed with this EIA/EMP Report.	<b>Annexure –11</b>
iv.	Plan and fund allocation to ensure the occupational health and safety of all contract and casual workers.	Rs. 430 Lacs have been earmarked for three years to ensure the occupational health and safety of all contract and casual workers. Details have been incorporated in this EIA/EMP Report.	Chapter - 10, Section 10.8.17, Page no. 421
<b>9.</b>	<b>Corporate Environment Policy:</b>		
i.	Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report.	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.	Chapter 10, Section 10.3, Page no.393- 396

ToR Point No.	ToR Point	Compliance	Ref. in EIA/EMP Report
ii.	Does the Environment Policy prescribe for standard operating process / procedures to bring into focus any infringement / deviation / violation of the environmental or forest norms / conditions? If so, it may be detailed in the EIA.	Yes, the Corporate Environment Policy prescribes for standard operating process to implement the environmental standards.	
iii.	What is the hierarchical system or Administrative order of the company to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions? Details of this system may be given.	The hierarchical system or Administrative order of the company to address environmental issues and for ensuring compliance with the environmental clearance conditions are given in the Corporate Environment Policy.	
iv.	Does the company have system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the company and / or shareholders or stakeholders at large? This reporting mechanism shall be detailed in the EIA report.	Yes, the company has system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the company.  The same has been incorporated under roles & responsibilities of Corporate Environment Policy.	
10.	Details regarding infrastructure facilities such as sanitation, fuel, restroom etc. to be provided to the labour force during	Details regarding infrastructure facilities provided to the labour force during construction as well as to the casual workers including truck drivers during operation phase have been incorporated in this EIA/EMP Report.	Chapter - 2, Section 2.3.3, Page no. 90



ToR Point No.	ToR Point	Compliance	Ref. in EIA/EMP Report
	construction as well as to the casual workers including truck drivers during operation phase.		
11.	To address the public hearing issues, provisions contained under Ministry's Office Memorandum vide F. No. 22-65/2017-IA.III dated 30/09/2020 shall be Complied.	<p>The Public Hearing has been conducted for the expansion project on 20.07.2022. Time bound action plan with budgetary allocation for implementation of commitments made during Public Hearing (as per verbal suggestions as well as written letters) has been prepared and incorporated in this EIA/EMP Report.</p> <p>Based on the issued raised during Public Hearing, HZL has prepared the socio-economic development plan in line with OM dated 30<sup>th</sup> September, 2020 and 20<sup>th</sup> Oct., 2020. Details have been incorporated in this EIA/EMP Report.</p>	<p>Chapter - 7, Section 7.2, Page no. 308-356</p> <p>Chapter - 8, Section 8.4, Table No. 8.3 Page no. 389</p>
12.	Any litigation pending against the project and/or any direction/order passed by any Court of Law against the project, if so, details thereof shall also be included. Has the unit received any notice under the Section 5 of Environment (Protection) Act, 1986 or relevant Sections of Air and Water Acts? If so, details thereof and compliance/ATR to the notice(s) and present status of the case.	<p>No litigation is pending against the project w.r.t. environment.</p> <p>A Show Cause Notice was issued to the Hindustan Zinc Ltd. by MOEFCC, New Delhi vide letter J-11011/279/2006-IA.II (I) dated 6<sup>th</sup> April, 2021 under Section 5 of Environment (Protection) Act, 1986 for violation of provisions of under EIA Notification, 2006. Reply of the same was submitted to MOEFCC, New Delhi vide letter HZL/CLZS/ENV/38/2021-22 dated 19<sup>th</sup> April, 2021. After detailed deliberation as per the personal hearing held on 05<sup>th</sup> August, 2021, the Show Cause Notice has been withdrawn by MOEFCC, New Delhi vide letter dated 31<sup>st</sup> August, 2021.</p> <p>Details of the same have been incorporated in this EIA/EMP Report.</p>	<p>-</p> <p>Chapter 1, Section 1.2.1 (A), page 67-71</p> <p><b><u>Annexure 5</u></b></p>
13.	A tabular chart with index for point wise compliance of above TORs.	Point-wise compliance of the ToRs has been given in the tabular form.	-

ToR Point No.	ToR Point	Compliance	Ref. in EIA/EMP Report
14.	The TORs prescribed shall be valid for a period of three years for submission of the EIA-EMP reports along with Public Hearing Proceedings (wherever stipulated).	Noted.	-
<b>Additional ToRs for Metallurgical Industry (Ferrous and Non-ferrous)</b>			
1.	Complete process flow diagram describing each unit, its processes and operations, along with material and energy inputs & outputs (material and energy balance).	Details of complete process flow diagram describing each unit, its processes and operations, along with material and energy inputs & outputs (material and energy balance) have been incorporated in this EIA/EMP Report.	Chapter 2, Section 2.7, Page no. 119-159 and Page no. 104-110
2.	Emission from Sulphuric acid plant and Sulphur muck management.	Details of emission generated from Sulphuric acid plant and its management have been incorporated in this EIA/EMP Report.	Chapter 2, Section 2.10.1, Table 2.32, page 168
3.	Details on installation of Continuous Emission Monitoring System with recording with proper calibration system.	Online Continuous Emission Monitoring System are already attached with the stacks and connected with SPCB/CPCB servers. As per CPCB guidelines timely calibration is carried out for CEMS.	Chapter -6, Section 6.2.2, Page no.302-304
4.	Details on toxic metals including fluoride emissions.	This is a Lead Zinc Smelter Complex. Therefore, no Fluoride emissions are envisaged.	-
5.	Details on stack height.	Details of stack including their height is incorporated in this EIA/EMP Report.	Chapter - 4, Section 4.7.3.1, Page no. 256-261
6.	Details on ash disposal and management.	Details on ash disposal and management have been incorporated in this EIA/EMP Report.	Chapter - 2, Section 2.7.5 Page no. 152

ToR Point No.	ToR Point	Compliance	Ref. in EIA/EMP Report
7.	Complete process flow diagram describing process of lead/zinc/copper/aluminium, etc.	Process flow diagrams of various unit existing as well as proposed in the CLZS Complex have been incorporated in this EIA/EMP Report.	Chapter - 2, Section 2.7 Page no. 119-159
8.	Details on smelting, thermal refining, melting, slag fuming, and Waelz kiln operation.	Details on smelting, thermal refining, melting, slag fuming, have been incorporated in this EIA/EMP Report. Waelz kiln operation neither exist nor proposed at CLZS Complex.	Chapter - 2, Section 2.7 Page no. 119-159
9.	Details on Holding and de-gassing of molten metal from primary and secondary aluminium, materials pre-treatment, and from melting and smelting of secondary aluminium.	No such operation will be carried out as this is not an Aluminum Plant, thus the point is not applicable.	-
10.	Details on toxic metal content in the waste material and its composition and end use (particularly of slag).	Waste Analysis test report for Trace metals in Slag, Cooler Cake (Hydro 1), Cooler Cake (Unit II of Hydro II), Purification Cake (Unit II of Hydro I), Fly Ash (CPP Unit 1,2&3), Jarofix, Jarosite and other materials has been incorporated in this EIA/EMP Report. End use of the waste materials has been given in incorporated in this EIA/EMP Report.	<b><u>Annexure 12 A, B, C, D, E, F</u></b>  Chapter 2, Section 2.10.4, Page 170-172
11.	Trace metals in waste material especially slag.	Waste Analysis test report for Trace metals in Slag, Cooler Cake (Hydro 1), Cooler Cake (Unit II of Hydro II), Purification Cake (Unit II of Hydro I), Fly Ash (CPP Unit 1,2&3), Jarofix, Jarosite and other materials has been incorporated in this EIA/EMP Report.	<b><u>Annexure 12 A,B,C,D,E,F</u></b>
12.	Plan for trace metal recovery.	Proposal for Minor metal recovery (Copper, Cadmium, Cobalt and Nickel) is already a part of the project proposal details are included in this EIA/EMP report.	Chapter -1, Section 1.2.1 (B), Page no. 71 & 74
13.	Trace metals in water.	Details of Trace metals in the Surface and Ground water	Chapter - 3,



ToR Point No.	ToR Point	Compliance	Ref. in EIA/EMP Report
		<p>samples have been carried out and same have been incorporated in this EIA/EMP report.</p> <p>Details of Surface &amp; Ground water analysis report is included in this EIA/EMP report.</p>	<p>Section 3.6.11, Page no. 217-222</p>
<b>Project Specific TOR</b>			
1.	One-month Ambient Air Quality (AAQ) data shall be collected additionally at locations near old stations and new location selected / corrected based on wind rose.	<p>Additional One-month for Oct.2021 Ambient Air Quality (AAQ) data has been collected at locations near old stations and new location selected based on wind rose.</p> <p>Details have been incorporated in this EIA/EMP Report.</p>	<p>Chapter - 3, Section – 3.6.9, Table No. 3.11 (C) Page no. 210-213</p>
2.	No additional water shall be taken as make up for proposed expansion. 500 KL/Hr. requirement shall be met from RO water.	<p>Noted and agreed too</p> <p>Details have been incorporated in this EIA/EMP Report.</p>	<p>Chapter - 2, Section – 2.5.3.1, Page no. 112-114</p>
3.	Action plan for green belt development covering 37% of the project area shall be submitted. Tree density in the existing green belt shall be increased from present 1200 trees per ha to 2500 trees per ha by gap filling.	<p>Out of the total plant area of 335.89 ha, 37.21% (i.e. 125.02 ha) has already been developed under greenbelt / plantation. The same will be maintained and enhanced by doing gap plantation to achieve the plantation density@2500/ha for proposed expansion.</p> <p>Action Plan for increasing the intensity of greenbelt development via gap plantation has been incorporated in this EIA / EMP Report.</p>	<p>Chapter - 10, Section 10.7, Page no. 409-411</p>
4.	<p>Fertilizer plant is an interlinked project at project site. Cumulative impact assessment shall be carried out by integrating following units under implementation:</p> <p>a. Activities proposed under the proposed expansion of</p>	<p>Cumulative impact assessment has been carried out for the project considering the said projects. Details are given in this EIA / EMP Report.</p>	<p>Chapter - 4, Section 4.7.3, Page No.255-273</p>

ToR Point No.	ToR Point	Compliance	Ref. in EIA/EMP Report
	Chanderiya Lead Zinc Smelter Complex. b. Proposed Ammonium Phosphate Fertilizer Complex of 1.02 MTPA (2x 0.51 MTPA) c. Capacity expansion from 4,20,000 to 5,04,000 TPA in Hydro-1 and Hydro-II Zinc Smelter through debottlenecking within the CLZS Complex d. Fumer Plant within the CLZS Complex as per EC issued vide F.No. J-11011/279/2006-IA. II(I) 5/10/2015.		
5.	Risk assessment shall be done for expansion project and the Disaster Management Plan for existing plant shall be upgraded to include new units/products.	Risk assessment and Disaster Management Plan has been prepared and incorporated in this EIA/EMP Report.	Chapter - 7, Section 7.4 & Page no. 364-381
6.	SO <sub>2</sub> emissions from H <sub>2</sub> SO <sub>4</sub> plant shall be < 1 kg/t of acid.	The SO <sub>2</sub> emission from Acid Plant (At Pyro Plant) will be reduced upto 1.5 Kg/ton of Acid production. The same will be achieved by improving the acid plant converter (SO <sub>2</sub> conversion efficiency by using super cesium catalyst in 4 <sup>th</sup> bed). The same will be achieved by December, 2023. The existing TGT is designed at 1.5 Kg/ton SO <sub>2</sub> emission and this expansion project involves only product mix change and no major structural modification or changes are involved. Therefore, it will not be feasible to achieve SO <sub>2</sub> emission < 1 kg/t of acid with the existing TGT.	Chapter 2, Section 2.10.1, Table 2.32, page 168

ToR Point No.	ToR Point	Compliance	Ref. in EIA/EMP Report
		The same has been incorporated in this EIA/EMP Report.	
7.	Acid mist from H <sub>2</sub> SO <sub>4</sub> plant shall be < 30mg / Nm <sup>3</sup> .	The existing TGT is designed at 50 mg/Nm <sup>3</sup> Acid Mist emission and this expansion project involves only product mix change and no major structural modification or changes are involved. Therefore, it will not be feasible to achieve Acid Mist emission < 50 mg/Nm <sup>3</sup> with the existing TGT. Therefore, the emission limits given as per CTO Conditions for Units will continue to be complied with. The same has been incorporated in this EIA/EMP Report.	Chapter 2, Section 2.10.1, Table 2.32, page 168
8.	Action plan for rain water harvesting shall be submitted.	Details regarding Rainwater Harvesting measures adopted as well as proposed have been incorporated in this EIA / EMP Report.	Chapter - 10, Section 10.6.3, Page No. 402-404
9.	Action plan for the stock piles with impervious floor, provision of garland drains and catch pits to trap runoff material shall be submitted.	Concreted impervious floor with Acid proof brick lining has been provided at site for waste storage with drains and pits from which, runoff water is being taken to the ETP for treatment. Details of the same have been incorporated in this EIA / EMP Report.	Chapter - 4, Section 4.9, Page No.276-278
10.	Action plan to reduce the fugitive emissions from the plant shall be furnished.	CLZ Unit already have a well-maintained system to control fugitive emissions like automated Vacuum Sweepers for roads, Bag filters, Covered Conveyors etc. Details have been incorporated in this EIA / EMP Report.	Chapter - 4, Section 4.7, Page No. 252-254
11.	The project proponent shall submit action plan for reuse/ recycling of entire wastewater after treatment.	CLZS Unit is maintaining ZLD at site. Details have been incorporated in this EIA / EMP Report.	Chapter - 4, Section 4.9, Page No.276-278
12.	Action plan to limit the dust emission from all the stacks below 30 mg/Nm <sup>3</sup> shall be furnished.	All the existing stacks are maintaining PM below 30 mg/Nm <sup>3</sup> for its Hydro and 50 mg/Nm <sup>3</sup> for CPP & Ausmelt. In Pyro plant, HZL will reduce the PM emission by replacement of existing bag filter bags with upgraded/ PTFE coated bags, which will bring down PM emission from existing 150 mg/Nm <sup>3</sup> to 100 mg/Nm <sup>3</sup> . The same will be	Chapter 2, Section 2.10.1, page 166



ToR Point No.	ToR Point	Compliance	Ref. in EIA/EMP Report
		<p>achieved by December, 2024.</p> <p>Further reduction in the PM Emissions from Pyro Plant is not technically feasible as the Bag filter technology installed in the plant is more than 30 years old, any updation in this will required change in whole plant design viz. installation of all new design Bag filters along with suctions and duct modification etc. As this expansion project involves only product mix change in pyro plant and no major structural modification is involved, therefore, it is not possible to reduce the PM emissions below 30 mg/Nm<sup>3</sup>.</p> <p>The same have been incorporated in this EIA / EMP Report.</p>	



## EXECUTIVE SUMMARY

### 1. PROJECT DESCRIPTION

#### 1.1 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. Hindustan Zinc Limited (HZL) is an India-based company, which is one of the largest Lead-Zinc integrated producer & a Leading producer of silver with more than 60 years of experience in Mining & Smelting. The Company's segments are mining and smelting of Zinc, Lead, Silver and Wind energy. The Company's operations include five Zinc-Lead mines, four Zinc Smelters, a Lead Smelter, a Zinc-Lead Smelter, a silver refinery plant and 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.

#### 1.2 Identification of the Project

##### A. Existing Project

Hindustan Zinc Limited (HZL) has an existing Chanderiya Lead Zinc Smelter (CLZS) Complex of Hindustan Zinc Limited (HZL) comprises of Pyro Metallurgical Smelter (1, 05,000 TPA Zinc and 35,000 TPA Lead), Ausmelt Lead Smelter (60,000 TPA) and Hydro Metallurgical Zinc Smelter (5, 04,000 TPA) at villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan). The complex also has three units of Captive Power Plant with 254 MW capacity (154 MW + 100 MW) to supply the power requirements for its metallurgical operations of CLZS Complex. It also has 8 Emergency DG sets with total capacity of 18.80 MW and power generation capacity through waste heat recovery of 34.7 MW.

The existing project was accorded Concurrence letter initially for Pyro Plant vide no. J-11013/29/92-EI dated 03.06.1983; Production capacity of Pyro Plant was increased from 105000 TPA (Zn - 70,000 TPA + Pb - 35,000 TPA) to 140000 TPA (Zn - 105000 TPA + Pb - 35000 TPA) vide NOC obtained from RSPCB vide no. F.12 (Chittor-60) RPCB/Gr. III/19418 dated 05.03.2004. Current CTO for Pyro Plant has been accorded by Rajasthan State Pollution Control Board (RSPCB) vide Order no. 2020-2021 / HDF /3070 dated 08.06.2020 (valid upto 29.02.2024).

The Environmental Clearance for existing {Hydro Zinc Smelter I (1,70,000 TPA Zinc Production)& CPP (154MW)} was issued vide F.No.J-11011/158/2003-IA.II(I) 31.03.2004; and Environmental Clearance for {Hydro Zinc Smelter II (2,10000 TPA) and its expansion (From 1,70,000 TPA to 2,10,000 TPA) was issued vide letter no J-11011/279/2006-IA.II(I) dated 06.12.2006 by MOEF & CC New Delhi.

The Environmental Clearance for Inclusion of Fumer Plant within the {Hydro Zinc Smelter II} was issued vide F.No.J-11011/279/2006-IA.II(I) 5.10.2015 and CTO was accorded by RSPCB vide Order no. 2020-2021/HDF/3009 dated 08.05.2020 (valid upto 31.03.2025).The Fumer plant has been installed but could not be operated due to some process incident during commissioning. Its operation is expected

to start in March, 2023. The Environment Clearance for Capacity Expansion in Hydro I & Hydro II Zinc Smelters (from 4,20,000 TPA to 5,04,000 TPA) through debottlenecking was accorded vide letter no. J-11011/279/2006-IA.II (I) dated 14.10.2020 by MOEF&CC. CTO has been issued vide order no. F(HDF)/Chittorgarh(Gangrar)/2(1)/2020-2021/6117-6119 dated 26/3/2021 & for Hydro II vide order no. F(HDF)/Chittorgarh(Gangrar)/2(1)/2020-2021/6120-6122 dated 26/3/2021 respectively.

The Environmental Clearance for Ausmelt Lead Smelter Plant (60,000 TPA) is been accorded vide letter no. F.No.J-11011/17/2005-IA.II (I) 3.8.2005 and CTO by RSPCB Order no. 2020-2021/HDF/3069 dated 05.06.2020 (valid upto 31.08.2023).

CTO for installation of 2 D.G. Sets (2 x 7.405 MW) was obtained from RSPCB vide Order no. 2020-2021 / HDF / 3068 dated 05.06.2020 (valid upto 30.04.2024). CTO for Township was obtained vide Order no. 2018-2019/CPM/5201 dated 23.05.2018.

Earlier, company has proposed expansion of the same plant as “Expansion in Existing CLZS Complex [Expansion in Hydro Smelter Unit by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis and Installation of 1 Lead Refinery, Expansion of CPP through Modernization, Recovery of Minor Metals & Installation 4 DG Sets] at villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan)” for which application was submitted on portal on 5<sup>th</sup> March, 2021 [Proposal no. IA/RJ/IND/192897/2021 and File No. J-11011/279/2015- IA.II(I)].

Baseline monitoring & data collection for the project was carried out during Post Monsoon Season (October 2020 to December 2020).

A Show Cause Notice was issued to the Hindustan Zinc Ltd. by MOEFCC, New Delhi vide letter J-11011/279/2006-IA.II (I) dated 6<sup>th</sup> April, 2021 under Section 5 of Environment (Protection) Act, 1986 for violation of provisions of under EIA Notification, 2006. Reply of the same was submitted to MOEFCC, New Delhi vide letter HZL/CLZS/ENV/38/2021-22 dated 19<sup>th</sup> April, 2021. After detailed deliberation as per the personal hearing held on 05<sup>th</sup> August, 2021, the Show Cause Notice has been withdrawn by MOEFCC, New Delhi vide letter dated 31<sup>st</sup> August, 2021.

A fresh Application for obtaining TOR for the proposal “Expansion within the existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Set] at villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan)” by M/s. Hindustan Zinc Limited was submitted on Parivesh Portal dated 05.09.2021 and ToR letter issued by MoEFCC, New Delhi vide letter no. J-11011/279/2006-IA.II (I) dated 27.09.2021 for the preparation of EIA/EMP Report. Public Hearing has been conducted for the project on 20.07.2022.

## **B. Project Proposal**

Application for obtaining TOR for the proposal “Expansion within the existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line &



Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Set] at villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan)” by M/s. Hindustan Zinc Limited was submitted on Parivesh Portal dated 05.09.2021 and ToR letter issued by MoEFCC, New Delhi vide letter no. J-11011/279/2006-IA.II (I) dated 27.09.2021 & add one month study for AAQ carried out during Oct. 2021 for the preparation of EIA/EMP Report.

The project proposal includes following modifications and inclusion in its existing units:

1. **Pyro Metallurgical Smelter Unit:** Change in Product Mix on total metal basis: 140,000 TPA (Refined Lead or Refined Zinc or Product Mix of both Metal) Installation of 1 Lead Refinery and three DG of 1500 KVA, 625 KVA & 750 KVA.
2. **Hydro Metallurgical Smelter Unit:**
  - ✓ Expansion in Melting and casting section of existing Hydro Zinc Smelter by adding 1 induction furnace (24 TPH) and 1 slab casting line (175000 MTPA) thereby increasing capacity from 504000 MTPA to 630000 MTPA.
  - ✓ Integration of RZO {Raw Zinc Oxide} Unit,
  - ✓ Installation of One DG set of 750 KVA
3. **Captive Power Plant Unit:** Modernization of CPP in its Unit 1&2 from 154 MW (2X77 MW) to 190 MW (2X95 MW) through Efficiency and power Enhancement by Modernization of Turbine internal and rotor, 500 KVA DG for FGD, Back Pressure Turbine Generator 6 MW and no Change in Unit 3 (100 MW) CPP.
4. **Minor Metals Unit:** Recovery of Copper, Cadmium, Cobalt and Nickel by reducing overall waste generation.

As per EIA Notification dated 14<sup>th</sup> Sept., 2006, as amended from time to time; the project falls under Category “A”, Project or Activity 3 (a) - {Metallurgy} as major activity and 1 (d) – {Thermal Power Projects} as minor activity.

Details of the production capacities before and after expansion are as given in Table –2.1:

**Table –1**  
**Unit - wise project proposal**

S. No	Name of the facility	Unit	Existing		Additional		Total after expansion		Remarks
			Capacity	Configuration	Capacity	Configuration	Capacity	Configuration	
Lead Zinc Smelter Unit (Pyro Plant)									
1.	Refined Lead	TPA	35,000	1 x 140,000	1,05,000	1x 140,000	140000	1 x 140,000	Change in product mix*
2.	Refined Zinc	TPA	105,000		35,000		[Total Metal Basis]		
3.	Total	TPA	140,000		140,000 (Change in product mix only)		140,000 (Change in product mix only)		
4.	Captive Power Plant	MW	90	1 x 90	NIL		NIL		Not installed
5.	DG	KVA	NIL	NIL	2875	1x625 1x1500 1x750	2875	1x625 1x1500 1x750	To be added
6.	Zn-Cd Alloy / Cadmium Metal (on equivalent cadmium basis) (By-product)	TPA	375	1 x 375	222	1 x 222	597	1 x 597	Increase in production capacity
7.	Copper Matte / CopperMetal (on equivalent copper basis) (By-product)	TPA	2100	1 x 2100	1238	1 x 1238	3338	1 x 3338	Increase in production capacity
8.	Silver (on equivalent silver basis) (By-product)	TPA	74	1 x 74	728.29	1 x 728.29	802.29	1 x 802.29	Increase in production capacity
9.	Sulphuric Acid (By-product)	TPA	1,76,000	1 x 1,76,000	47,505	1 x 47,505	2,23,505	1 x 2,23,505	Increase in production capacity
10.	Antimony Slag/Antimony Trioxide (Sb2O3) (on equivalent Antimony basis) (By-product)	TPA	NIL	NIL	992	1 x992	992	1 x 992	To be added
11.	Lead Oxide/ Concentrate (by products)	TPA	NIL	NIL	20,000	1 x 20,000	20,000	1 x 20,000	To be added
12.	Calomel/Mercury Sludge (on equivalent mercury basis) (By-product)	TPA	NIL	NIL	14.8	1 x 14.8	14.8	1 x 14.8	To be added
Hydro-I + Hydro-II Zinc Smelter Unit & Captive Power Plant (Combined Capacity)									
1.	Zinc (Hydro- I + II) / Zinc Alloys and its Compounds	TPA	5,04,000	2 x 2,52,000	1,26,000	1 x 1,26,000	6,30,000	2 x 2,52,000 1 x 1,26,000	Increase in Production Capacity
Hydro I									

S. No	Name of the facility	Unit	Existing		Additional		Total after expansion		Remarks
			Capacity	Configuration	Capacity	Configuration	Capacity	Configuration	
2.	Captive Power Plant	MW	154	2x77	36	2x18	190	2x95	Increase in Production Capacity
3.	DG	KVA	1750	1 x 750 1 x 1000	NIL	Nil	1750	1 x 750 1 x 1000	No change
4.	WHRB	MW	9.4	1 x 9.4	Nil	Nil	9.4	1 x 9.4	No change
5.	Back Pressure Turbine Generator	MW	NIL	Nil	6	1 x 6	6	1 x 6	To be added
6.	DG FGD	KVA	NIL	Nil	500	1 x 500	500	1 x 500	To be added
7.	Cadmium Metal/ Cadmium Sponge (equivalent metal) (By-product)	TPA	680	1 x 680	NIL	NIL	680	1 x 680	No change
8.	Copper Cement/ Copper sulphate/ Copper matte/ (equivalent metal) (By product)	TPA	510	1 x 510	NIL	NIL	510	1 x 510	No change
9.	Low grade lead concentrate (By-product)	TPA	30,000	1 x 30,000	NIL	NIL	30,000	1 x 30,000	No change
10.	Sulphuric Acid (By-product)	TPA	3,07,774	1 x 3,07,774	Nil	Nil	3,07,774	1 x 3,07,774	No change
11.	Calomel (Mercury Chloride) (By-product)	TPA	20	1 x 20	NIL	NIL	20	1 x 20	No change
12.	Sodium Chloride (By-product)	TPA	250	1 x 250	Nil	Nil	250	1 x 250	No change
13.	Sodium Sulphate (By-product)	TPA	1250	1 x 1250	Nil	Nil	14.8	1 x 1250	No change
<b>Hydro II</b>									
1.	Captive Power Plant	MW	100	1 x 100	NIL	Nil	100	1 x 100	No Change
2.	DG	KVA	21,780	1 x 625 2 x 1250 1 x 125 2 x 9265	750	1 x 750	22,530	1 x 625 2 x 1250 1 x 125 2 x 9265 1 x 750	Additional DG to be installed
3.	WHRB	MW	25.3	1 x 4.3 1 x 21	1	1 x 1	26.3	1 x 5.3 1 x 21	Increase in power generation
4.	Cadmium Metal/ Cadmium Sponge (equivalent metal) (By-product)	TPA	680	1 x 680	NIL	NIL	680	1 x 680	No change
5.	Copper Cement/ Copper sulphate/ Copper matte/ (equivalent metal) (By product)	TPA	510	1 x 510	NIL	NIL	510	1 x 510	No change
6.	Lead Silver Cake (By-product)	TPA	16000	1 x 16000	16000	1 x 16000	32000	1 x 32000	Increase in production capacity



S. No	Name of the facility	Unit	Existing		Additional		Total after expansion		Remarks
			Capacity	Configuration	Capacity	Configuration	Capacity	Configuration	
7.	Copper Speiss/ Copper Residue (By-product)	TPA	700	1 x 700	500	1 x 500	1200	1 x 1200	Increase in production capacity
8.	Sulphuric Acid (By-product)	TPA	307774	1 x 307774	Nil	Nil	307774	1 x 307774	No change
9.	Calomel (Mercury Chloride) (By-product)	TPA	20	1 x 20	NIL	NIL	20	1 x 20	No change
10.	Sodium Chloride (By-product)	TPA	250	1 x 250	Nil	Nil	250	1 x 250	No change
11.	Sodium Sulphate (By-product)	TPA	1250	1 x 1250	Nil	Nil	1250	1 x 1250	No change
<b>Ausmelt Lead Smelter Plant</b>									
1.	Lead	TPA	60,000	1 x 60,000	NIL	NIL	60,000	1 x 60,000	No Change
2.	Sulphuric Acid (By-product)	TPA	50500	1 x 50500	NIL	NIL	50500	1 x 50500	No Change
3.	Copper Sulphate (By-product)	TPA	7920	1 x 7920	NIL	NIL	7920	1 x 7920	No Change
4.	Silver (on equivalent silver basis) (By-product)	TPA	94.71	1 x 94.71	NIL	NIL	94.71	1 x 94.71	No Change
5.	Zinc Rich Dust (By-product)	TPA	6600	1 x 6600	NIL	NIL	6600	1 x 6600	No Change
<b>Minor Metal Recovery Unit</b>									
1.	Lead Bullion / Lead Silver Cake / Lead Cake/Low Grade Lead Cake / Low Grade Lead Material (on Equivalent metal basis)	TPA	NIL	NIL	8873	1 x 8873	8873	1 x 8873	To be added
2.	Cadmium Sponge/ Cadmium Metal/ Low Grade Cadmium (on Equivalent metal basis)	TPA	NIL	NIL	3050	1 x 3050	3050	1 x 3050	To be added
3.	Cobalt / Cobalt Concentrate (on Equivalent metal basis)	TPA	NIL	NIL	50	1 x 50	50	1 x 50	To be added
4.	Ni cake / Ni Compounds (on Equivalent metal basis)	TPA	NIL	NIL	30	1 x 30	30	1 x 30	To be added
5.	Zn So <sub>4</sub> Solution (on Equivalent metal basis)	TPA	NIL	NIL	2781	1 x 2781	2781	1 x 2781	To be added
6.	CuSO <sub>4</sub> Solution/ Copper Cement/ CU Matte (on Equivalent metal basis)	TPA	NIL	NIL	2436	1 x 2436	2436	1 x 2436	To be added

Source: Pre-Feasibility Report

\*In Pyro Plant, Change in Product Mix has been proposed on total Metal basis i.e. 1,40,000 TPA (Refined Lead or Refined Zinc or Product Mix of both Metals).

#### 1.4 Brief Description of the Project

Brief description about the proposed Project is given in Table - 2

Table - 2

Brief Description of the Project

S. No.	Particulars	Details								
A.	Nature of the Project	Expansion Project								
B.	Size of the Project	Expansion in existing Chanderiya Lead- Zinc Smelter Complex adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II , Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 Back Pressure Turbine Generator, Recovery of Minor Metals & Installation of 5 DG Sets at villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan).								
C.	Category of the Project	Category “A”, Project or Activity 3 (a) - {Metallurgy} as major activity and 1 (d) – {Thermal Power Projects} as minor activity.								
D.	Location Details									
1.	Villages	Putholi, Ajoliya Ka Khera & Biliya								
2.	Tehsil	Gangrar & Chittorgarh								
3.	District	Chittorgarh								
4.	State	Rajasthan								
5.	Latitude& Longitude	Chanderiya Lead Zinc Smelter [all four corners] <table><tr><td>A</td><td>24°57'21.29"N, 74°38'34.39"E</td></tr><tr><td>B</td><td>24°58'21.03"N, 74°40'43.43"E</td></tr><tr><td>C</td><td>24°57'20.33"N, 74°38'37.46"E</td></tr><tr><td>D</td><td>24°58'35.69"N, 74°39'16.22"E</td></tr></table>	A	24°57'21.29"N, 74°38'34.39"E	B	24°58'21.03"N, 74°40'43.43"E	C	24°57'20.33"N, 74°38'37.46"E	D	24°58'35.69"N, 74°39'16.22"E
A	24°57'21.29"N, 74°38'34.39"E									
B	24°58'21.03"N, 74°40'43.43"E									
C	24°57'20.33"N, 74°38'37.46"E									
D	24°58'35.69"N, 74°39'16.22"E									
6.	Toposheet No.	GA3012, GA3016, GA3009, GA3013								
E.	Area Details									
1.	Total Plant Area	335.89 ha								
2.	Greenbelt/ Plantation Area	Out of the total plant area (335.89 ha), 37.21% (i.e. 125.02 ha) area has already been developed under greenbelt/ plantation. 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 Villages	<ul style="list-style-type: none"><li>• Putholi (~0.5 km in SW direction from plant site)</li><li>• Ajoliya Ka Khera (~ 1 km in West direction from plant site)</li><li>• Biliya (~ Adjacent in North direction from plant site)</li></ul>								
2.	Nearest Town/City/ District HQ	<ul style="list-style-type: none"><li>• Chittorgarh (~7.0 km in South direction from plant site)</li></ul>								

S. No.	Particulars	Details
3.	Nearest Railway Station	Chanderiya Railway station (~2.5 km in SW direction from plant site) <ul style="list-style-type: none"> <li>Chittorgarh Railway Station (~9.25 km in SSW direction from plant site)</li> <li>Gangrar Railway Station (~9.5 km in NNW direction from plant site)</li> </ul>
4.	National Highway	<ul style="list-style-type: none"> <li>NH-79 (~0.5 km in West direction from plant site)</li> <li>NH-76 (~2.5 km in ESE direction from plant site)</li> </ul>
5.	Nearest Airport	Maharana Pratap Airport – Udaipur (~85 km in SW direction from plant site)
6.	National Park, Wildlife Sanctuary, Biosphere Reserve, Tiger Reserve, Wildlife Corridors, Reserved / Protected Forest (PF) etc. within 10 km radius	<ul style="list-style-type: none"> <li>17 RF &amp; 1 PF present within 10 km radius of the project site.</li> </ul>
7.	Water Body within 10 km radius	<ul style="list-style-type: none"> <li>Putholi Nala (Passing through the plant site)</li> <li>Berach River (Adjacent in East direction from the Plant site)</li> <li>Gambhir Nadi (~4.0 km in South direction from the Plant site)</li> <li>Nagdi ka Nala (~8.5 km in NNE direction from the Plant site)</li> <li>Canal (~8 km in WNW direction from the Plant site)</li> </ul>
8.	Archeological Sites within 10 km radius study area	Chittorgarh Fort (~6 km in South direction from the Plant site)
9.	Seismic Zone	Zone - II [as per IS 1893 (Part-I): 2002] i.e. Low Damage Risk Zone
<b>G.</b>	<b>Cost Details</b>	
	Total Cost for the Project	Rs 786 Crores
	Cost for Environmental Protection Measures	Capital Cost: Rs. 120.05 Crores/- Recurring Cost: Rs. 15.14 Crore /annum

Source: Pre-Feasibility Report

## 1.5 LOCATION MAP

Location map of the proposed expansion project is given as Figure No.: 1.



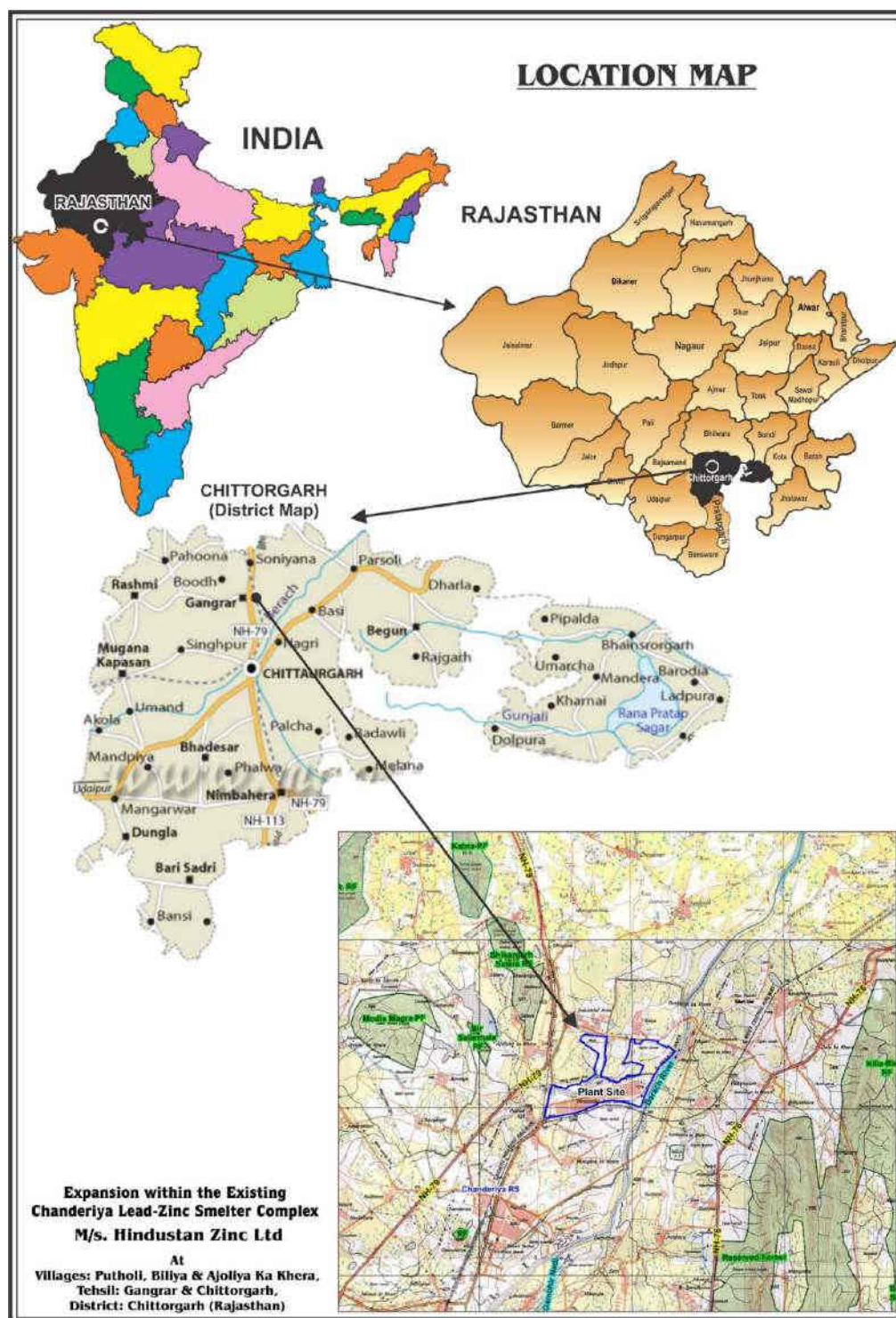


Figure -1: Location Map

## 1.6 MAJOR REQUIREMENTS FOR EXPANSION PROJECT

### 1.6.1 Raw Material Requirement

Major raw material required for Lead and Zinc expansion project are Zinc concentrate, Lead concentrate, Coal, Limestone and various additives Fuel etc..

Details regarding quantity of raw materials required, their source along with distance and mode of transportation are given in Table - 3.

Table - 3

Raw Materials Requirement, Source and Transportation & Additives Requirement- CLZS Complex

Raw materials requirement, Source and Transportation & Recidives requirement - ZLDs complex							
S. No.	Particular	UNIT	Quantity			Probable transportation	
			Existing	Additional	Total After expansion	Source	Distance and mode
Zinc Lead Smelter Plant (Pyro Plant+ Ausmelt)							
1.	Zinc concentrate	TPA	199500	58000	257500	HZL mines-RA, SK & Zawar mines	~200 km Through Trucks
2.	Lead concentrate	TPA	138500	196500	335000	HZL mines-RA, SK & Zawar mines	~200 km Through Trucks
3.	Coke	TPA	100000	NIL	100000	Indigenous /imported	~1500 km Through Rail / Trucks
4.	Lime Stone	TPA	45000	NIL	45000	Nearby Mines	~250 km Through Trucks
5.	Iron ore /Iron Oxide	TPA	30000	NIL	30000	Mines India	~1000 km Through Trucks
6.	Zinc Oxide /Zinc Dust /Zinc Bearing material/ Zinc Dross	TPA	NIL	50000	50000	Market/ HZL Smelters / From authorised recyclers	~ 200 km Through Trucks
7.	Lead Oxide / Lead Silver Cake / Low Grade Lead Material / Lead Bearing Outsourced Secondaries	TPA	NIL	50000	50000	Market/ HZL Smelters / From authorised recyclers	~ 200 km Through Trucks
8.	Silica	MT	3600	NIL	3600	Nearby Mines	~150 km Through Trucks
9.	Coal/ Coke	MT	1500	NIL	1500	Indigenous /imported	~1500 km Through Rail / Trucks
10.	Dolomite	MT	1700	NIL	1700	Nearby Mines	~150 km Through Trucks
Hydro I & Hydro-II (Incl. Fumer plant) and CPP							
1.	Zinc concentrate	TPA	698458	NIL	698458	HZL mines-RA, SK & Zawar mines	~200 km Through Trucks
2.	Calcine (ZnO)	TPA	337990	8916	346906	HZL Smelters	~200 km Through Trucks
3.	Zinc Dross/ Ash/ Zinc bearing waste	TPA	15000	NIL	15000	Market/ HZL Smelters / From authorised recyclers	~200 km Through Trucks
4.	Aluminium Metal	TPA	4800	NIL	4800	Market	~200 km Through Trucks
5.	Magnesium Metal	TPA	60	NIL	60	Market	~200 km Through Trucks
6.	Copper Metal	TPA	600	NIL	600	Market	~200 km Through Trucks
7.	Limestone for FGD	TPA	NIL	131465	131465	Nearby Mines	~200 km Through Trucks
8.	Zinc Cathode	TPA	NIL	200000	200000	HZL Smelter	~200 km Through Trucks
9.	Raw Zinc Oxide(RZO) / ZnODust/ Zinc Oxide/Zinc Bearing Material	TPA	NIL	45000	45000	HZL Smelter	~200 km Through Trucks
10.	Limestone chips	TPA	NIL	25000	25000	Nearby Mines	~250 km Through

S. No.	Particular	UNIT	Quantity			Probable transportation	
			Existing	Additional	Total After expansion	Source	Distance and mode
							Trucks
11.	De- Fluorinating Agent	TPA	NIL	550	550	Imported/Indigenous	~1500 km Through Rail / Trucks
<b>Minor Metal Unit</b>							
12.	PF Cake	TPA	NIL	8800	8800	HZL Smelter	Captive / 200 km, through Trucks
13.	Cadmium Sponge	TPA	NIL	4000	4000	HZL Smelter	Captive / 200 km, through Trucks
14.	Copper Matte	TPA	NIL	3500	3500	HZL Smelter	Captive / 200 km, through Trucks
15.	Cobalt Cake	TPA	NIL	2000	2000	HZL Smelter	Captive / 200 km, through Trucks
16.	Copper Dross	TPA	NIL	12000	12000	HZL Smelter	Captive / 200 km, through Trucks
17.	Coal	TPA	NIL	1480	1480	HZL Smelter	Approx. 1500kms Through Trucks
18.	Zinc Dust	TPA	NIL	2210	2210	HZL Smelter	Captive / 200 km, through Trucks
19.	Sulphuric Acid	TPA	NIL	6500	6500	HZL Smelter	Captive through pipeline; 200 km, through Tankers

Source: Pre-feasibility Report

#### 1.6.2 Fuel Requirement

Details regarding quantity of fuel required, their source along with distance & mode of transportation for expansion project are given in the below table-4.

**Table -4**  
**Unit-Wise Fuel Requirement- CLZS Complex**

Unit wise Fuel Requirement - CEES complex							
S. No.	Particular	Unit	Quantity			Probable transportation	
			Existing	Additio nal	Total After expansion	Source	Distance and mode
Pyro Metallurgical Smelter and Ausmelt Lead Smelter Unit							
1.	Fuel HSD/LDO/Propane	KLA	24000	NIL	24000	IOCL / Reliance, Gujarat Based Refinery	~1000 km, through Tankers
2.	PNG	SCM/day	50000	6000	56000	GAIL, Adani Gas, other suppliers	~ 2 km, through Pipeline
Hydro Metallurgical Smelter Unit [I & Hydro-II]							
1.	LPG	Kg/day	221	NIL	221	IOCL / Reliance, Gujarat Based Refinery	~1000 km, through Tankers
2.	Oil	KLA	41.4	NIL	41.4	IOCL / Reliance, Gujarat Based Refinery	~1000 km, through Tankers
3.	HSD/LDO	KLA	956	2000	2956	IOCL / Reliance, Gujarat Based Refinery	~1000 km, through Tankers
4.	PNG	SCM/ day	3500	1500	5000	GAIL, Adani Gas, other suppliers	~ 2 km, through Pipeline
5.	Imported Coal (for Fumer)	TPA	132000	18000	150000	Australia/Indonesian/Russia /SA via Gujarat Port	~1000 km, through Rail / Trucks
Captive Power Plant [254 MW to 290 MW]							
6.	Imported Coal/ Indian Coal for CPP	TPA	1204500	688855	1893355	Australia/Indonesian/Russia /SA /WCL/ACCL/	~1000 km, through Rail /Trucks
7.	HSD/LDO	KLA	508	Nil	508	IOCL / Reliance, Gujarat Based Refinery	~1000 km, through Rail /Trucks



S. No.	Particular	Unit	Quantity			Probable transportation	
			Existing	Additio nal	Total After expansion	Source	Distance and mode
DG Sets [ Pyro +Hydro]							
1.	LDO /HSD /PROPANE	KLA	4800	1200	6000	IOCL / Reliance, Gujarat Based Refinery	~1000 km, through Trucks
Minor Metal Unit							
2.	LDO/HSD for Boiler (5 TPH)	KLA	NIL	1740	1740	IOCL / Reliance, Gujarat Based Refinery	~1000 km, through Trucks

Source: Pre-feasibility Report

### 1.6.3 Other Basic Requirement

Other basic requirements for the expansion project are given in Table - 5.

**Table - 5**  
**Basic Requirements for the Project**

Particular	Requirement			Source
	Existing	Proposed	Total after expansion	
Water (KLD)	38570	500	39070	Gosunda Dam (Captive) / Proposed STP Chittorgarh / Udaipur/ other proposed STP's (Recycled Water)
Power (MW)	260	48	308	Captive Power Plant/WHRS/ Solar Panels /AVVNL/BPTG
Steam (TPH)	1210.4	5	1215.4	CPP 1, CPP 2, CPP 3 WHRB 1, WHRB 2, Roof Top Solar panels, Fumer/State Grid (AVVNL)/New Boiler
Manpower (No. of Persons)	2919	360	3279	Local / Nearby area

Source: Pre-feasibility Report

### 1.7 PROCESS DESCRIPTION

The plant consists of the various units as given under:

- Pyro Plant (based on Imperial smelting process enabling simultaneous production of Zinc & Lead metals through Pyro-metallurgical process route)
- Ausmelt Plant (based on Top Submerged Lance Technology).
- Hydro-I Unit & Hydro-II Unit with Fumer (metallurgical zinc extraction process is conventionally known as Roast-Leach-Electro win process)
- Captive Power Plant Unit (Coal based thermal power plant)
- Minor Metal Complex [Recovery of minor metals like Copper, Cadmium, Cobalt and Nickel. Cobalt and Antimony Slag (on metal basis) from various processes of the CLZS complex]

### 1.8 DESCRIPTION OF ENVIRONMENT

#### 1.8.1 Presentation of Results (Air, Noise, Water & Soil)

- Ambient air quality monitoring has been carried out at 9 monitoring stations within 10 km radius of the study area on 24 hourly bases during post-monsoon season (Oct. - Dec. 2020).
- The concentration of PM<sub>2.5</sub> ranges between 26.1 to 55.4 µg/m<sup>3</sup>, PM<sub>10</sub> ranges between 58.2 to 92.4 µg/m<sup>3</sup>, SO<sub>2</sub> ranges between 5.8 to 19.7 µg/m<sup>3</sup> and NO<sub>2</sub> ranges between 13.8 to 38.6 µg/m<sup>3</sup>. CO concentration was observed as BDL to 1.13 mg/m<sup>3</sup>. The concentration of Pb was found to be in range of BDL to 0.59 µg/m<sup>3</sup>. The concentration of Ni was found to be in range of BDL to 14.3 ng/m<sup>3</sup>.
- Additional 1 Month Baseline Study (Oct., 2021) for AAQ monitoring has been carried out at 13 stations in the study area on Project Specific TOR point 1. The concentration of PM<sub>2.5</sub> ranges

between 25.4 to 53.9 µg/m<sup>3</sup>, PM<sub>10</sub> ranges between 55.4 to 91.5 µg/m<sup>3</sup>, SO<sub>2</sub> ranges between 5.5 to 22.1 µg/m<sup>3</sup> and NO<sub>2</sub> ranges between 12.3 to 36.9 µg/m<sup>3</sup>. CO concentration was observed as BDL to 1.15 mg/m<sup>3</sup>. The concentration of Pb was found to be in range of BDL to 0.57 µg/m<sup>3</sup>. The concentration of Ni was found to be in range of BDL to 12.7 ng/m<sup>3</sup>.

- Ambient noise levels were monitored at 8 locations around the plant site. Noise levels vary from 53.1 to 68.9 Leq dB (A) during day time and from 43.3 to 62.3 Leq dB (A) during night time.
- The ground water quality analysis for all the 8 sampling locations shows that pH varies 7.34 to 8.02, Total dissolved solids found between (468.00 to 1923.00 mg/l) & total hardness (250.00 to 1005.00 mg/l).
- Surface water quality analysis for 5 sampling locations shows that pH varies 7.52 to 7.76, Total dissolved solids varies from 371.0 to 629.0 mg/l, Total hardness 170.0 to 336.8 mg/l and conductivity (608 to 982.0 µS/cm). The COD (26.9 to 59.0 mg/l) and BOD (6.1 to 16.0 mg/l). The nutrients were also found low viz. sulphate (56.3 to 132.4 mg/l), nitrate (1.03 to 6.87 mg/l), calcium (30.1 to 87.5 mg/l), magnesium (23.09 to 36.94 mg/l). The Dissolved oxygen (5.9 to 7.4 mg/l) indicated that the water bodies are safe for aquatic biodiversity.
- Soil monitoring was carried out at 8 locations and the analysis results show that soil brown & Blackish Brown, Reddish Brown & the textures of the soil samples majorly was Silty Loam, Loam Clay, Silt Clay Loam & Sandy clay Loam. The samples have rich content of organic matter comprising of 0.84 % to 1.41 % for the plant growth, nitrogen (196.81 to 350.14 kg/ha) better to sufficient, phosphorus (39.74 to 58.64 kg/ha) less to average and potassium (186.61 to 329.86 kg/ha) medium to sufficient, Magnesium (362.95 to 499.32 mg/kg), and Calcium (1692.5 to 3096.5 mg/kg).
- Above baseline results shows the emission levels & water quality 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 IV & VII of this EIA/EMP report.

### 1.8.2 Biological Environment

**Flora:** Most common species found in the area are *Acacia nilotica* (Babul), *Azadirachta indica* (Neem), *Bombax ceiba* (Red Silk Cotton), *Acacia catechu* (Khair), *Psidium guajava* (Guava) etc.

**Fauna:** Commonly found species in the study area are *Funambulus spp.* (Five-striped Palm Squirrel), *Calotes versicolor* (Garden Lizard), *Rana hexadactyla* (Frog), *Bubulcus ibis* (Cattle egret) etc.

As per the authenticated list, total 6 schedule I species i.e., *Panthera pardus* (Leopard), *Prionailurus rubiginosus* (Rusty Spotted Cat), *Gyps bengalensis* (White-rumped Vulture), *Falco jugger* (Laggar Falcon), *Pavo cristatus* (Indian Peafowl), *Varanus bengalensis* (Bengal Monitor lizard) found within the study area during survey.

### 1.8.3 Socio-Economic Environment

The population of the study area as per 2011 Census records is 343256 (for 10 km radius). Total no. of households are 72325. Scheduled Caste fraction of the population of the study area is 49056 (14%)

and Scheduled Tribe 16309 (5%). Literacy rate of the area is 63.3%. Total working population and non-working population is 39% and 61%, respectively in the study area.

## 2. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Anticipated environmental impacts due to operation of the proposed expansion project along with mitigation measures are given below:

Table - 6

### Anticipated Environmental Impacts And Mitigation Measures

Discipline	Anticipated Impact	Mitigation Measures
Air	<b>Construction Phase:</b> Increase in dust (Particulate Matter) and NO <sub>x</sub> concentration due to Leveling activity and Heavy vehicular movement.	<ul style="list-style-type: none"> <li>Water spraying on roads and construction site will prevent fugitive dust.</li> <li>Construction equipment having PUC certificate will be deployed.</li> <li>Vehicles having construction materials will be covered with tarpaulin.</li> <li>A separate storage area will be demarcated for construction material to confine the dust dispersion.</li> <li>Proper PPEs will be provided to workers to avoid accumulation of dust in respiratory tracts and prevent air borne diseases.</li> <li>Proper greenbelt development and plantation inside and outside the plant premises.</li> </ul>
	<b>Operation Phase:</b> The major air pollutants emitted from the CLZS complex include PM, SO <sub>2</sub> , Acid Mist, Lead, NO <sub>x</sub> , Hg & its compounds, NMHC & CO.	<ul style="list-style-type: none"> <li>Extensive dust extraction network provided consisting of Venturi Scrubbers and Bag Filters.</li> <li>Gas wash tower and Thiessen Disintegrator provided to capture Furnace Gas</li> <li>Cansolv technology for Sulphur capture from Ausmelt Lead Furnace.</li> <li>State-of-The-Art DCDA Acid Plants &amp; Tail Gas Treatment Plant.</li> <li>Adequate stack height has been maintained for the existing DG set for better dispersion of the emissions, same will be followed for the proposed DG sets.</li> <li>Spraying of water is being continuously carried out at the various location viz., Lead concentrated bays, Belt conveyors, etc., to suppress the dust particles.</li> <li>Ventilation system followed by bag filters, are provided in the metal tapping area to control work zone emissions</li> <li>Concentrate shed, Coal yard and Ash handling unit disposal area, concentrate unloading point area are provided with water sprinklers to arrest the dust and fugitive sources of dust.</li> <li>In order to minimize fugitive emissions Zn concentrate containing 8-10% moisture is being handled;</li> <li>Mobile vacuum dust sweeping system on industrial</li> </ul>



Discipline	Anticipated Impact	Mitigation Measures
		<p>roads and vacuum dust cleaning system for plant area</p> <ul style="list-style-type: none"> <li>All existing Stacks have been provided with CEMS and the same are connected to CPCB &amp; RSPCB Server.</li> <li>Greenbelt / plantation at site helps to restrict the emission within the premises.</li> </ul>
Noise	<p><b>Construction Phase:</b> Noise increase due to construction equipment may cause disturbance, inconvenience, loss of concentration, hearing problems, etc.</p> <p><b>Operation Phase:</b></p> <ul style="list-style-type: none"> <li>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 &amp; from vehicular movements for transportation of construction material.</li> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>Equipment will be kept in good condition to keep the noise level within 90 dB (A).</li> <li>Acoustic enclosures for machines &amp; equipment, providing PPEs (Ear plugs/ Ear defenders) to persons working just close to machines, lubrication &amp; maintenance of machineries/equipment's/ Vehicles.</li> <li>Greenbelt for attenuation of noise propagation and Periodical noise monitoring is being/ will be carried out with enclosures &amp; barriers.</li> </ul> <p>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.</p> <p>Following noise abatement measures will also be taken:</p> <ul style="list-style-type: none"> <li>Machine operators and Persons working just close to machine are being / will be provided with personal protective equipment viz. Ear plugs / Ear muffs etc.</li> <li>Proper maintenance, oiling and greasing of machines at regular intervals is being / will be done to reduce generation of noise.</li> <li>Greenbelt along the plant boundary has been developed. The same will be enhanced w.r.t area &amp; density.</li> <li>Regular monitoring of noise level is being / will be carried out and corrective measures in concerned machinery will be adopted accordingly.</li> </ul>
Water	<p><b>Construction Phase:</b></p> <ul style="list-style-type: none"> <li>Increase in suspended solids due to soil run-off during heavy precipitation due to loose soil at construction site.</li> <li>Domestic waste water will be generated during construction activities. And stagnant water or water logging for a long time may lead to various water borne diseases &amp; unpleasant smell in nearby area.</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>Domestic Waste water generated due to construction activities is being/will be treated in existing STP (1000 KLD) and treated water is being</li> </ul>

Discipline	Anticipated Impact	Mitigation Measures
	<p><b>Operation Phase:</b></p> <ul style="list-style-type: none"> <li>No additional Fresh water will be required for the proposed expansion project.</li> <li>No ground water abstraction is being done and will not be done for the proposed expansion project.</li> <li>Total wastewater generated from CLZS complex is 7598 KLD, no additional waste water will generate after expansion as we will utilize internal water in expansion. At present we are treating average 7598m<sup>3</sup> or less effluent per day while we have treatment facility for 12600 m<sup>3</sup>/d so increment if any in waste water will be treated in existing system.</li> <li>Domestic Waste water is being / will be generated from the office toilets.</li> </ul> <p>Hence there will be no significant impact on ground water level &amp; quality.</p>	<p>/will be used in process/Plantation.</p> <ul style="list-style-type: none"> <li>The existing plant is a Zero discharge Facility and after expansion it will continue to be a zero-discharge facility.</li> <li>Industrial effluent is being / will be treated in two existing ETPs (8400 KLD and 4200 KLD, respectively).</li> <li>All the Treated trade effluent is being used for Slag Granulation and Lime slurry preparation and remaining treated trade effluent will be further treated through three stage reverse osmosis (R.O.) plants and R.O. permeate will be recycled/ reused in the process within the premises.</li> <li>RO reject is being evaporated in solar evaporation pond and also used for spraying on waste disposal area; and</li> <li>Mist evaporators are already installed at site.</li> <li>Blow down water from CPP is being/will be treated in neutralization pit and further reused in dust suppression.</li> <li>Domestic waste water will be treated in Sewage Treatment Plant and treated water will be used in process/Plantation.</li> <li>Storm water management practice will be continue as existing.</li> </ul>
Soil	<p><b>Construction Phase:</b></p> <p>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 &amp; Soil stockpiling which results in soil deterioration or reduce fertility of soil if not managed properly.</p> <p><b>Operation Phase:</b></p> <ul style="list-style-type: none"> <li>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.</li> <li>This may lead to change in physico-chemical characteristics of soil of the area.</li> </ul>	<ul style="list-style-type: none"> <li>Careful design, planning and good site management would minimize wastage of materials such as concrete, mortars and cement grouts.</li> <li>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.</li> <li>To reduce the soil compaction, working on the wet soil will be avoided.</li> <li>Adequate pollution control measures are being and will be implemented to avoid contamination or degradation of soil.</li> <li>A horticulturist is being / will be engaged to ensure soil quality improvement &amp; have proper landscaping &amp; green cover maintenance system with qualified persons.</li> <li>No adverse impact on the soil quality of the area is anticipated.</li> </ul>
<b>Biological Environment</b>		

Discipline	Anticipated Impact	Mitigation Measures
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.	

### 3. ENVIRONMENTAL MONITORING PROGRAMME

Details of the environmental monitoring schedule / frequency, which will be undertaken for various environmental components, as per conditions of EC / CTE are given below:

**Table - 7**  
**Post Project Monitoring**

S. No.	Description	Frequency of monitoring
1.	Meteorological data	Hourly
2.	Ambient Air Quality Monitoring	Monthly & Continuous Online Monitoring by using CAAQMS
3.	Fugitive emissions	Quarterly
4.	Stack Monitoring	Quarterly & Continuous Online Monitoring by using CEMS
5.	Water Quality & Level Monitoring	Quarterly
6.	Waste water	Quarterly & Continuous Online Monitoring by using CEQMS
7.	Noise Level Monitoring	Half yearly
8.	Soil Quality Monitoring	Half yearly
9.	Medical check-up of the employees	Yearly as per Factory Act
10.	Performance Guaranty Tests for Pollution Control Device System	Once at the time of installation and at the time of repair / maintenance

### 4. ADDITIONAL STUDIES

Additional Studies conducted as per Terms of Reference (ToR) issued by State Level Expert Appraisal Committee (SEAC), Rajasthan vide letter no.F1(4)/SEIAA/SEAC-Raj/Sectt/Project/Cat. 1(d)(18063/18314)/2019-20/13405 dated 23<sup>rd</sup> September, 2020 are Public Hearing, Hydro-geological Study & Rain water Harvesting Plan and Risk Assessment & Disaster Management Plan.

### 5. PROJECT BENEFITS

The proposed expansion project will help in combating the growing demand of Lead and 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. As per OM dated 30<sup>th</sup> September 2020 and 20<sup>th</sup> October 2020, company has proposed a detailed action plan along with budgetary allocation for implementation of the commitments made during Public Hearing held on 20<sup>th</sup> July, 2022. Details are given in Chapter 8, Section 8.4 of this EIA/EMP Report report.

## 6. ENVIRONMENT MANAGEMENT PLAN

The major sources of pollution from the CLZS Complex are air emission from stacks (Particulate Matter, SO<sub>2</sub>, Acid Mist, Lead, NO<sub>x</sub>, Hg & its compounds, NMHC & CO), fugitive emission from material handling, storage, transportation activity etc., industrial as well as domestic waste water generation, increase in noise level, solid & hazardous waste generation etc. the Management plan suggested for the same has been given as under:

Table - 8

Environment Management Plan

Particulars	Details
Air Quality Management	<ul style="list-style-type: none"> <li>Emissions generated from production process as well as the prescribed limits from CPCB &amp; MOEFCC are as PM (Pyro: 150mg/Nm<sup>3</sup>, Ausmelt: 50mg/Nm<sup>3</sup>, Hydro: 30 mg/Nm<sup>3</sup>, DG Sets: 75mg/Nm<sup>3</sup>), SO<sub>2</sub> (Pyro &amp; Ausmelt: 2kg/ton of 100% conc. Acid produced; Hydro: 1 kg/ton of acid produced; CPP: 600mg/Nm<sup>3</sup>), Acid Mist (Pyro &amp; Ausmelt: 50mg/Nm<sup>3</sup>; Hydro: 30mg/Nm<sup>3</sup>); Lead (Sinter &amp; Ausmelt: 10m/Nm<sup>3</sup>); NO<sub>x</sub> (CPP: 300 mg/Nm<sup>3</sup>, DG Sets: 710mg/Nm<sup>3</sup>), Hg &amp; its compounds (CPP: 0.03mg/Nm<sup>3</sup>); NMHC (DG Sets: 100mg/Nm<sup>3</sup>) &amp; CO (DG Sets: 150mg/Nm<sup>3</sup>).</li> <li>The SO<sub>2</sub> emission from Acid Plant (At Pyro Plant) will be reduced upto 1.5 Kg/ton of Acid production. The same will be achieved by improving the acid plant converter (SO<sub>2</sub> conversion efficiency by using super cesium catalyst in 4th bed). The same will be achieved by December, 2023.</li> <li>In Pyro plant, HZL will reduce the PM emission by replacement of existing bag filter bags with upgraded/ PTFE coated bags, which will bring down PM emission from existing 150 mg/Nm<sup>3</sup> to 100 mg/Nm<sup>3</sup>. The same will be achieved by December, 2024.</li> <li>Extensive dust extraction network provided consisting of Venturi Scrubbers and Bag Filters.</li> <li>Gas wash tower and Thiessen Disintegrator provided to capture Furnace Gas</li> <li>Cansolv technology for Sulphur capture from Ausmelt Lead Furnace.</li> <li>State-of-The-Art DCDA Acid Plants &amp; Tail Gas Treatment Plant.</li> <li>Adequate stack height has been maintained for the existing DG set for better dispersion of the emissions, same will be followed for the proposed DG sets.</li> <li>Spraying of water is being continuously carried out at the various location viz., Lead concentrated bays, Belt conveyors, etc., to suppress the dust particles.</li> <li>Ventilation system followed by bag filters, are provided in the metal tapping area to control work zone emissions</li> <li>Concentrate shed, Coal yard and Ash handling unit disposal area, concentrate unloading point area are provided with water sprinklers to arrest the dust and fugitive sources of dust.</li> <li>In order to minimize fugitive emissions Zn concentrate containing 8-10% moisture is</li> </ul>



Particulars	Details
	<p>being handled;</p> <ul style="list-style-type: none"> <li>Mobile vacuum dust sweeping system on industrial roads and vacuum dust cleaning system for plant area</li> <li>All existing Stacks have been provided with CEMS and the same are connected to CPCB &amp; RSPCB Server.</li> <li>Greenbelt / plantation at site helps to restrict the emission within the premises.</li> </ul>
Water Management	<ul style="list-style-type: none"> <li>Total wastewater generated from CLZS complex is 7598 KLD (1500 KLD Pyro, 450 KLD Ausmelt, 3296 KLD H-I &amp; 2352 KLD H-II), which is being treated in two existing ETPs (8400 KLD and 4200 KLD, respectively).</li> <li>In ETP-1, 1037 (KLD) Reused in Lime Slurry preparation /slag cooling (Pyro), 1099 (KLD) Reused in slag Granulation (Ausmelt), 2486 (KLD) Reused in process (H1) from RO-1 Permeate &amp; 550 KLD from RO-2 Permeate. In ETP-2, 72 (KLD) Reused in Lime slurry preparation, 1825 KLD Reused in process (H2) in RO-2 from Ro Permeate.</li> <li>All the Treated trade effluent is being used for Slag Granulation and Lime slurry preparation and remaining treated trade effluent will be further treated through three stage reverse osmosis (R.O.) plants and R.O. permeate will be recycled/ reused in the process within the premises.</li> <li>RO reject is being evaporated in solar evaporation pond and also used for spraying on waste disposal area; and</li> <li>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.</li> <li>Mist evaporators are already installed at site.</li> <li>Effluent treatment plant followed with Three stage RO Plant and Multiple Effect Evaporator (MEE/MVR) Plant is already Commissioned at site;</li> <li>Blow down water from CPP is being/will be treated in neutralization pit and further reused in dust suppression.</li> <li>Domestic Waste water (300 KLD) generated from the office toilets is being/will be treated in existing STP (1000 KLD) and treated water (290 KLD) is being /will be used in process/Plantation.</li> <li>No wastewater is being /will be discharged outside the plant. Hence, Zero Liquid discharge will be maintained.</li> <li>The rainwater harvesting is being and will be added in and around plant premises.</li> </ul>
Noise Management	<ul style="list-style-type: none"> <li>All the design/installation precautions as specified by the manufacturers with respect to noise control will be strictly adhered to for the expansion projects too;</li> <li>High noise generating sources are/will be insulated adequately by providing suitable enclosures;</li> <li>Design and layout of building to minimize transmission of noise, segregation of</li> </ul>

Particulars	Details
	<p>particular items of plant and to avoid reverberant areas;</p> <ul style="list-style-type: none"> <li>Buildings have been / will be acoustically designed</li> <li>Use of lagging with attenuation properties on plant components / installation of sound attenuation panels around the equipment.</li> <li>Other than the regular maintenance of the various equipment, ear plugs/muffs are recommended for the personnel working close to the noise generating units;</li> <li>All the openings like covers, partitions are designed properly.</li> <li>Provision of Inlet and outlet mufflers; easy to design and construct.</li> <li>Noise control system designed to form an integral part of the plant.</li> <li>The existing greenbelt with rich canopy helps to attenuate the noise emitted by the various sources in the plant.</li> </ul>
Solid & Hazardous Waste Management	<ul style="list-style-type: none"> <li>Recovery of minor metals like Nickel, Copper, Cadmium and Cobalt will result in reduction in waste generation;</li> <li>Used/Spent Oil &amp; Waste Oil will be sold to registered recycler.</li> <li>Spent catalyst, Cooler cake, Anode Mud, Cobalt Cake, Purification cake / Enrichment cake, Discarded containers/barrels/liners used for Haz. Waste/chemicals, Flue gas cleaning residue &amp; Non-ferrous Sludge from ETP and scrubbers etc. will be sold to registered recycler or sent for Co-processing/ disposal in Secured landfill site.</li> <li>Spent ion exchange resin containing toxic metal &amp; Water purification Resin will sold to registered recycler or will be disposed in Secured landfill site</li> <li>Filter and Filter material which contain organic compound &amp; Oil Soaked Jute/cotton waste/Used PPE's will be sold to registered recycler/disposed to secured landfill site/ sent to approved incinerator and MEE Salt will be used for recovery of Glauber Salt and De-florination Cake sent to Secured landfill site.</li> <li>Jarosite Cake from Hydro 1 Unit will be used in Cement Manufacturing/ Road/Rail embankment/Concrete construction/ disposal in Lined Jarofix yard while for Hydro 2 Unit Fumer unit is under commissioning at site.</li> <li>Fly ash is/ will be generated in Power plant which is being/will be sold to the nearby cement plant for utilization in cement manufacturing.</li> <li>Bottom ash is being/ will be generated in Power plant which is being/will be supplied for Bricks/ other useful manufacturer purpose.</li> <li>Municipal solid waste generated from the plant will be segregated and disposed off scientifically.</li> </ul>
Green Belt Development / Plantation	<ul style="list-style-type: none"> <li>Out of the total plant area i.e 335.89 ha of CLZS Complex, 37.21% (i.e. 125.02 ha) area is already been covered under greenbelt/plantation.</li> <li>The species planted are Neem, Neeli Gulmohar, Dhak, Sheesham, Gular, Amaltas, Imli, Peepal, Siris, Kachnar, Jhaoo, Kaner, Arjun, Kasod, Chural, Babool, Kikar, Bahera,</li> </ul>

Particulars	Details
	<p>Ratanjot, etc.</p> <ul style="list-style-type: none"> <li>The same will be maintained and enhanced by doing gap plantation to achieve the plantation density @2500/ha</li> </ul>

## 7. OCCUPATIONAL HEALTH & SAFETY

To control and minimize the risks at workplace, Chanderiya Lead Zinc Smelter Complex 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.

## 8. CONCLUSION

The proposed expansion project will be implemented only by modification in the CLZS complex. Thus, there is no likelihood of adverse impact due to the proposed expansion project. However, adequate mitigation measures will be implemented to ensure emission levels within prescribed norms. Post project compliance monitoring is being/will be carried on regular basis. Looking to the above report, it can be concluded that the proposed expansion project will be implemented in sustainable manner and will result in growth of the surrounding areas by increased indirect employment opportunities in the region including ancillary development and supporting infrastructure.



## CHAPTER- 1

### INTRODUCTION

#### 1.1 PURPOSE OF THE REPORT

This report has been prepared in reference to the Terms of Reference (ToR) issued by MoEFCC, New Delhi vide their letter no. J-11011/279/2006-IA.II(I) dated 27.09.2021 for carrying out the Environmental Impact Assessment (EIA) study for “Expansion within the existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Set] at villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (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 Expansion within the existing CLZS Complex 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; and
- ∞ The public to understand the proposal and its likely impacts on people and the environment.

#### 1.2 IDENTIFICATION OF PROJECT AND PROJECT PROPONENT

##### 1.2.1 Identification of the Project

##### A. Details of the Existing Project

Hindustan Zinc Limited and existing Chanderiya Lead Zinc Smelter Complex of Hindustan Zinc Limited (HZL) comprises of Pyro Metallurgical Smelter (1, 05,000 TPA Zinc and 35,000 TPA Lead), Ausmelt Lead Smelter (60,000 TPA) and Hydro Metallurgical Zinc Smelter (5, 04,000 TPA). Pyro-metallurgical plant is based on Imperial smelting process. This Process enables simultaneous production of zinc and lead metals. The main sections for this process route are Sinter, Imperial Smelting Furnace (ISF) and Refineries while Ausmelt technology is one of the direct smelting technologies which has been applied to commercial production of a broad spectrum of non-ferrous and precious metals and the high temperature treatment of various waste materials. The essence of the Ausmelt Technology system is a vertical lance submerged in a molten slag bath; further Hydro metallurgical zinc extraction process employs roast leach electro-winning technology. The complex also has three units of Captive Power Plant with 254 MW capacity (154 MW + 100 MW) to supply the power requirements for its metallurgical operations of CLZS Complex. It also has 8 Emergency DG sets with total capacity of 18.80 MW and power generation capacity through waste heat recovery of 34.7 MW.

The existing project was accorded Concurrence letter initially for Pyro Plant vide no. J-11013/29/92-EI dated 03.06.1983 followed by NOC issued by Rajasthan Board for Prevention and Control of Pollution vide letter No. F. 12 (723) RPCB / NOC / 1535 dated 26<sup>th</sup> April 1991 and F.12 (723) RPCB / NOC / 5160



dated 29<sup>th</sup> June 1992.; Production capacity of Pyro Plant was increased from 105000 TPA (Zn - 70,000 TPA + Pb - 35,000 TPA) to 140000 TPA (Zn - 105000 TPA + Pb - 35000 TPA) vide NOC obtained from RSPCB vide no. F.12 (Chittor-60) RPCB/Gr. III/19418 dated 05.03.2004. Current CTO for Pyro Plant has been accorded by Rajasthan State Pollution Control Board (RSPCB) vide Order no. 2020-2021 / HDF /3070 dated 08.06.2020 (valid upto 29.02.2024).

The Environmental Clearance for existing {Hydro Zinc Smelter I (1,70,000 TPA Zinc Production) & CPP (154MW)} was issued vide F.No.J-11011/158/2003-IA.II(I) 31.03.2004; and Environmental Clearance for {Hydro Zinc Smelter II (2,10000 TPA) and its expansion (From 1,70,000 TPA to 2,10,000 TPA) was issued vide letter no J-11011/279/2006-IA.II(I) dated 06.12.2006 by MOEF & CC New Delhi.

The Environmental Clearance for Inclusion of Fumer Plant within the {Hydro Zinc Smelter II} was issued vide F.No.J-11011/279/2006-IA.II(I) 5.10.2015 and CTO was accorded by RSPCB vide Order no. 2020-2021/HDF/3009 dated 08.05.2020 (valid upto 31.03.2025). The Fumer plant has been installed but could not be operated due to some process incident during commissioning. Its operation is expected to start in March, 2023. The Environment Clearance for Capacity Expansion in Hydro I & Hydro II Zinc Smelters (from 4,20,000 TPA to 5,04,000 TPA) through debottlenecking was accorded vide letter no. J-11011/279/2006-IA.II (I) dated 14.10.2020 by MOEF&CC. CTO has been issued vide order no. F(HDF)/Chittorgarh(Gangrar)/2(1)/2020-2021/6117-6119 dated 26/3/2021 & for Hydro II vide order no. F(HDF)/Chittorgarh(Gangrar)/2(1)/2020-2021/6120 -6122 dated 26/3/2021 respectively.

The Environmental Clearance for Ausmelt Lead Smelter Plant (60,000 TPA) is been accorded vide letter no. F.No.J-11011/17/2005-IA.II (I) 3.8.2005 and CTO by RSPCB Order no. 2020-2021/HDF/3069 dated 05.06.2020 (valid upto 31.08.2023).

CTO for installation of 2 D.G. Sets (2 x 7.405 MW) was obtained from RSPCB vide Order no. 2020-2021 / HDF / 3068 dated 05.06.2020 (valid upto 30.04.2024). CTO for Township was obtained vide Order no. 2018-2019/CPM/5201 dated 23.05.2018.

Copy of the existing Environmental Clearances are 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
<b>Existing Environmental Clearances (EC)</b>		
1.	Concurrence for the Lead Zinc Smelter {Pyro Plant} by Principle Scientific Officer, GOI Environmental Department, New Delhi	Vide letter no. J-11013/29/92-EI dated 03.06.1983 ( <b>Annexure 1a</b> )
2.	EC letter for Hydro-I plant	Vide F.No.J-11011/158/2003-IA.II(I)dated 31.03.2004 ( <b>Annexure 1b</b> )
3.	EC for Ausmelt Lead Smelter Plant	vide F.No.J-11011/17/2005-IA.II (I) dated 3.8.2005 ( <b>Annexure 1c</b> )
4.	EC letter for Hydro-II plant	Vide F.No. J-11011/279/2006-IA.II (I) dated 06.12.2006 ( <b>Annexure 1d</b> )
5.	EC letter for Inclusion of Fumer plant with Hydro-II Plant	Vide F.No.J-11011/279/2006-IA.II(I) dated 5.10.2015 Valid upto 4.10.2022 ( <b>Annexure 1e</b> )

S. No.	Particular	Letter No & Date
6.	Environment Clearance (EC) for Hydro-I & II unit on combined basis with production capacity of 5, 04,000 TPA Zinc by MOEFCC, New Delhi	vide letter no. J-11011/279/2006-IA.II (I) dated 14.10.2020 <b>(Annexure 1f)</b>
S. No.	Particular	Letter No & Date
<b>Consent To Establish (CTE)</b>		
1.	N.O.C for the adequacy of pollution control measures for Proposed Lead Zinc Smelter at Village Chanderiya, Dist. Chittorgarh, Raj.	vide letter no. 12(723) RPCB/NOC/1535 dated 26.04.1991 <b>(Annexure 3a(i))</b>
2.	CTE for proposed enhancement of production zinc from 70,000 TPA to 1,05,000 TPA at Zinc Smelter, Chanderiya	vide letter no. F.12 (Chittor-60)RPCB/Gr. III/19418 dated 05.03.2004 valid upto 05.03.2007 <b>(Annexure 3a)</b>
3.	CTE for installation of Zinc smelter plant (1,70,000 TPA) and captive power plant (154MW) at Chanderiya, Chittorgarh	vide letter no. F.12 (Chittor-60)RPCB/Gr. III/14372 dated 19.07.2004 valid upto 19.07.2007 <b>(Annexure 3b)</b>
4.	CTE for Zinc manufacturing unit up to 2,50,000 MT/Annum capacity & captive power plant of 100 MW	vide letter no. F.12(CH-78) RPCB/Gr.III/2588 dated 08.01.2007 valid upto 08.01.2010 <b>(Annexure 3c)</b>
5.	CTE for Fumer plant (Pyro Metallurgical Fuming Process) within existing Hydro Zinc Smelter Phase-II Plant	vide Order no. 2017-2018/CPM/4915 dated 01.08.2017 valid upto 30.11.2021 <b>(Annexure 3d)</b>
6.	CTE for implementation of pollution control scheme for 60,000 TPA Lead Smelter with existing Zinc Smelter	vide letter no. F.12(CH-70) RPCB/Gr.III/752 dated 14.09.2005 valid upto 14.09.2008 <b>(Annexure 3e)</b>
7.	CTE for DG ( 2*8 MW ) at Pyro plant	vide Order no. 2012-2013/CPM/1610 dated 20.03.2013 valid upto 31.12.2015 <b>(Annexure 3f)</b>
S. No.	Particular	Letter No & Date
<b>Current Consent To Operate (CTO)</b>		
1.	CTO for Pyro Metallurgical Zinc Smelter Plant	Vide Order no. 2020-2021 / HDF /3070 dated 08.06.2020 valid upto 29.02.2024. (Valid upto 29.02.2024) <b>(Annexure 4a)</b>
2.	CTO for Hydro-I (Zn production 2,10,000 TPA) and CPP (154 MW)	Vide Order No. 2019-2020/HDF/2859 dated 16.01.2020 valid upto 31.08.2023. (Valid upto 31.08.2023) <b>(Annexure 4b)</b>
3.	CTO letter obtained for the expansion of Hydro-I plant (As per the EC obtained on 14.10.2020)	Vide Order No. F(HDF)/Chittorgarh(Gangrar)/2(1)/2020-2021/6117-6119 dated 26/3/2021. (Valid upto 28.02.2026) <b>(Annexure 4bi)</b>
4.	CTO for Hydro-II & 100MW electricity	Vide Order no. 2019-2020/HDF/2818 dated 18.12.2019 valid upto 31.01.2024. (Valid upto 31.01.2024) <b>(Annexure 4c)</b>
5.	CTO letter obtained for the expansion of Hydro-II plant (As per the EC obtained on 14.10.2020)	Vide Order no F(HDF)/Chittorgarh (Gangrar)/2(1)/2020-2021/6120 -6122 dated 26/3/2021. (Valid upto 28.02.2026) <b>(Annexure 4ci)</b>
6.	CTO for Fumer Plant (Pyro Metallurgical	Vide Order no. 2020-2021/HDF/3009 dated

S. No.	Particular	Letter No & Date
	fuming process) within existing Hydro Zinc Smelter Phase-II plant	08.05.2020 (valid upto 31.03.2025) ( <b>Annexure 4d</b> )
7.	CTO for Ausmelt Lead Plant	Vide Order no. 2020-2021/HDF/3069 dated 05.06.2020 (valid upto 31.08.2023) ( <b>Annexure 4e</b> )
8.	CTO for installation of 2 D.G. Sets (2 x 8MW)	Vide Order no. 2020-2021/ HDF / 3068 dated 05.06.2020 (valid upto 30.04.2024) ( <b>Annexure 4f</b> )
9.	CTO for Township	CTO letter obtained for Township vide Order no. 2018-2019/HDF/8905 dated 04.03.2022 (Valid upto 30.04.2027) ( <b>Annexure 4g</b> )
10.	CTO for WHRB and STP	vide Order no. 2021-2022/HDF / 8858 dated 18.01.2022 (Valid upto 31.12.2026). ( <b>Annexure-4g(l)</b> )

Earlier, company has proposed expansion of the same plant as “Expansion in Existing CLZS Complex [Expansion in Hydro Smelter Unit by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis and Installation of 1 Lead Refinery, Expansion of CPP through Modernization, Recovery of Minor Metals & Installation 4 DG Sets] at villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan)” for which application was submitted on portal on 5<sup>th</sup> March, 2021 [Proposal no. IA/RJ/IND/192897/2021 and File No. J-11011/279/2015- IA.II(I)].

Baseline monitoring & data collection for the project was carried out during Post Monsoon Season (October, 2020 to December, 2020).

The project was considered for approval of ToR in 32<sup>nd</sup> REAC (Industry 1) meeting held on 16.03.2021. As per MOM of 32<sup>nd</sup> meeting of REAC (Industry 1) displayed on Parivesh on 19.03.2021, the project was returned in the present form due to the following reasons:

- Project proponent as well as the consultant deliberately suppressed the information regarding grant of EC by MoEF&CC on 05/01/2021 for setting up of the fertilizer complex in the land adjacent to the smelter complex wherein the green belt development for the existing zinc smelter was envisaged.
- No details have been mentioned about the Fertilizer complex neither in the Form I nor in the Pre-feasibility report as there is an involvement of inter-movement of materials between the smelter complex and fertilizer complex.
- Neither the proponent nor the consultant was unable to explain the products envisaged under the minor metal production.
- Consultant made contradicting statements on the baseline data collected during October to December, 2020 with respect to the prevailing meteorological conditions, location of sampling stations and parameters monitored for the different environmental components.
- Implementation status of the EC dated 14/10/2020 has not been furnished.
- Scoping for carrying out the cumulative impact assessment including fertilizer complex has not been considered.

- vii. Form I has been filled with generic information and no project specific quantities have been provided which are essentially required for due-diligence by the EAC.
- viii. In furtherance to the above, Show Cause Notice was issued to the Hindustan Zinc Ltd. by MOEFCC, New Delhi vide letter J-11011/279/2006-IA.II (I) dated 6th April, 2021 under Section 5 of Environment (Protection) Act, 1986 for violation of provisions of under EIA Notification, 2006. Reply of the same was submitted to MOEFCC, New Delhi vide letter HZL/CLZS/ENV/38/2021-22 dated 19th April, 2021. After detailed deliberation as per the personal hearing held on 05<sup>th</sup> August, 2021, the Show Cause Notice has been withdrawn by MOEFCC, New Delhi vide letter dated 31<sup>st</sup> August, 2021.

Afterwards, Afresh Application for obtaining TOR for the proposal “Expansion within the existing Chanderiya Lead Zinc Smelter Complex[Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Set] at villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan)” by M/s. Hindustan Zinc Limited was submitted on Parivesh Portal dated 05.09.2021 and ToR letter issued by MoEFCC, New Delhi vide letter no. J-11011/279/2006-IA.II (I) dated 27.09.2021 for the preparation of EIA/EMP Report. Public Hearing has been conducted for the project on 20.07.2022.

## **B. Project Proposal**

Hindustan Zinc Limited is proposing for the following:

1. Pyro Metallurgical Smelter Unit: Change in Product Mix on total metal basis: 140,000 TPA (Refined Lead or Refined Zinc or Product Mix of both Metal) Installation of 1 Lead Refinery and three DG of 1500 KVA, 625 KVA & 750 KVA.
2. Hydro Metallurgical Smelter Unit:
  - ✓ Expansion in Melting and casting section of existing Hydro Zinc Smelter by adding 1 induction furnace (24 TPH) and 1 slab casting line (175000 MTPA) thereby increasing capacity from 504000 MTPA to 630000 MTPA.
  - ✓ Integration of RZO {Raw Zinc Oxide} Unit,
  - ✓ Installation of One DG set of 750 KVA
3. Captive Power Plant Unit : Modernization of CPP in its Unit 1&2 from 154 MW (2X77 MW) to 190 MW (2X95 MW) through Efficiency and power Enhancement by Modernization of Turbine internal and rotor, 500 KVA DG for FGD, Back Pressure Turbine Generator 6 MW and no Change in Unit 3 (100 MW) CPP .
4. Minor Metals Unit with Recovery of Copper, Cadmium, Cobalt and Nickel by reducing overall waste generation.

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



**Table - 1.2(A)**  
**Unit - wise project proposal**

S. No	Name of the facility	Unit	Existing		Additional		Total after expansion		Remarks
			Capacity	Configuration	Capacity	Configuration	Capacity	Configuration	
Lead Zinc Smelter Unit (Pyro Plant)									
1.	Refined Lead	TPA	35,000	1 x 140,000	1,05,000	1x 140,000	140000 [Total Metal Basis]	1 x 140,000	Change in product mix*
2.	Refined Zinc	TPA	105,000		35,000				
3.	Total	TPA	140,000		140,000 (Change in product mix only)				
4.	Captive Power Plant	MW	90	1 x 90	NIL		NIL		Not installed
5.	DG	KVA	NIL	NIL	2875	1x625 1x1500 1x750	2875	1x625 1x1500 1x750	To be added
6.	Zn-Cd Alloy / Cadmium Metal (on equivalent cadmium basis) (By-product)	TPA	375	1 x 375	222	1 x 222	597	1 x 597	Increase in production capacity
7.	Copper Matte / Copper Metal (on equivalent copper basis) (By-product)	TPA	2100	1 x 2100	1238	1 x 1238	3338	1 x 3338	Increase in production capacity
8.	Silver (on equivalent silver basis) (By-product)	TPA	74	1 x 74	728.29	1 x 728.29	802.29	1 x 802.29	Increase in production capacity
9.	Sulphuric Acid (By-product)	TPA	1,76,000	1 x 1,76,000	47,505	1 x 47,505	2,23,505	1 x 2,23,505	Increase in production capacity
10.	Antimony Slag/Antimony Trioxide(Sb2O3) (on equivalent Antimony basis) (By-product)	TPA	NIL	NIL	992	1 x. 992	992	1 x. 992	To be added
11.	Lead Oxide/ Concentrate (by products)	TPA	NIL	NIL	20,000	1 x 20,000	20,000	1 x 20,000	To be added
12.	Calomel/Mercury Sludge (on equivalent mercury basis) (By-product)	TPA	NIL	NIL	14.8	1 x 14.8	14.8	1 x 14.8	To be added
Hydro-I + Hydro-II Zinc Smelter Unit & Captive Power Plant (Combined Capacity)									
1.	Zinc (Hydro- I + II) / Zinc Alloys and its Compounds	TPA	5,04,000	2 x 2,52,000	1,26,000	1 x 1,26,000	6,30,000	2 x 2,52,000 1 x 1,26,000	Increase in Production Capacity
Hydro I									
2.	Captive Power Plant	MW	154	2x77	36	2x18	190	2x95	Increase in Production

S. No	Name of the facility	Unit	Existing		Additional		Total after expansion		Remarks
			Capacity	Configuration	Capacity	Configuration	Capacity	Configuration	
									Capacity
3.	DG	KVA	1750	1 x 750 1 x 1000	NIL	Nil	1750	1 x 750 1 x 1000	No change
4.	WHRB	MW	9.4	1 x 9.4	Nil	Nil	9.4	1 x 9.4	No change
5.	Back Pressure Turbine Generator	MW	NIL	Nil	6	1 x 6	6	1 x 6	To be added
6.	DG FGD	KVA	NIL	Nil	500	1 x 500	500	1 x 500	To be added
7.	Cadmium Metal/ Cadmium Sponge (equivalent metal) (By-product)	TPA	680	1 x 680	NIL	NIL	680	1 x 680	No change
8.	Copper Cement/ Copper sulphate/ Copper matte/ (equivalent metal) (By product)	TPA	510	1 x 510	NIL	NIL	510	1 x 510	No change
9.	Low grade lead concentrate (By-product)	TPA	30,000	1 x 30,000	NIL	NIL	30,000	1 x 30,000	No change
10.	Sulphuric Acid (By-product)	TPA	3,07,774	1 x 3,07,774	Nil	Nil	3,07,774	1 x 3,07,774	No change
11.	Calomel (Mercury Chloride) (By-product)	TPA	20	1 x 20	NIL	NIL	20	1 x 20	No change
12.	Sodium Chloride (By-product)	TPA	250	1 x 250	Nil	Nil	250	1 x 250	No change
13.	Sodium Sulphate (By-product)	TPA	1250	1* 1250	Nil	Nil	14.8	1* 1250	No change
<b>Hydro II</b>									
1.	Captive Power Plant	MW	100	1 x 100	NIL	Nil	100	1 x 100	No Change
2.	DG	KVA	21,780	1 x 625 2 x 1250 1 x 125 2 x 9265	750	1 x 750	22,530	1 x 625 2 x 1250 1 x 125 2 x 9265 1 x 750	Additional DG to be installed
3.	WHRB	MW	25.3	1 x 4.3 1 x 21	1	1 x 1 -	26.3	1 x 5.3 1 x 21	Increase in power generation
4.	Cadmium Metal/ Cadmium Sponge (equivalent metal) (By-product)	TPA	680	1 x 680	NIL	NIL	680	1 x 680	No change
5.	Copper Cement/ Copper sulphate/ Copper matte/ (equivalent metal) (By product)	TPA	510	1 x 510	NIL	NIL	510	1 x 510	No change
6.	Lead Silver Cake (By-product)	TPA	16000	1 x 16000	16000	1 x 16000	32000	1 x 32000	Increase in production capacity

S. No	Name of the facility	Unit	Existing		Additional		Total after expansion		Remarks
			Capacity	Configuration	Capacity	Configuration	Capacity	Configuration	
7.	Copper Speiss/ Copper Residue (By-product)	TPA	700	1 x 700	500	1 x 500	1200	1 x 1200	Increase in production capacity
8.	Sulphuric Acid (By-product)	TPA	307774	1 x 307774	Nil	Nil	307774	1 x 307774	No change
9.	Calomel (Mercury Chloride) (By-product)	TPA	20	1 x 20	NIL	NIL	20	1 x 20	No change
10.	Sodium Chloride (By-product)	TPA	250	1 x 250	Nil	Nil	250	1 x 250	No change
11.	Sodium Sulphate (By-product)	TPA	1250	1 x 1250	Nil	Nil	1250	1 x 1250	No change
<b>Ausmelt Lead Smelter Plant</b>									
1.	Lead	TPA	60,000	1 x 60,000	NIL	NIL	60,000	1 x 60,000	No Change
2.	Sulphuric Acid (By-product)	TPA	50500	1 x 50500	NIL	NIL	50500	1 x 50500	No Change
3.	Copper Sulphate (By-product)	TPA	7920	1 x 7920	NIL	NIL	7920	1 x 7920	No Change
4.	Silver (on equivalent silver basis) (By-product)	TPA	94.71	1 x 94.71	NIL	NIL	94.71	1 x 94.71	No Change
5.	Zinc Rich Dust (By-product)	TPA	6600	1 x 6600	NIL	NIL	6600	1 x 6600	No Change
<b>Minor Metal Recovery Unit</b>									
1.	Lead Bullion / Lead Silver Cake / Lead Cake/Low Grade Lead Cake / Low Grade Lead Material (on Equivalent metal basis)	TPA	NIL	NIL	8873	1 x 8873	8873	1 x 8873	To be added
2.	Cadmium Sponge/ Cadmium Metal/ Low Grade Cadmium (on Equivalent metal basis)	TPA	NIL	NIL	3050	1 x 3050	3050	1 x 3050	To be added
3.	Cobalt / Cobalt Concentrate (on Equivalent metal basis)	TPA	NIL	NIL	50	1 x 50	50	1 x 50	To be added
4.	Ni cake / Ni Compounds (on Equivalent metal basis)	TPA	NIL	NIL	30	1 x 30	30	1 x 30	To be added
5.	Zn So <sub>4</sub> Solution (on Equivalent metal basis)	TPA	NIL	NIL	2781	1 x 2781	2781	1 x 2781	To be added
6.	CuSO <sub>4</sub> Solution/ Copper Cement/ CU Matte (on Equivalent metal basis)	TPA	NIL	NIL	2436	1 x 2436	2436	1 x 2436	To be added

Table - 1.2(B)  
Product - wise project proposal

S. No.	Products	Unit	Production capacity															Remarks
			Existing granted					Additional					Total after expansion					
			Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	
Products																		
1.	Refined Lead/Lead	TPA	35,000	-	-	60,000	95,000	1,05,000	-	-	NIL	1,05,000	140,000	-	-	60,000	2,00,000	Additional melting capacity by adding 1 furnace and 1 slab casting line in Hydro I and Max. Production achieved in Pyro will be 1,40,000 TPA
2.	Refined Zinc/ Zinc	TPA	105,000	5,04,000		-	6,09,000	35,000	1,26,000		-	1,61,000		6,30,000		-	7,70,000	
	Total	TPA	140,000	5,04,000		60,000	7,04,000	1,40,000 (change in product mix only)	1,26,000		NIL	2,66,000		140,000	6,30,000		60,000	
Power																		
3.	CPP	MW	90#	154	100	NIL	254	NIL	36	NIL	NIL	36	90#	190	100	NIL	290	#Not Installed
4.	WHRB	MW	Nil	9.4	4.321	Nil	34.7	NIL	NIL	1.0	NIL	1.0	Nil	9.4	5.321	Nil	35.7	No Change
5.	Back Pressure Turbine Generator	MW	NIL	NIL	NIL	NIL	NIL	NIL	6	Nil	Nil	6	Nil	6	Nil	Nil	6	To be added
6.	DG Sets	KVA	NIL	1 x 750 1 x 1000	1 x 625 2 x 1250 1 x 125 2 x 9265	NIL	23530	1 x 625 1 x 1500 1 x 750	500 KVA	1 x 750	NIL	4125	1 x 625 1 x 1500 1 x 750	1 x 750 1 x 1000 1x500	1 x 625 2 x 1250 1 x 125 2 x 9265	NIL	27655	5 additional DG proposed



S. No.	Products	Unit	Production capacity															Remarks
			Existing granted					Additional					Total after expansion					
			Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	
														1 x 750				
		MW	Nil	2 x 7.405	Nil	Nil	14.81	Nil	Nil	Nil	Nil	Nil	Nil	2 x 7.405	Nil	Nil	14.81	No Change
By Products																		
7.	Sulphuric Acid	TPA	176,000	307774	307774	50500	842048	47505	NIL	NIL	NIL	47505	223505	307774	19624	50500	889553	Increase in acid production in Pyro
8.	Zn-Cd Alloy /Cadmium Metal/Cadmium Sponge (on equivalent cadmium basis) (By-product)	TPA	375	680	680	NIL	1,735	222	Nil	Nil	NIL	222	597	680	680	NIL	1957	To be increased in Pyro
9.	Copper Matte / Cu residue/ Copper cement / Copper Compounds / Copper (on equivalent copper	TPA	2100	510	510	Nil	3120	1238	Nil	Nil	NIL	1238	3338	510	510	Nil	4,358	To be increased in Pyro

S. No.	Products	Unit	Production capacity															Remarks
			Existing granted					Additional					Total after expansion					
			Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	
	basis)																	
10.	Copper Sulphate (By-product)		Nil	Nil	Nil	7920	7920	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	7920	7,920	No Change
11.	Silver (on equivalent silver basis) (By-product)	TPA	74	NIL	NIL	94.71	168.71	728.29	NIL	NIL	NIL	728.29	802.29	NIL	NIL	94.71	897	To be increased in Pyro
12.	Antimony Slag / Antimony Trioxide( Sb2O3) (on equivalent Antimony basis)	TPA	NIL	NIL	NIL	NIL	NIL	992	NIL	NIL	NIL	992	992	NIL	NIL	NIL	992	To be added
13.	Zinc Rich dust	TPA	NIL	NIL	NIL	6600	6600	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	6600	6600	No Change
14.	Calomel/ Mercury Chloride/ Mercury Sludge (By-Product)	TPA	NIL	20	20	NIL	40	14.8	NIL	NIL	NIL	14.8	14.8	20	20	NIL	54.8	To be increased in Pyro
15.	Low Grade Lead Concentra	TPA	NIL	30,000	NIL	NIL	30,000	NIL	NIL	NIL	NIL	NIL	NIL	30,000	NIL	NIL	30,000	No change

S. No.	Products	Unit	Production capacity															Remarks
			Existing granted					Additional					Total after expansion					
			Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	
	te /																	
16.	Lead Silver Cake	TPA	NIL	NIL	16,000	NIL	16,000	NIL	NIL	16000	NIL	16000	NIL	NIL	32000	NIL	32000	To be increased in Hydro II
17.	Copper Speiss/ Copper Residue (By-product)	TPA	NIL	NIL	700	NIL	700	NIL	NIL	500	NIL	500	NIL	NIL	1200	NIL	1200	To be increased in Hydro II
18.	Lead Oxide / Concentrate	TPA	NIL	NIL	NIL	NIL	NIL	20000	NIL	NIL	NIL	20000	20000	NIL	NIL	NIL	20000	To be added
19.	Sodium Chloride	TPA	NIL	250	250	NIL	500	NIL	NIL	NIL	NIL	Nil	NIL	250	250	NIL	500	No change
20.	Sodium Sulphate	TPA	NIL	1250	1250	NIL	2500	NIL	NIL	NIL	NIL	Nil	NIL	1250	1250	NIL	2500	No change
Minor Metal Unit																		
S. No.	Products	Unit	Production capacity															Remarks
			Existing granted					Additional					Total after expansion					
21.	Lead Bullion / Lead Silver Cake / Lead Cake/Low Grade Lead Cake / Low	TPA	Nil					8873					8873					The products of the Minor Metal Complex will be reprocessed at Chanderiya Lead Zinc Complex in

S. No.	Products	Unit	Production capacity															Remarks
			Existing granted					Additional					Total after expansion					
			Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	
	Grade Lead Material (on Equivalent metal basis )																	Pyro and Hydro Metallurgical Smelter Unit without increasing overall Metal capacity proposed herewith in this proposal. Thus overall reducing the Waste generation and disposal.
22.	Cadmium Sponge/ Cadmium Metal/ Low Grade Cadmium (on Equivalent metal basis )	TPA	Nil					3050					3050					
23.	Cobalt / Cobalt Concentrate (on Equivalent metal basis )	TPA	Nil					50					50					
24.	Ni cake / Ni Compounds (on Equivalent metal basis )	TPA	Nil					30					30					
25.	Zn So4	TPA	Nil					2781					2781					



Expansion within the existing Chanderiya Lead Zinc Smelter Complex

At villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan)

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S. No.	Products	Unit	Production capacity															Remarks
			Existing granted					Additional					Total after expansion					
			Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	
	Solution (on Equivalent metal basis )																	
26.	CuSO4 Solution/ Copper Cement/ CU Matte (on Equivalent metal basis )	TPA	Nil					2436					2436					

Source: Pre-Feasibility Report

### C. Screening Category

As per EIA Notification dated 14<sup>th</sup> Sept., 2006, as amended from time to time; the project falls under Category “A”, Project or Activity 3 (a) - {Metallurgy} as major activity and 1 (d) – {Thermal Power Projects} as minor activity.

### D. Current Status of the Expansion Project with respect to Environment Clearance

The chronology of the project activities undertaken so far with respect to the process of getting Environment Clearance are as given in Table - 1.3:

**Table - 1.3**  
**Status of the Expansion Project with respect to Environment Clearance**

S. No.	Project Activity	Detail
1.	Application (Form - 1/ToR and Pre-Feasibility Report) uploaded on MoEFCC portal	05.03.2021
2.	Baseline Monitoring & Data Collection	During Post-Monsoon Season (Oct. to Dec., 2020)
3.	First Technical Presentation (for ToR approval) held before REAC (Industry - I)	16.03.2021
4.	As per MOM of 32 <sup>nd</sup> meeting REAC (Industry 1) displayed on Parivesh Portal and the project was returned in present form	19.03.2021
5.	Show Cause Notice was issued to HZL, by MoEFCC, New Delhi	06.04.2021
6.	Reply of the same was submitted to MoEFCC, New Delhi	19.04.2021
7.	Personal Hearing held by MoEFCC, New Delhi	05.08.2021
8.	Show Cause Notice withdrawn by MoEFCC, New Delhi	31.08.2021
9.	A Fresh Application for obtaining TOR was submitted on Parivesh Portal.	05.09.2021
10.	First Technical Presentation (for ToR approval) held before REAC (Industry - I)	14.09.2021
11.	ToR letter issued by MoEFCC, New Delhi vide letter no. J-11011/279/2006-IA.II (I)	27.09.2021
12.	Additional Baseline data collection for AAQ	October, 2021
13.	Public Hearing documents submitted to RSPCB	03.01.2022
14.	Public Hearing conducted on	20.07.2022

### 1.2.2 Introduction of the Project Proponent

#### Project Proponent

M/s Hindustan Zinc Limited (HZL) is part of the Vedanta conglomerate, which is recognized as one of the most successful producers of various non-ferrous metals in India. Hindustan Zinc Limited (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 and Sindesar Khurd, and smelting complexes in Chanderiya Debari and Dariba, all in the state of Rajasthan.



Figure no. 1.1 (GreenCo Gold Certificate awarded to HZL, CLZS Complex)

Hindustan Zinc Limited, Chanderiya Lead Zinc Smelter has been awarded with the GreenGo Gold certificate (issue date: 09-08-2022 and validity date: 08-08-2025) by The Confederation of Indian Industry (CII) Sohrabji Godrej Green Business Centre their innovative environmental initiatives.

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 403 MT as on 31st March 2020 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 7,30,955 TPA of CO<sub>2</sub>. Total Exchequer to Government during 2019-20 was Rs. 9150 Crores, including royalty, taxes and dividend. 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.

### 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 - 1.4.

Table - 1.4

#### Brief Description of Nature, Size and Location of Project

S. NO.	PARTICULARS	DETAILS
A.	Nature & Size of the Project	Expansion in existing Chanderiya Lead- Zinc Smelter Complex by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 Back Pressure Turbine Generator, Recovery of Minor Metals & Installation of 5 DG Sets at villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil:

S. NO.	PARTICULARS	DETAILS
		Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan).
1.	<b>Total area</b>	
	Total Plant area	Total Plant Area:- 335.89 ha
	Greenbelt & Plantation area	Out of the total plant area (335.89 ha), 37.21% (i.e. 125.02 ha) area has already been developed under greenbelt/ plantation. The same will be maintained and enhanced by doing gap plantation to achieve the plantation density @ 2500/ha.
<b>B.</b>	<b>Location Details</b>	
1.	Village	Putholi, Ajoliya Ka Khera & Biliya
2.	Tehsil	Gangrar & Chittorgarh
3.	District	Chittorgarh
4.	State	Rajasthan
5.	Latitude & Longitude	Chanderiya Lead Zinc Smelter [all four corners]
		<b>A</b> 24°57'21.29"N, 74°38'34.39"E
		<b>B</b> 24°58'21.03"N, 74°40'43.43"E
		<b>C</b> 24°57'20.33"N, 74°38'37.46"E
		<b>D</b> 24°58'35.69"N, 74°39'16.22"E
6.	Toposheet No.	GA3012, GA3016, GA3009, GA3013

Source: Pre-Feasibility Report

### 1.3.2 Importance to the Country and Region

#### National Importance

Global Zinc & Lead 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.

The lead industry in India is poised to perform well on the back of good demand prospects. India is Asia's largest lead consuming market after China where growth is largely dependent on the demand from the automotive sector and the industrial sector. India has the second largest number of mobile subscribers in the world after China, and is currently ranked 5th in global vehicle production. India's growing telecom industry and on-going infrastructure development has boosted the industrial battery demand, as is the case with an expanding photovoltaic market which is planned to reach 227 GW by 2022. Lead will continue witnessing a robust demand, driven mainly by the automotive and industrial battery segments. India's automobile market is expanding fast and is expected to play a significant role in leading demand growth going forward. The automobile sector, the telecom sector



and the power sector (solar, wind and invertors) will be the main demand drivers for lead usage. Huge opportunities for battery demand growth make the outlook for lead metal positive.

### Regional Importance

India is likely to witness a substantial growth in the demand for lead batteries given that several sectors, including automotive, telecommunication, railways and defense, are set to expand in the years ahead. As a battery ingredient, lead is increasingly used in inverters, UPS and similar energy storage devices.

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 4<sup>th</sup> 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 2019-2024. 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 in the Terms of Reference (ToR) prescribed by the MoEFCC, New Delhi vide their letter no. no. J-11011/279/2006-IA.II(I) dated 27.09.2021. Point-wise compliance for the ToRs issued for the project is given on Page no. 21 – 45 of this EIA/EMP Report.

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.

**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 "Expansion within the existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Set] at villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan)" by M/s. Hindustan Zinc Limited is carried out within the existing plant premises and no additional area is required.

**2.2 NEED FOR THE PROJECT**

Global Zinc & Lead 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.

The lead industry in India is poised to perform well on the back of good demand prospects. India is Asia's largest lead consuming market after China where growth is largely dependent on the demand from the automotive sector and the industrial sector. India has the second largest number of mobile subscribers in the world after China, and is currently ranked 5<sup>th</sup> in global vehicle production. India's growing telecom industry and on-going infrastructure development has boosted the industrial battery demand, as is the case with an expanding photovoltaic market which is planned to reach 227 GW by 2022. Lead will continue witnessing a robust demand, driven mainly by the automotive and industrial battery segments. India's automobile market is expanding fast and is expected to play a significant role in leading demand growth going forward. The automobile sector, the telecom sector and the power sector (solar, wind and invertors) will be the main demand drivers for lead usage. Huge opportunities for battery demand growth make the outlook for lead metal positive.

Looking into the increasing demand of Lead & Zinc, M/s. Hindustan Zinc Ltd. is proposing Expansion within the existing Chanderiya Lead- Zinc Smelter Complex At villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan).

## **2.3 LOCATION OF THE PROJECT**

The plant site is located in Putholi, Ajoliya Ka Khera & Biliya Villages of Gangrar & Chittorgarh tehsil of Chittorgarh District in the State of Rajasthan.

### **2.3.1 General Location Map**

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

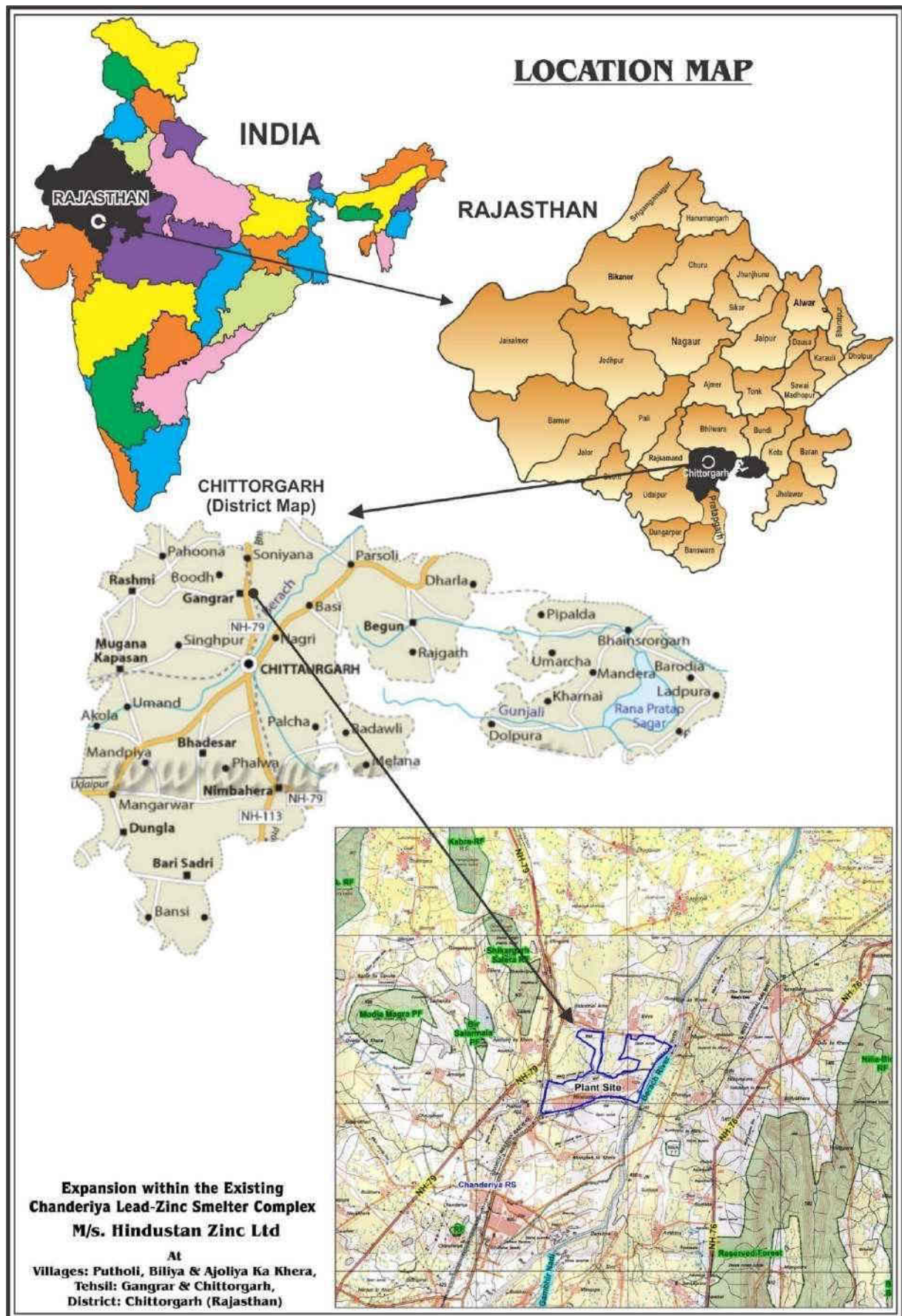


Figure 2.1: Location Map



### 2.3.2 Specific Location Map

The map showing specific location of the plant site along with geographical coordinates is as given below in Figure - 2.2 and Google Earth downloaded image of the plant site is given in Figure - 2.3.

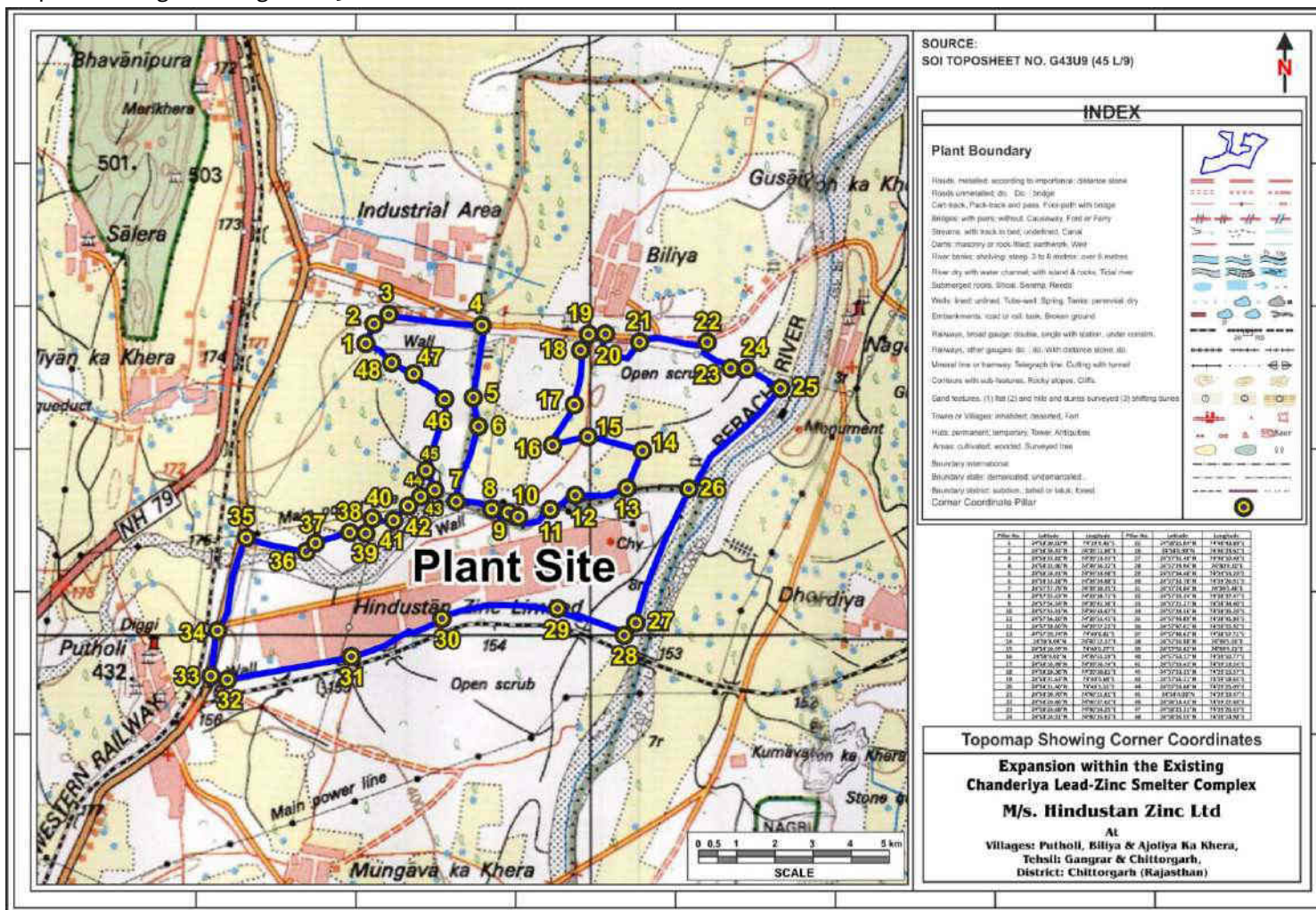


Figure 2.2: Map showing Specific Plant Location along with Corner Co-ordinates of the Plant site



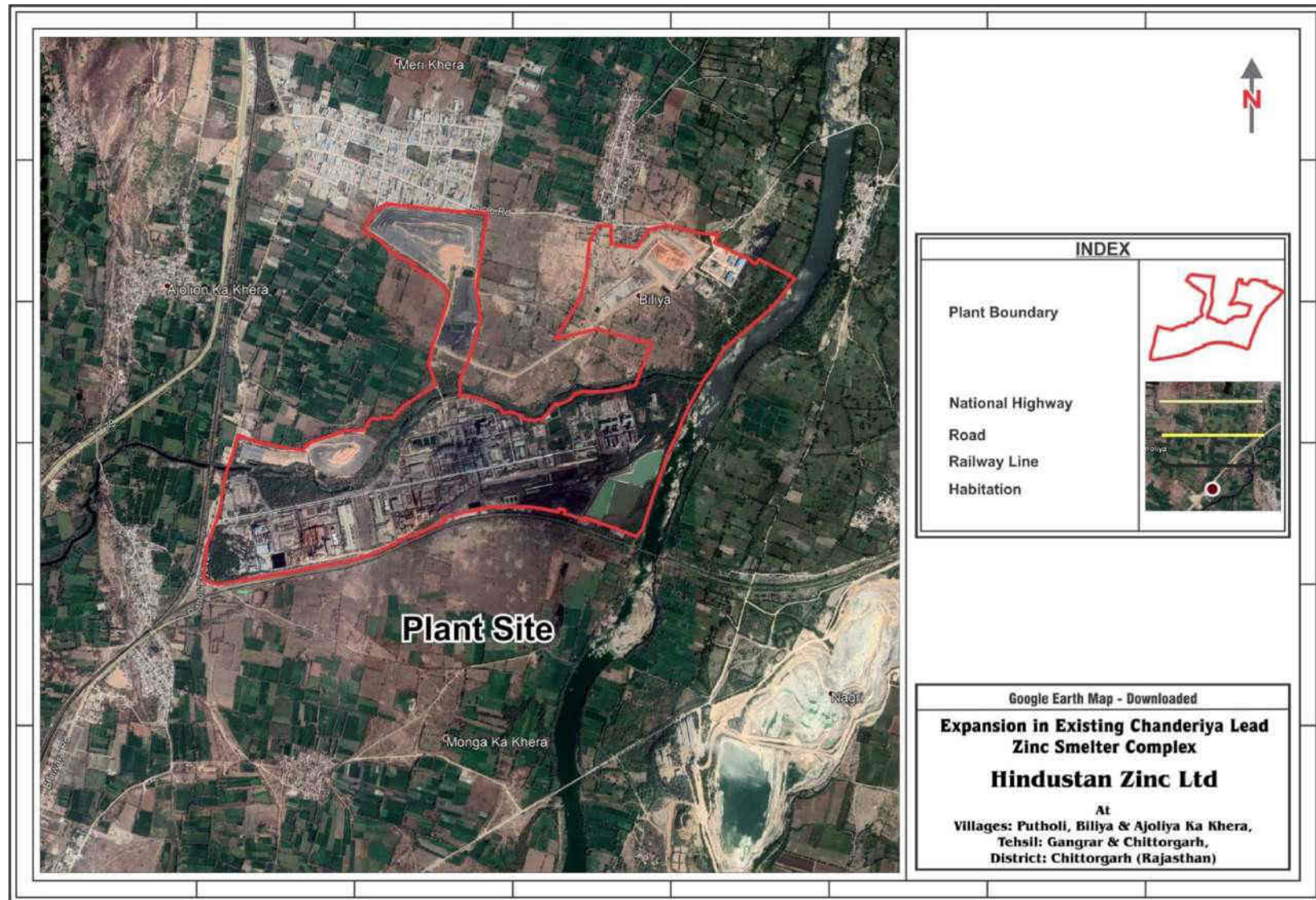


Figure 2.3: Google Earth Downloaded Map of the Plant Site

### 2.3.3 Project Site Layout

Total plant area of Chanderiya Lead Zinc Smelter Complex is 335.89 ha and is under the possession of M/s. Hindustan Zinc Ltd. Proposed expansion will be done within the existing plant premises. Thus; no additional area is required.

Land use of the plant is industrial; Out of the total plant area (335.89 ha), 125.02 ha (37.21 %) area has already been developed under greenbelt/ plantation. 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.

**Table - 2.1**  
**Plant Area Break-up**

S. No.	Particular /Unit	Existing Area (ha)	Additional Area (ha)	Total Area (ha)
1.	Pyro Plant & Ausmelt Lead Plant	29.00	NIL	29.00
2.	Hydro Plant - I	20	NIL	20
3.	Hydro Plant - II & Fumer	26.50	NIL	26.50
4.	CPP Unit I, II & III Including Railway siding	20.00	NIL	20.00
5.	Waste Disposal Yards [SLF/JF/SLG]	54.6	NIL	54.6
6.	Utility Buildings, Facility, Offices / Others Open area	60.77 [ 55.97+4.8]	NIL	60.77 [ 55.97+4.8]
7.	Greenbelt/Plantation	125.02	NIL	125.02
<b>Total</b>		<b>335.89</b>	<b>NIL</b>	<b>335.89</b>

Source: Pre-feasibility Report

Being an existing plant, various facilities like workshop, machinery stores, cranes, conveyor system, training hall, security office etc. are already provided in the plant premises.

No major change is proposed in the utility and common facilities of the area for this expansion project apart from following installation in the existing complex as;

1. One additional Lead Refinery (100 KTA); three additional DG of 1500 KVA, 625 KVA & 750 KVA in Pyro Unit.
2. The installation of a RZO circuit in the existing Hydro Unit in the existing open area of plant, an additional induction furnace and 1 slab casting line (175000 TPA) & one DG set of 750 KVA.
3. Modernization of CPP in its Unit 1&2 from 154 MW (2X77 MW) to 190 MW (2X95 MW) through Efficiency and power Enhancement by Modernization of Turbine internal and rotor, BPTG [Back Pressure Turbine Generator] Installation of 6 MW, FGD and 1 DG of 500 KVA with FGD.
4. Minor Metals Unit with Recovery of Copper, Cadmium, Cobalt, and Nickel by reducing overall waste generation.

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



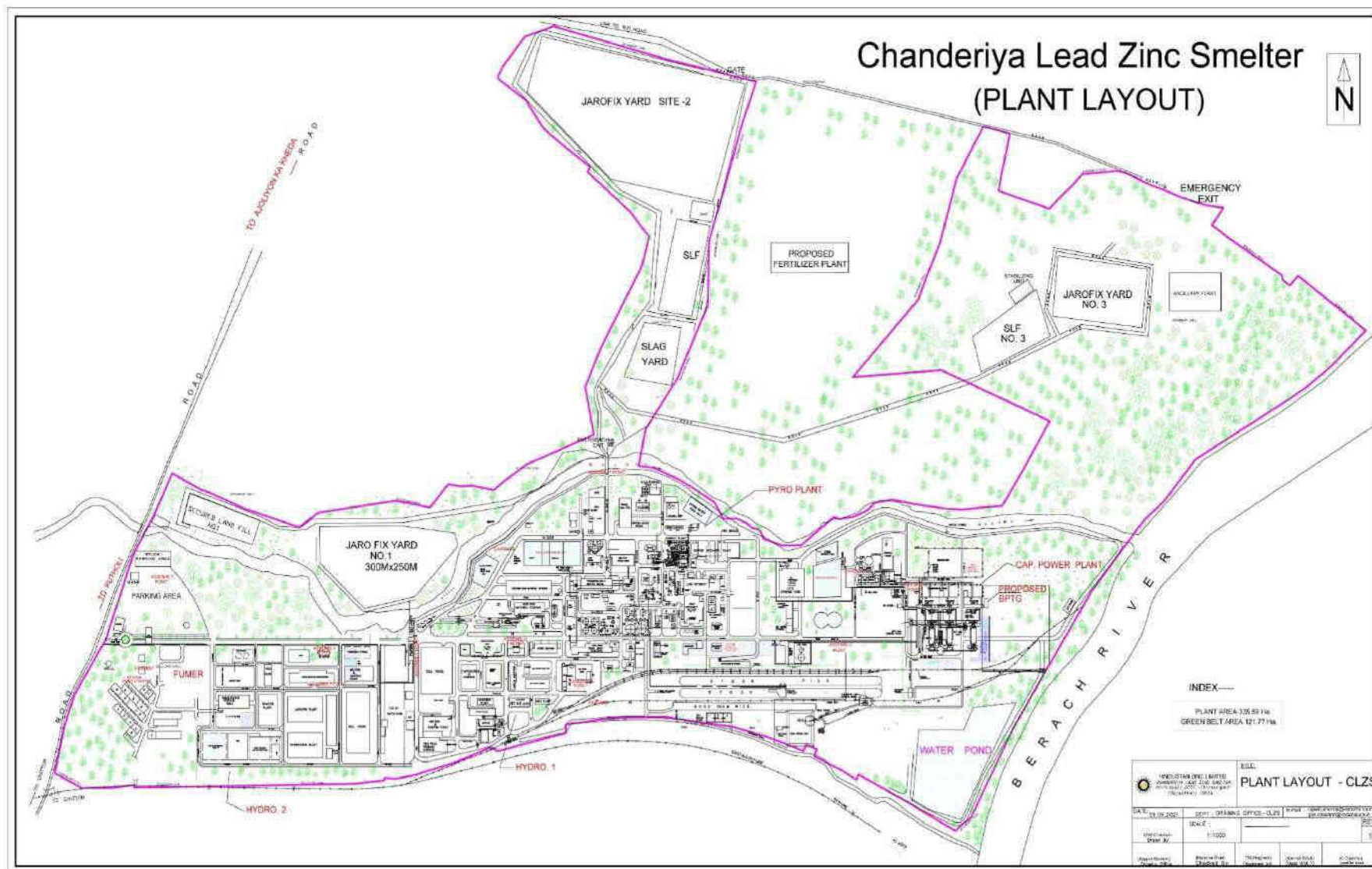


Figure 2.4: Plant Layout



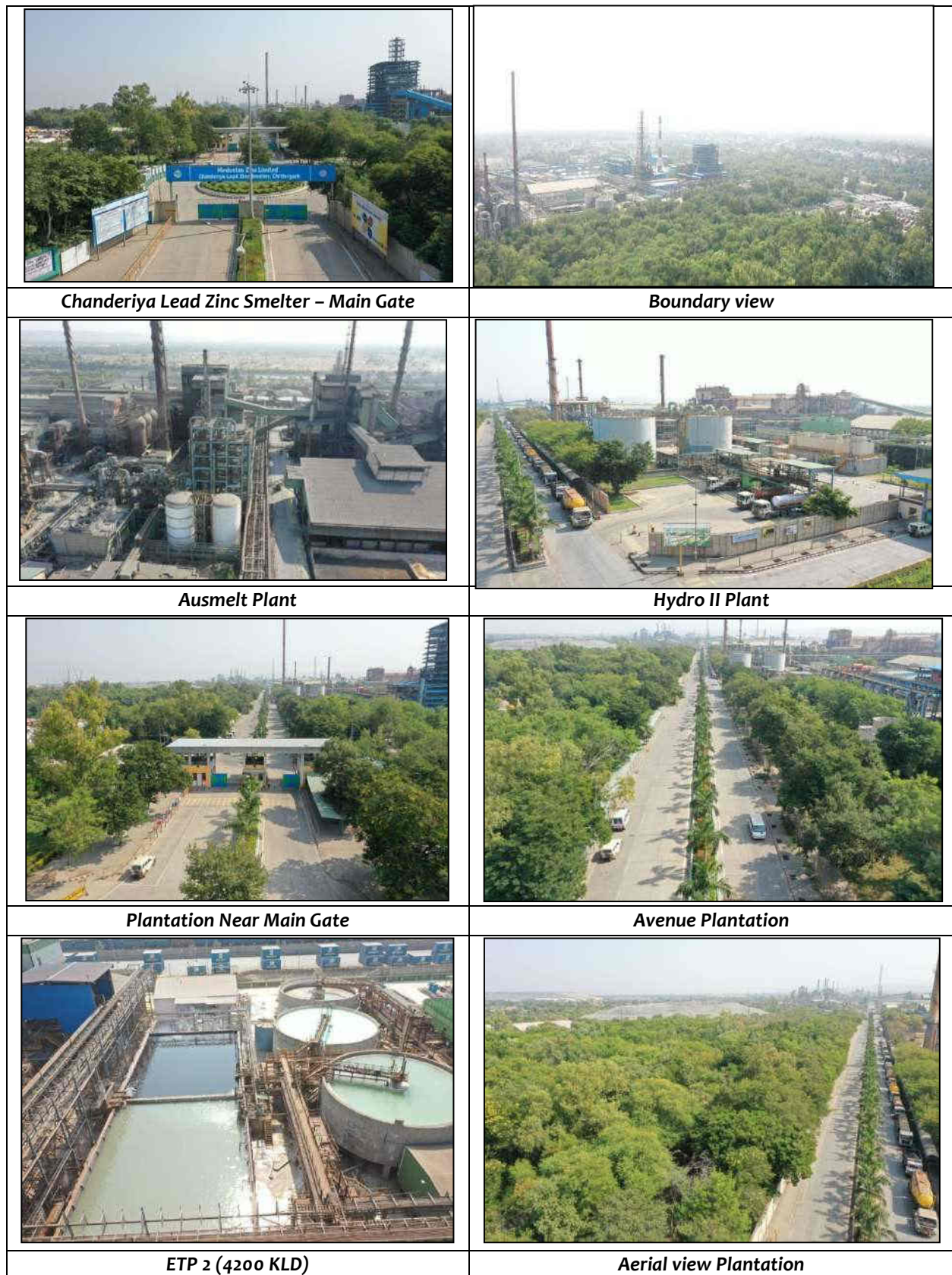


Figure 2.5: Plant Site photographs

## **2.4 SIZE OR MAGNITUDE OF OPERATION**

M/s. Hindustan Zinc Limited is proposing Expansion within the existing Chanderiya Lead Zinc Smelter [Change in Product Mix in its Pyro Metallurgical Smelter Unit with total metal basis: 140,000 TPA (Refined Lead or Refined Zinc or Product Mix of both Metal), installation of one Lead Refinery (100 KTA) and 3 DG Sets of 1500 KVA, 625 KVA & 650 KVA. Expansion in Melting and casting section of existing Hydro Zinc Smelter by adding 1 induction furnace (24 TPH) and 1 slab casting line (175000 TPA) thereby increasing existing capacity from 504000 MTPA to 630000 MTPA, Integration of RZO {Raw Zinc Oxide} Plant & Installation of One DG set of 750 KVA in its Hydro Metallurgical Smelter Unit, Modernization of Captive Power Plant with Capacity Enhancement in its Unit 1&2 from 154 MW (2X77 MW) to 190 MW (2X95 MW) through Efficiency and Modernization of Turbine internal and rotor, 500 KVA DG Set for FGD, Back Pressure Turbine Generator 6 MW and no Change in Unit 3 (100 MW) CPP. Recovery of Minor Metals with Copper, Cadmium, Cobalt and Nickel by reducing overall waste generation in the complex at Villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar and Chittorgarh, District: Chittorgarh (Rajasthan).

Table – 2.2 (A)  
Unit- wise project proposal

S. No	Name of the facility	Unit	Existing		Additional		Total after expansion		Remarks
			Capacity	Configuration	Capacity	Configuration	Capacity	Configuration	
Lead Zinc Smelter Unit (Pyro Plant)									
1.	Refined Lead	TPA	35,000	1 x 140,000	1,05,000	1x 140,000	140000 [Total Metal Basis]	1 x 140,000	Change in product mix*
2.	Refined Zinc	TPA	105,000		35,000				
3.	Total	TPA	140,000		140,000 (Change in product mix only)				
4.	Captive Power Plant	MW	90	1 x 90	NIL		NIL		Not installed
5.	DG	KVA	NIL	NIL	2875	1x625 1x1500 1x750	2875	1x625 1x1500 1x750	To be added
6.	Zn-Cd Alloy / Cadmium Metal (on equivalent cadmium basis) (By-product)	TPA	375	1 x 375	222	1 x 222	597	1 x 597	Increase in production capacity
7.	Copper Matte / Copper Metal (on equivalent copper basis) (By-product)	TPA	2100	1 x 2100	1238	1 x 1238	3338	1 x 3338	Increase in production capacity
8.	Silver (on equivalent silver basis) (By-product)	TPA	74	1 x 74	728.29	1 x 728.29	802.29	1 x 802.29	Increase in production capacity
9.	Sulphuric Acid (By-product)	TPA	1,76,000	1 x 1,76,000	47,505	1 x 47,505	2,23,505	1 x 2,23,505	Increase in production capacity
10.	Antimony Slag/Antimony Trioxide(Sb2O3) (on equivalent Antimony basis) (By-product)	TPA	NIL	NIL	992	1 x 992	992	1 x 992	To be added
11.	Lead Oxide/ Concentrate (by products)	TPA	NIL	NIL	20,000	1 x 20,000	20,000	1 x 20,000	To be added
12.	Calomel/Mercury Sludge (on equivalent mercury basis) (By-product)	TPA	NIL	NIL	14.8	1 x 14.8	14.8	1 x 14.8	To be added
Hydro-I + Hydro-II Zinc Smelter Unit & Captive Power Plant (Combined Capacity)									
1.	Zinc (Hydro- I + II) / Zinc Alloys and its Compounds	TPA	5,04,000	2 x 2,52,000	1,26,000	1 x 1,26,000	6,30,000	2 x 2,52,000 1 x 1,26,000	Increase in Production Capacity
Hydro I									

**Expansion within the existing Chanderiya Lead Zinc Smelter Complex**

At villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan)

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S. No	Name of the facility	Unit	Existing		Additional		Total after expansion		Remarks
			Capacity	Configuration	Capacity	Configuration	Capacity	Configuration	
2.	Captive Power Plant	MW	154	2x77	36	2x18	190	2x95	Increase in Production Capacity
3.	DG	KVA	1750	1 x 750 1 x 1000	NIL	NIL	1750	1 x 750 1 x 1000	No change
4.	WHRB	MW	9.4	1 x 9.4	NIL	NIL	9.4	1 x 9.4	No change
5.	Back Pressure Turbine Generator	MW	NIL	NIL	6	1 x 6	6	1 x 6	To be added
6.	DG FGD	KVA	NIL	NIL	500	1 x 500	500	1 x 500	To be added
7.	Cadmium Metal/ Cadmium Sponge (equivalent metal) (By-product)	TPA	680	1 x 680	NIL	NIL	680	1 x 680	No change
8.	Copper Cement/ Copper sulphate/ Copper matte/ (equivalent metal) (By product)	TPA	510	1 x 510	NIL	NIL	510	1 x 510	No change
9.	Low grade lead concentrate (By-product)	TPA	30,000	1 x 30,000	NIL	NIL	30,000	1 x 30,000	No change
10.	Sulphuric Acid (By-product)	TPA	3,07,774	1 x 3,07,774	NIL	NIL	3,07,774	1 x 3,07,774	No change
11.	Calomel (Mercury Chloride) (By-product)	TPA	20	1 x 20	NIL	NIL	20	1 x 20	No change
12.	Sodium Chloride (By-product)	TPA	250	1 x 250	NIL	NIL	250	1 x 250	No change
13.	Sodium Sulphate (By-product)	TPA	1250	1 x 1250	NIL	NIL	14.8	1* 1250	No change
<b>Hydro II</b>									
1.	Captive Power Plant	MW	100	1 x 100	NIL	NIL	100	1 x 100	No Change
2.	DG	KVA	21,780	1 x 625 2 x 1250 1 x 125 2 x 9265	750	1 x 750	22,530	1 x 625 2 x 1250 1 x 125 2 x 9265 1 x 750	Additional DG to be installed
3.	WHRB	MW	25.3	1 x 4.3 1 x 21	1	1 x 1 -	26.3	1 x 5.3 1 x 21	Increase in power generation
4.	Cadmium Metal/ Cadmium Sponge (equivalent metal) (By-product)	TPA	680	1 x 680	NIL	NIL	680	1 x 680	No change
5.	Copper Cement/ Copper sulphate/ Copper matte/ (equivalent metal) (By product)	TPA	510	1 x 510	NIL	NIL	510	1 x 510	No change



**Expansion within the existing Chanderiya Lead Zinc Smelter Complex**

At villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan)

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S. No	Name of the facility	Unit	Existing		Additional		Total after expansion		Remarks
			Capacity	Configuration	Capacity	Configuration	Capacity	Configuration	
6.	Lead Silver Cake (By-product)	TPA	16000	1 x 16000	16000	1 x 16000	32000	1 x 32000	Increase in production capacity
7.	Copper Speiss/ Copper Residue (By-product)	TPA	700	1 x 700	500	1 x 500	1200	1 x 1200	Increase in production capacity
8.	Sulphuric Acid (By-product)	TPA	307774	1 x 307774	NIL	NIL	307774	1 x 307774	No change
9.	Calomel (Mercury Chloride) (By-product)	TPA	20	1 x 20	NIL	NIL	20	1 x 20	No change
10.	Sodium Chloride (By-product)	TPA	250	1 x 250	NIL	NIL	250	1 x 250	No change
11.	Sodium Sulphate (By-product)	TPA	1250	1 x 1250	NIL	NIL	1250	1 x 1250	No change
<b>Ausmelt Lead Smelter Plant</b>									
1.	Lead	TPA	60,000	1 x 60,000	NIL	NIL	60,000	1 x 60,000	No Change
2.	Sulphuric Acid (By-product)	TPA	50500	1 x 50500	NIL	NIL	50500	1 x 50500	No Change
3.	Copper Sulphate (By-product)	TPA	7920	1 x 7920	NIL	NIL	7920	1 x 7920	No Change
4.	Silver (on equivalent silver basis) (By-product)	TPA	94.71	1 x 94.71	NIL	NIL	94.71	1 x 94.71	No Change
5.	Zinc Rich Dust (By-product)	TPA	6600	1 x 6600	NIL	NIL	6600	1 x 6600	No Change
<b>Minor Metal Recovery Unit</b>									
1.	Lead Bullion / Lead Silver Cake / Lead Cake/Low Grade Lead Cake / Low Grade Lead Material (on Equivalent metal basis)	TPA	NIL	NIL	8873	1 x 8873	8873	1 x 8873	To be added
2.	Cadmium Sponge/ Cadmium Metal/ Low Grade Cadmium (on Equivalent metal basis)	TPA	NIL	NIL	3050	1 x 3050	3050	1 x 3050	To be added
3.	Cobalt / Cobalt Concentrate (on Equivalent metal basis)	TPA	NIL	NIL	50	1 x 50	50	1 x 50	To be added
4.	Ni cake / Ni Compounds (on Equivalent metal basis)	TPA	NIL	NIL	30	1 x 30	30	1 x 30	To be added
5.	Zn So4 Solution (on Equivalent metal basis)	TPA	NIL	NIL	2781	1 x 2781	2781	1 x 2781	To be added
6.	CuSO4 Solution/ Copper Cement/ CU Matte (on Equivalent metal basis)	TPA	NIL	NIL	2436	1 x 2436	2436	1 x 2436	To be added

**Table – 2.2 (B)**  
**Product - wise project proposal**

S. No.	Products	Unit	Production capacity															Remarks
			Existing granted					Additional					Total after expansion					
			Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	
Products																		
1.	Refined Lead/Lead	TPA	35,000	-	-	60,000	95,000	1,05,000	-	-	NIL	1,05,000	140,000	-	-	60,000	2,00,000	Additional melting capacity by adding 1 furnace and 1 slab casting line in Hydro I and Max. Production achieved in Pyro will be 1,40,000 TPA
2.	Refined Zinc/Zinc	TPA	105,000	5,04,000		-	6,09,000	35,000	1,26,000		-	1,61,000		6,30,000		-	7,70,000	
	Total	TPA	140,000	5,04,000		60,000	7,04,000	1,40,000 (change in product mix only)	1,26,000		NIL	2,66,000	140,000	6,30,000		60,000	8,30,000	
Power																		
3.	CPP	MW	90#	154	100	NIL	254	NIL	36	NIL	NIL	36	90#	190	100	NIL	290	#Not Installed
4.	WHRB	MW	NIL	9.4	4.321	NIL	34.7	NIL	NIL	1.0	NIL	1.0	NIL	9.4	5.321	NIL	35.7	No Change
5.	Back Pressure Turbine Generator	MW	NIL	NIL	NIL	NIL	NIL	NIL	6	NIL	NIL	6	NIL	6	NIL	NIL	6	To be added
6.	DG Sets	KVA	NIL	1 x 750 1 x 1000	1 x 625 2 x 1250 1 x 125 2 x 9265	NIL	23530	1 x 625 1 x 1500 1 x 750	500 KVA	1 x 750	NIL	4125	1 x 625 1 x 1500 1 x 750	1 x 750 1 x 1000 1X500	1 x 625 2 x 1250 1 x 125 2 x 9265 1 x 750	NIL	27655	5 additional DG proposed
By Products																		

**Expansion within the existing Chanderiya Lead Zinc Smelter Complex**

At villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan)

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S. No.	Products	Unit	Production capacity															Remarks
			Existing granted					Additional					Total after expansion					
			Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	
7.	Sulphuric Acid	TPA	176,000	307774	307774	50500	842048	47505	NIL	NIL	NIL	47505	223505	307774	19624	50500	889553	Increase in acid production in Pyro
8.	Zn-Cd Alloy /Cadmium Metal/Cadmium Sponge (on equivalent cadmium basis) (By-product)	TPA	375	680	680	NIL	1,735	222	NIL	NIL	NIL	222	597	680	680	NIL	1957	To be increased in Pyro
9.	Copper Matte / Cu residue/ Copper cement / Copper Compounds / Copper (on equivalent copper basis)	TPA	2100	510	510	NIL	3120	1238	NIL	NIL	NIL	1238	3338	510	510	NIL	4,358	To be increased in Pyro
10.	Copper Sulphate (By-product)		NIL	NIL	NIL	7920	7920	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	7920	7,920	No Change
11.	Silver (on equivalent silver basis) (By-product)	TPA	74	NIL	NIL	94.71	168.71	728.29	NIL	NIL	NIL	728.29	802.29	NIL	NIL	94.71	897	To be increased in Pyro
12.	Antimony Slag / Antimony Trioxide(Sb2O3) (on equivalent Antimony basis)	TPA	NIL	NIL	NIL	NIL	NIL	992	NIL	NIL	NIL	992	992	NIL	NIL	NIL	992	To be added
13.	Zinc Rich dust	TPA	NIL	NIL	NIL	6600	6600	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	6600	6,600	No Change
14.	Calomel/ Mercury Chloride/ Mercury Sludge (By-Product)	TPA	NIL	20	20	NIL	40	14.8	NIL	NIL	NIL	14.8	14.8	20	20	NIL	54.8	To be increased in Pyro

**Expansion within the existing Chanderiya Lead Zinc Smelter Complex**

At villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan)

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S. No.	Products	Unit	Production capacity															Remarks
			Existing granted					Additional					Total after expansion					
			Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	
15.	Low Grade Lead Concentrate /	TPA	NIL	30,000	NIL	NIL	30,000	NIL	NIL	NIL	NIL	NIL	NIL	30,000	NIL	NIL	30,000	No change
16.	Lead Silver Cake	TPA	NIL	NIL	16,000	NIL	16,000	NIL	NIL	16000	NIL	16,000	NIL	NIL	32000	NIL	32,000	To be increased in Hydro II
17.	Copper Speiss/ Copper Residue (By-product)	TPA	NIL	NIL	700	NIL	700	NIL	NIL	500	NIL	500	NIL	NIL	1200	NIL	1,200	To be increased in Hydro II
18.	Lead Oxide / Concentrate	TPA	NIL	NIL	NIL	NIL	NIL	20,000	NIL	NIL	NIL	20,000	20000	NIL	NIL	NIL	20,000	To be added
19.	Sodium Chloride	TPA	NIL	250	250	NIL	500	NIL	NIL	NIL	NIL	NIL	NIL	250	250	NIL	500	No change
20.	Sodium Sulphate	TPA	NIL	1250	1250	NIL	2500	NIL	NIL	NIL	NIL	NIL	NIL	1250	1250	NIL	2500	No change

**Minor Metal Unit**

S. No.	Products	Unit	Production capacity			Remarks
			Existing granted	Additional	Total after expansion	
21.	Lead Bullion / Lead Silver Cake / Lead Cake/Low Grade Lead Cake / Low Grade Lead Material (on Equivalent metal basis )	TP A	NIL	8873	8873	The products of the Minor Metal Complex will be reprocessed at Chanderiya
22.	Cadmium Sponge/ Cadmium Metal/ Low Grade Cadmium (on Equivalent metal basis )	TP A	NIL	3050	3050	Lead Zinc Complex in Pyro and Hydro Metallurgical
23.	Cobalt / Cobalt Concentrate (on	TP A	NIL	50	50	Smelter Unit without



**Expansion within the existing Chanderiya Lead Zinc Smelter Complex**

At villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan)

Chapter - 2 of Final EIA / EMP Report

S. No.	Products	Unit	Production capacity															Remarks
			Existing granted					Additional					Total after expansion					
			Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	
	Equivalent metal basis )																	increasing overall Metal capacity proposed herewith in this proposal. Thus overall reducing the Waste generation and disposal.
24.	Ni cake / Ni Compounds (on Equivalent metal basis )	TP A	NIL					30					30					
25.	Zn So4 Solution (on Equivalent metal basis )	TP A	NIL					2781					2781					
26.	CuSO4 Solution/ Copper Cement/ CU Matte (on Equivalent metal basis )	TP A	NIL					2436					2436					

**Table - 2.3**  
**Magnitude of Operation in terms of Cost**

S. No.	Particular	Details
<b>A.</b>	<b>Cost Details</b>	
1.	Total Cost for the Project	Rs. 786 Crores/-
2.	Cost for Environmental Protection Measures	Capital Cost: Rs. 120.05 Crores/- Recurring Cost: Rs. 15.14 Crores/annum
<b>B</b>	<b>No. of working days</b>	Working days are 365days/annum. However, production days varies from 300- 350 days/ annum

#### **Facilities / Activities Proposed**

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

**Table - 2.4**  
**Scope of Proposed Expansion Project**

Unit	Major facilities and associated activities proposed
Pyro Metallurgical Lead Zinc Smelter Unit	<ul style="list-style-type: none"> <li>– Additional 100 KT Lead Refinery Unit</li> <li>– {Lead Refinery Plant }</li> <li>– 07 no. of kettles in lead refinery plant</li> <li>– Three DG - 1X625 kVA, 1X1500 kVA &amp; 1x750 kVA</li> <li>– Fuel Change to PNG [Piped Natural Gas].</li> </ul>
RZO Unit	<ul style="list-style-type: none"> <li>– 35000 TPA</li> </ul>
Additional Melting Casting Line	<ul style="list-style-type: none"> <li>– 1,75,000TPA</li> <li>– 1 DG- 750 KVA</li> <li>– 1 MW increase in WHRB</li> </ul>
Minor Metal Recovery	<ul style="list-style-type: none"> <li>– Cadmium Recovery Unit: 2470 TPA</li> <li>– PF Cake Unit for recovery of Copper as Metal / Sulphate / Copper Cement: 960 TPA</li> <li>– Cobalt &amp; Nickle Recovery Unit               <ul style="list-style-type: none"> <li>○ Cobalt: 50 TPA</li> <li>○ Nickle: 30 TPA</li> </ul> </li> <li>– Boiler (5 TPH)</li> </ul>
Captive Power Plant	<ul style="list-style-type: none"> <li>– Capacity Enhancement in Unit 1 &amp; 2 from 154 MW (2X77 MW) to 190 MW (2X95 MW) through Efficiency and Modernization of Turbine internal and rotor,</li> <li>– FGD and its associated Facilities,</li> <li>– 500 KVA DG Set for FGD and</li> <li>– BPTG of 6 MW.</li> </ul>

## **2.5 REQUIREMENTS FOR THE PROJECT**

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

### **2.5.1 Raw Material Requirement**

Major raw material required for Zinc and Lead production is Zinc concentrate, Lead concentrate, Coal, Limestone and various additives Fuel etc. Details regarding quantity of raw materials, their source

along with distance and mode of transportation are given in Table - 2.5.

**Table - 2.5**  
**Raw Material Requirement& Additives Requirement– CLZS Complex**

S. No.	Particular	UNIT	Quantity			Probable transportation	
			Existing	Additional	Total After expansion	Source	Distance and mode
Zinc Lead Smelter Plant (Pyro Plant+ Ausmelt)							
1.	Zinc concentrate	TPA	199500	58000	257500	HZL mines-RA, SK & Zawar mines	~200 km Through Trucks
2.	Lead concentrate	TPA	138500	196500	335000	HZL mines-RA, SK & Zawar mines	~200 km Through Trucks
3.	Coke	TPA	100000	NIL	100000	Indigenous /imported	~1500 km Through Rail / Trucks
4.	Lime Stone	TPA	45000	NIL	45000	Nearby Mines	~250 km Through Trucks
5.	Iron ore /Iron Oxide	TPA	30000	NIL	30000	Mines India	~1000 km Through Trucks
6.	Zinc Oxide /Zinc Dust /Zinc Bearing material/ Zinc Dross	TPA	NIL	50000	50000	Market/ HZL Smelters / From authorised recyclers	~ 200 km Through Trucks
7.	Lead Oxide / Lead Silver Cake / Low Grade Lead Material / Lead Bearing Outsourced Secondaries	TPA	NIL	50000	50000	Market/ HZL Smelters / From authorised recyclers	~ 200 km Through Trucks
8.	Silica	MT	3600	NIL	3600	Nearby Mines	~150 km Through Trucks
9.	Coal/ Coke	MT	1500	NIL	1500	Indigenous /imported	~1500 km Through Rail / Trucks
10.	Dolomite	MT	1700	NIL	1700	Nearby Mines	~150 km Through Trucks
Hydro I & Hydro-II (Incl. Fumer plant) and CPP							
1.	Zinc concentrate	TPA	698458	NIL	698458	HZL mines-RA, SK & Zawar mines	~200 km Through Trucks
2.	Calcine (ZnO)	TPA	337990	8916	346906	HZL Smelters	~200 km Through Trucks
3.	Zinc Dross/ Ash/ Zinc bearing waste	TPA	15000	NIL	15000	Market/ HZL Smelters / From authorised recyclers	~200 km Through Trucks
4.	Aluminium Metal	TPA	4800	NIL	4800	Market	~200 km Through Trucks
5.	Magnesium Metal	TPA	60	NIL	60	Market	~200 km Through Trucks
6.	Copper Metal	TPA	600	NIL	600	Market	~200 km Through Trucks

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S. No.	Particular	UNIT	Quantity			Probable transportation	
			Existing	Additional	Total After expansion	Source	Distance and mode
7.	Limestone for FGD	TPA	NIL	131465	131465	Nearby Mines	~200 km Through Trucks
8.	Zinc Cathode	TPA	NIL	200000	200000	HZL Smelter	~200 km Through Trucks
9.	Raw Zinc Oxide(RZO) / ZnO Dust/ Zinc Oxide/Zinc Bearing Material	TPA	NIL	45000	45000	HZL Smelter	~200 km Through Trucks
10.	Limestone chips	TPA	NIL	25000	25000	Nearby Mines	~250 km Through Trucks
11.	De- Fluorinating Agent	TPA	NIL	550	550	Imported/Indigenous	~1500 km Through Rail / Trucks
<b>Minor Metal Unit</b>							
12.	PF Cake	TPA	NIL	8800	8800	HZL Smelter	Captive / 200 km, through Trucks
13.	Cadmium Sponge	TPA	NIL	4000	4000	HZL Smelter	Captive / 200 km, through Trucks
14.	Copper Matte	TPA	NIL	3500	3500	HZL Smelter	Captive / 200 km, through Trucks
15.	Cobalt Cake	TPA	NIL	2000	2000	HZL Smelter	Captive / 200 km, through Trucks
16.	Copper Dross	TPA	NIL	12000	12000	HZL Smelter	Captive / 200 km, through Trucks
17.	Coal	TPA	NIL	1480	1480	HZL Smelter	Approx. 1500kms Through Trucks
18.	Zinc Dust	TPA	NIL	2210	2210	HZL Smelter	Captive / 200 km, through Trucks
19.	Sulphuric Acid	TPA	NIL	6500	6500	HZL Smelter	Captive through pipeline; 200 km, through Tankers

Source: Pre-feasibility Report

**Mass Balance Diagram**

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



Table – 2.6

## Combined Mass and Material balance for Zinc Lead Smelter Plant (Pyro Plant)&amp; Ausmelt Lead Plant

Category	Material Name	UOM	Case :1 (Zinc/Lead metal : 105 K/95 K)	Case :2 (Zinc/Lead metal : 140 K/60 K)	Case :3 (Zinc/Lead metal : 0 K/200 K)	CTO Qty.- To be Applied
Input	Zinc Concentrate	TPA	174000	257500	0	257500
Input	Lead Concentrate	TPA	132500	69000	335000	335000
Input	Lead Oxide / Lead Silver Cake / Low Grade Lead Material / Lead Bearing Outsourced Secondaries	TPA	50000	50000	50000	50000
Input	Zinc Oxide	TPA	50000	50000	0	50000
Waste	ISF Slag	TPA	85000	110000	140000	140000
Waste	Ausmelt Slag	TPA	26000	26000	26000	26000
Waste	ETP Sludge	TPA	5400	5400	5400	5400
Hazardous Waste	HGP Cake/HGP Dust	TPA	7500	7500	5740	7500
Hazardous Waste	ISF Dross	TPA	10000	10000	10000	10000
By Product	Antimony Slag/ Antimony Trioxide(Sb <sub>2</sub> O <sub>3</sub> ) (on equivalent Antimony basis)	TPA	407	226	992	992
By Product	Lead Oxide/ Conc.	TPA	20000	20000	12000	20000
By Product	Copper Matte / Copper Metal (on equivalent copper basis)	TPA	1825	1378	3338	3338
By Product	Zn-Cd Alloy / Cadmium Metal (on equivalent cadmium basis)	TPA	375	597	0	597
By Product	Calomel [ Mercury Sludge]	TPA	11.0	10.8	14.8	14.8
By Product	Copper Sulphate	TPA	7920	7920	7920	7920
By Product	Silver	TPA	386	228	897	897
By Product	Sulphuric Acid	TPA	226806	274005	153685	274005
By Product	Zn Rich Dust	TPA	6600	6600	6600	6600

Category	Material Name	UOM	Case :1 (Zinc/Lead metal : 105 K/95 K)	Case :2 (Zinc/Lead metal : 140 K/60 K)	Case :3 (Zinc/Lead metal : 0 K/200 K)	CTO Qty.- To be Applied
Product	Refined Zinc	TPA	105000	140000	0	0 to 140000
Product	Refined Lead	TPA	95000	60000	200000	60000 to 200000

Table – 2.7

## Minor Metal Recovery from Pyro Plant &amp; Ausmelt Lead Plant

Category	Description	CTO-Qty. (MTPA)	By Product Name	Qty.-MTPA	% Sb	Eq. Sb-MTPA
By Product	Antimony Slag/Antimony Trioxide(Sb2O3) (on equivalent Antimony basis)	992	Antimony Slag	4010	20	802
			Antimony Trioxide	190	99.9	190
					Total	992
Category	Description	CTO-Qty. (MTPA)	By Product Name	Qty.-MTPA	% Zn	% Pb
By Product	Lead Oxide/ Conc.	20000	Lead Oxide/ Conc.	20000	20	55
Category	Description	CTO-Qty. (MTPA)	By Product Name	Qty.-MTPA	% Cu	Eq. Cu-MTPA
By Product	Copper Matte / Copper Metal (on equivalent copper basis)	3338	Copper Matte	4950	25.0	1238
			Copper	2100	99.99	2100
					Total	3338
Category	Description	CTO-Qty. (MTPA)	By Product Name	Qty.-MTPA	% Cd	Eq. Cd-MTPA
By Product	Zn-Cd Alloy / Cadmium(on equivalent cadmium basis)	597	Zn-Cd Alloy	1480	15.0	222
			Cadmium	375	99.99	375
					Total	597
Category	Description	CTO-Qty. (MTPA)	By Product Name	Qty.-MTPA	% Hg	-
By Product	Calomel [ Mercury Sludge]	14.8	Calomel [ Mercury Sludge]	14.8	91.0	

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Category	Description	CTO-Qty. (MTPA)	By Product Name	Qty.-MTPA	% Sb	Eq. Sb-MTPA
Category	Description	CTO-Qty. (MTPA)	By Product Name	Qty.-MTPA	% Cu	-
By Product	Copper Sulphate	7920	Copper Sulphate	7920	4.0	
Category	Description	CTO-Qty. (MTPA)	By Product Name	Qty.-MTPA	% Ag	-
By Product	Silver	897	Silver	897	99.99	
Category	Description	CTO-Qty. (MTPA)	By Product Name	Qty.-MTPA	% Zn	% Pb
By Product	Zn Rich Dust	6600	Zn Rich Dust	6600	20	50

Table – 2.8

**Mass and Material balance for Existing Hydro Zinc Smelter Unit (I & II)**

Hydro Balance with Fumer/RZO and Ancillary Integration	Material Balance	Qty	Grade %	Metal
A	Zn Concentrate (R1 and R2)	667066	50%	333533
B	Calcine Production(R1 and R2)	581148	56%	325443
C	Calcine Receipt from other Unit	306727	56%	171767
D	Zn Cathode receipt from other unit (max)	133500	100%	133500
E	RZO	45000	50%	22500
F	Zinc sulphate solution(Ancillary)	19093	14%	2673
Total Input				655883
Total Output(Zinc ingot)				634469
E	Jarosite	106217	3%	3186.51
F	PF Cake	1931	35%	676
G	ETP Losses	9600	4%	384
H	Anode Mud	2200	35%	770

Hydro Balance with Fumer/RZO and Ancillary Integration	Material Balance	Qty	Grade %	Metal
I	Cooler Cake	5000	35%	1750
J	Cobalt Cake	1000	35%	350
K	Fumer Slag	0	2%	0
L	Lead Silver Cake	16000	6%	960
M	Copper speiss/Copper residue	700	9%	63
N	Fumer Slag	150000	2%	3000
O	Geothite cake	5640	6%	338
P	Deflourination cake	500	7%	35
Q	Zn Dross	8010	85%	6809
R	Cd sponge	3114	7%	217.98
S	Cobalt cake	1760	11%	193.6
T	Lead Cake	792	1%	7.92
U	Zinc sulphate solution(Ancillary)	19093	14%	2673.02
Total Loss				21414.03
V	Sulphuric Acid	600850	MT	by product
X	Calomel	40	MT	by product

**Table – 2.9**  
**Mass and Material balance for Proposed Hydro Zinc Smelter Unit ( I & II)**

Proposal with Fumer	Material Balance	Qty	Grade %	Metal
A	Zn Concentrate	698458	50%	349229
B	Calcine Production	595364	56%	333404
C	Calcine Receipt from other Unit	297812	56%	166775



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Proposal with Fumer	Material Balance	Qty	Grade %	Metal
D	Zn Cathode receipt from other unit (max)	127000	100%	127000
E	Raw Zinc Oxide(RZO) / ZnO Dust/ Zinc Oxide/Zinc Bearing Material	45000	50%	22500
F	Zinc sulphate solution(Ancillary- MMC)	30000	14%	4200
<b>Total Input</b>				<b>653879</b>
<b>Total Output</b>				<b>630649</b>
E	Jarosite	200000	4%	8000
F	PF Cake	12520	32%	4006
G	ETP Losses	9600	2%	192
H	Anode Mud	2200	35%	770
I	Cooler Cake	5000	35%	1750
J	Cobalt Cake	1000	35%	350
K	Fumer Slag	143666	2.41%	3462
L	Goethite Cake	11471	14.5%	1663
M	Lead-silver cake	32000	8.7%	2784
N	De-Fluorination cake	600	23.38%	140
O	Copper cpeiss/Copper Residue	1200	9.43%	113.16
<b>Total Loss [ Hazardous Waste]</b>				<b>23230</b>

**Table – 2.10**  
**HYDRO BYPRODUCTS & NON HAZ WASTE**

S. No.	Material	Unit	Quantity
<b>By product</b>			
1	CADMIUM SPONGE	TPA	1360
2	COPPER CEMENT	TPA	1020

3	Low Grade Lead Concentrate	TPA	30000
4	SULPHURIC ACID	TPA	615548
5	COPPER SPEISS/COPPER RESIDUE	TPA	1200
6	Lead Silver Cake	TPA	32000
<b>Waste Non Hazardous</b>			
7	Fumer Slag	TPA	150000

Table-2.11

## Break up of quantity with concentration of Minor Metal Complex

S. No.	Description	Product Name	Qty (TPA)	Pb content	Pb (TPA)
1	Lead Bullion / Lead Silver Cake / Lead Cake/Low Grade Lead Cake / Low Grade Lead Material (on Equivalent metal basis)	Lead Bullion	8500 MTPA	96%	8160
		Lead-Silver Cake	792 MTPA	20%	158
		Low Grade Lead Cake	1400 MTPA	30%	420
		Low Grade Lead Material	300 MTPA	45%	135
				<b>Total</b>	<b>8873</b>
2	CuSO <sub>4</sub> Solution/ Copper Cement/ CU Matte (on Equivalent metal basis )			<b>Cu content</b>	<b>Cu (TPA)</b>
		CuSO <sub>4</sub> Solution	24000 Cu.M	60 gpl	1440
		Copper Cement	112 MTPA	32%	36
		Cu Matte	4500 MTPA	21%	945
				<b>Total</b>	<b>2421</b>
3	ZnSO <sub>4</sub> Solution (on Equivalent metal basis )			<b>Zn content</b>	<b>Zn (TPA)</b>
		ZnSO <sub>4</sub> solution	26815 Cu.M	140 gpl	3754
				<b>Total</b>	<b>3754</b>
4	Cadmium Sponge/ Cadmium Metal/ Low Grade Cadmium (on Equivalent metal basis )			<b>Cd content</b>	<b>Cd (TPA)</b>
		Cadmium sponge	4000 MTPA	65%	2600
		Cadmium metal	2600 MTPA	100.00%	
		Low Grade Cadmium	2550 MTPA	17.63%	450
				<b>Total</b>	<b>5650</b>
5	Description	Product Name	Qty (TPA)	Co content	Co (TPA)

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	Cobalt / Cobalt Concentrate (on Equivalent metal basis )	Cobalt	3300 MTPA	1.50%	50
		Cobalt concentrate	167 MTPA	30%	
				Total	100
6	<b>Description</b>	<b>Product Name</b>	<b>Qty (TPA)</b>	<b>Ni content</b>	<b>Ni (TPA)</b>
	Ni cake / Ni Compounds (on Equivalent metal basis)	Nickel cake/ Ni Compounds	200 MTPA	15.00%	30
			Total		30

### 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 - 2.12.

**Table - 2.12**  
**Unit-Wise Fuel Requirement– CLZS Complex**

S. No.	Particular	Unit	Quantity			Probable transportation	
			Existing	Additio nal	Total After expansion	Source	Distance and mode
Pyro Metallurgical Smelter and Ausmelt Lead Smelter Unit							
1.	Fuel HSD/LDO/Propane	KLA	24000	NIL	24000	IOCL / Reliance, Gujarat Based Refinery	~1000 km, through Tankers
2.	PNG	SCM/day	50000	6000	56000	GAIL, Adani Gas, other suppliers	~ 2 km, through Pipeline
Hydro Metallurgical Smelter Unit [I & Hydro-II]							
1.	LPG	Kg/day	221	NIL	221	IOCL / Reliance, Gujarat Based Refinery	~1000 km, through Tankers
2.	Oil	KLA	41.4	NIL	41.4	IOCL / Reliance, Gujarat Based Refinery	~1000 km, through Tankers
3.	HSD/LDO	KLA	956	2000	2956	IOCL / Reliance, Gujarat Based Refinery	~1000 km, through Tankers
4.	PNG	SCM/ day	3500	1500	5000	GAIL, Adani Gas, other suppliers	~ 2 km, through Pipeline
5.	Imported Coal (for Fumer)	TPA	132000	18000	150000	Australia/Indonesian/Russia /SA via Gujarat Port	~1000 km, through Rail / Trucks
Captive Power Plant [254 MW to 290 MW]							
6.	Imported Coal/ Indian Coal for CPP	TPA	1204500	688855	1893355	Australia/Indonesian/Russia /SA /WCL/ACCL/	~1000 km, through Rail /Trucks
7.	HSD/LDO	KLA	508	Nil	508	IOCL / Reliance, Gujarat Based Refinery	~1000 km, through Rail /Trucks
DG Sets [ Pyro +Hydro]							
1.	LDO /HSD /PROPANE	KLA	4800	1200	6000	IOCL / Reliance, Gujarat Based Refinery	~1000 km, through Trucks
Minor Metal Unit							
2.	LDO/HSD for Boiler (5 TPH)	KLA	NIL	1740	1740	IOCL / Reliance, Gujarat Based Refinery	~1000 km, through Trucks

Source: Pre-feasibility Report

### 2.5.3 Other Basic Requirement

Other basic requirements for the proposed expansion project are given in Table - 2.13 (A).

**Table - 2.13 (A)**  
**Basic Requirements for the Project**

Particular	Requirement			Source
	Existing	Proposed	Total after expansion	
Water (KLD)	38570	500	39070	Gosunda Dam (Captive) / Proposed STP Chittorgarh / Udaipur/ other proposed STP's (Recycled Water)
Power (MW)	260	48	308	Captive Power Plant/WHRS/ Solar Panels /AVVNL/BPTG



Particular	Requirement			Source
	Existing	Proposed	Total after expansion	
Steam (TPH)	1210.4	5	1215.4	CPP 1, CPP 2, CPP 3 WHRB 1, WHRB 2, Roof Top Solar panels, Fumer/State Grid (AVVNL)/New Boiler
Manpower (No. of Persons)	2919	360	3279	Local/Outside

Source: Pre-feasibility Report

### 2.5.3.1 Water Requirement

Existing Water requirement for the project is 38570 KLD. After the expansion project, 500 KLD additional water will be required for the Minor Metal Unit which will be sourced from RO permeate water from ETP. Therefore, no additional Fresh Water will be required for the proposed expansion project.

The water is being / will be sourced from Gosunda Dam (Fresh Water) & Proposed STP Chittorgarh/ Udaipur/ other proposed STP's (Recycled Water). 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 CLZS Complex are given as under:

- Letter reg. allocation of water (1500 MCFT) from Gosunda Dam obtained from Energy Dept., Govt. of Rajasthan vide letter no. F 2(28) Energy/86-IV/ dated 19.11.1994. (**Annexure 6a**).
- Agreement signed between Municipal Corporation Udaipur, Urban Improvement Trust, Udaipur and Hindustan Zinc Ltd. on 09.05.2021 for supply of treated water from Proposed STP (20 MLD) at Udaipur (**Annexure 6b**).
- 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 6c**).
- Agreement between Nagar Parishad, Chittorgarh and Hindustan Zinc Ltd. on 05.01.2021 for supply of Treated water (3000 KLD) from STP at Chittorgarh (**Annexure 6d**).

Break-up of the water requirement is given in Table - 2.13 B and Water Balance Diagram is given in Figure - 2.6.

**Table - 2.13 (B)**  
**Water Requirement Break-up for CLZS Complex (in KLD)**

Unit	Water Requirement (KLD)			Source
	Existing	Additional	Total after expansion	
Pyro	5600	NIL	5600	Gosunda Dam (Captive) / Proposed STP Chittorgarh / Udaipur/ other proposed STP's (Recycled Water)
Ausmelt	2300	NIL	2300	
Hydro	8670	NIL	8670	
CPP [Unit 1/2/3]	22000	NIL	22000	
Minor Metal	NIL	500	500	
<b>Total for CLZS Complex</b>	<b>38570</b>	<b>500</b>	<b>39070</b>	

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Unit	Water Requirement (KLD)			Source
	Existing	Additional	Total after expansion	
Proposed Fertilizer Plant	NIL	10100	10100	Gosunda dam, STP Udaipur & Proposed STP Chittorgarh.
<b>Grand Total</b>	38570	10600	49170	

Source: Pre-feasibility Report

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

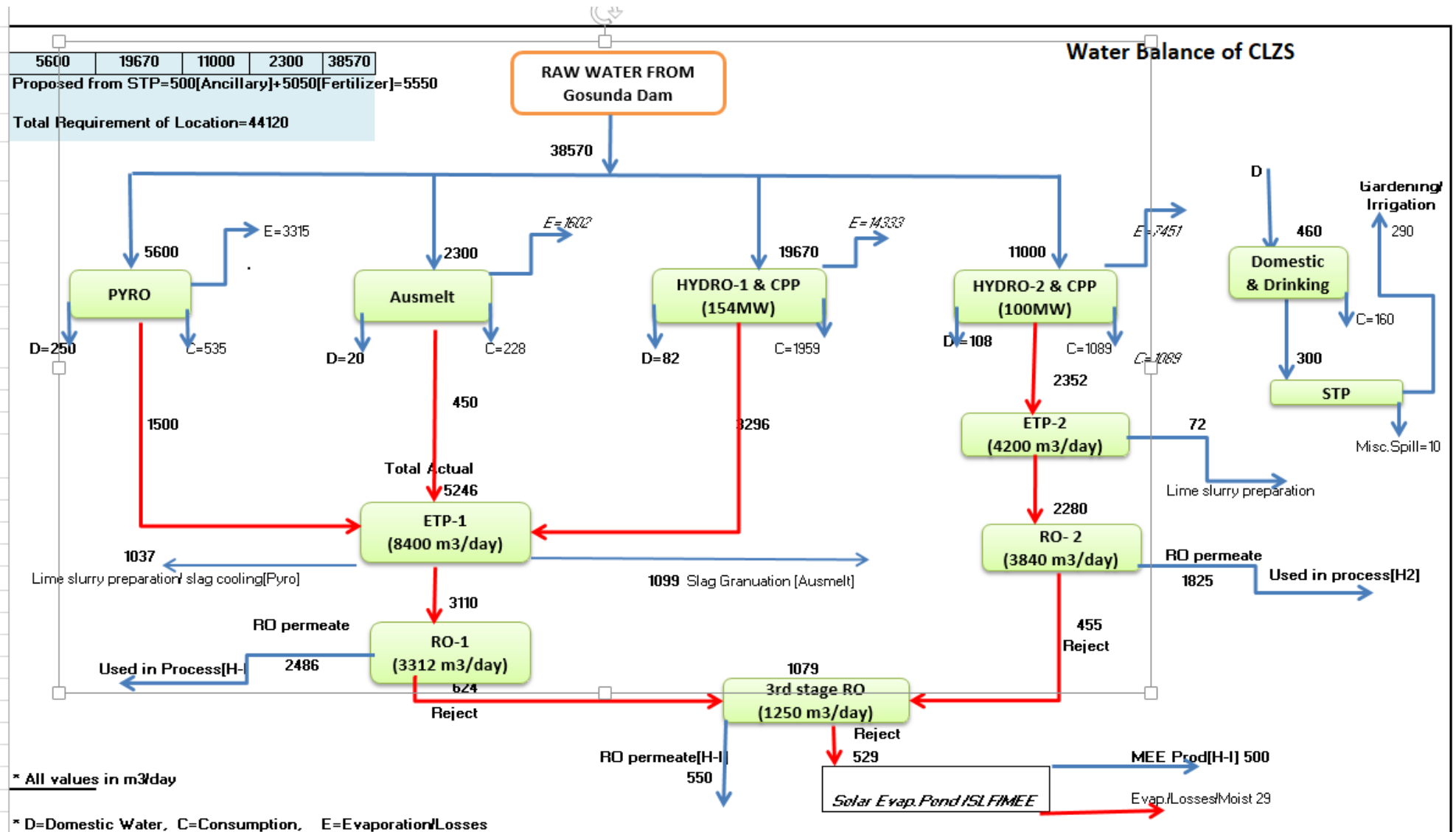


Figure 2.6: Water Balance Diagram

#### 2.5.4 Power Requirement

Existing Total Power requirement of the Chanderiya Lead Zinc Smelter Complex is 260 MW. The same is being sourced from existing CPPs (154 MW & 100 MW) and WHRS of 34.70 MW capacity, Solar Panels located within the complex & AVVNL. 8 DG Sets are available for back up and emergency purpose with capacity as 38.34at CLZS Complex. 48 MW additional power will be required for the expansion project, which will be fulfilled from the existing sources and Proposed CPP expansion from 254 MW to 290 MW and BPTG. 5 DG Sets (1 x 625 kVA, 1 x 1500 kVA, 1 x 750 kVA at Pyro Plant; 500 KVA at CPP; 1 x 750 kVA at Hydro II) have been proposed for back up and emergency purpose within the CLZS Complex.

Details reg. power requirement is given in Table - 2.14 (A) & 2.14 (B).

**Table - 2.14 (A)**  
**Power Generation (MW)**

S. No.	Source	Existing	Additional	Total after expansion
1.	CPP 1	77	18	95
2.	CPP 2	77	18	95
3.	CPP 3	100	0	100
4.	WHRB 1	9.4	0	9.4
5.	WHRB 2	4.3	1	5.3
6.	Solar	0.9	0	0.9
7.	Fumer (WHRB)	21	0	21
8.	BPTG	0	6	6
9.	Boiler	0	0	0
	Total	289.6	43	332.6

**Table - 2.14 (B)**  
**Power Requirement**

Unit	Power Requirement (MW)			Source
	Existing	Additional	Total after expansion	
Pyro	15.5	6	21.5	CPP 1, CPP 2, CPP 3 WHRB 1, WHRB 2, Solar panels, Fumer/State Grid (AVVNL)
Ausmelt	4.5	NIL	4.5	
Hydro [I&II]	220	17	237	
CPP (254 MW)	20	5	25	
Minor Metal	NIL	20	20	
<b>Total for CLZS Complex</b>	<b>260</b>	<b>48</b>	<b>308</b>	
Proposed Fertilizer Plant	NIL	35	35	Existing CLZS CPP/ State Grid (AVVNL)
<b>Total</b>	<b>260</b>	<b>83</b>	<b>343</b>	

Source: Pre-feasibility Report

#### Energy Balance

Energy balance for the exiting & proposed power requirement is given in Table - 2.15 (a) & Table - 2.15 (b).



**Table - 2.15 (A)**  
**Energy Balance - Existing Capacity**

S. No.	Description	Capacity / Annum	Working Day	TPD	Running Hrs.	TPH	GJ/T	MW
1	Pyro Metallurgical Lead Zinc Smelter	105000 Zn 35000 Pb	340	411	24 hrs. per day	17.12	25	15.5
2	Ausmelt Lead Smelter	60000 TPA	330	182		7.5		4.5
	Hydro Metallurgical Zinc Smelter with Fumer	504000	340	1482		61.75	220	
4	Captive Power Plant	254(MW)	365	(Coal) 3300		-	-	20
5	WHRB + Solar	34.7(MW)	365			-	-	-
6	DG Set	38.34(MW)	Emergency Purpose					-
Total Power Requirement								260

**Table - 2.15 (B)**  
**Energy Balance - Proposed Capacity**

S. No.	Description	Capacity / Annum	Working Day	TPD	Running Hrs.	TPH	GJ/T	MW
1	Pyro Metallurgical Lead Zinc Smelter	140000	340	411	24 hrs. per day	17.12	20 to 25	15.5 + 6 * upcoming refinery
2	Ausmelt Lead Smelter	60000 TPA	330	182		7.5		4.5
	Hydro Metallurgical Zinc Smelter with Fumer with RZO Unit+ Additional Melting Casting Line	630000	340	1853		77.2		220 + 17
3	Minor Metal Recovery		330					20
4	Captive Power Plant	(290 MW)	365	(Coal) 5187		-	-	20 + 5
5	WHRB + Solar	35.7( MW)	365			-	-	0
6	DG Set	42.465(MW)	Emergency Purpose					0
7	Any other (Fertilizer)							35
<b>Total Power Requirement</b>								<b>343</b>

#### 2.5.5 Manpower Requirement

Existing manpower of the Chanderiya Zinc- Lead Smelter is 2919. Additional manpower of 360 persons will be required for the said 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 above, during implementation phase, around 360 Contractual workers will be employed for construction of proposed expansion.

Details regarding manpower requirement is given in Table - 2.16.

**Table - 2.16**  
**Manpower Requirement**

S. No.	Unit	EXISTING	ADDITIONAL	EXPANSION	Remarks
1.	Pyro Plant + Ausmelt)	774	150	924	New Addition
2.	Hydro-I & Hydro II (Including Fumer Plant)	1132	60	1192	For O&M+E&I manpower for new casting line
3.	CPP	262	0	262	No change
4.	Common / Enabling Function	751	0	751	No change
5.	Minor Metal Unit	0	150	150	New Addition
	<b>Total</b>	<b>2919</b>	<b>360</b>	<b>3279</b>	

Source: Pre-feasibility Report

#### 2.5.6 Steam Requirement

Existing steam requirement of the CLZS Complex is 1111.4 TPH. The same is being sourced from existing CPPs, WHRS and Fumer located within the complex. 5 TPH additional steam will be required in minor metal complex for the expansion project, which will be fulfilled from the proposed Boiler of 5 TPH capacity. The surplus steam of 60 TPH will be supplied to the proposed Fertilizer plant proposed in the nearby area of the Complex.

Details regarding manpower requirement is given in Table - 2.17 (A) & 2.17 (B).

**Table - 2.17 (A)**  
**Steam Generation**

S. No.	Source	Existing (TPH)	Additional (TPH)	Total after expansion (TPH)
1.	CPP 1	310	25	335
2.	CPP 2	310	25	335
3.	CPP 3	320	16	336
4.	WHRB 1	51.2	0	51.2
5.	WHRB 2	51.2	0	51.2
6.	Solar	0	0	0
7.	Fumer	168	0	168
8.	Boiler	0	5	5
	<b>Total</b>	<b>1210.4</b>	<b>71</b>	<b>1281.4</b>

**Table - 2.17 (B)**  
**Steam Requirement**

Unit	Steam Requirement (TPH)			Source
	Existing	Additional	Total after expansion	
Pyro	NIL	NIL	NIL	CPP 1, CPP 2, CPP 3 WHRB 1, WHRB 2, Roof Top Solar panels, Fumer/State Grid (AVVNL)/proposed boiler
Ausmelt	NIL	NIL	NIL	
Hydro [I&II]	270.4	NIL	270.4	
CPP (254 MW)	940	NIL	940	
Minor Metal	NIL	5	5	

Unit	Steam Requirement (TPH)			Source
	Existing	Additional	Total after expansion	
Mics. (Please specify, if any)	NIL	NIL	NIL	Balance steam from CLZS CPP
Total for CLZS	1210.4	5	1215.4	
Fertilizer Unit	Nil	60	60	
<b>Total</b>	<b>1210.4</b>	<b>65</b>	<b>1275.4</b>	

## INTERLINKED PROJECTS

Details of the interlinked projects are given as under:

**Table - 2.18**  
**Interlinked Projects**

S. No.	Name of the Interlinked projects of Hindustan Zinc Ltd.	Purpose	EC details
1.	Proposed Ammonium Phosphate Fertilizer Complex of 1.02 MTPA (2 x 0.51 MTPA) at village Biliya, Tehsil & District Chittorgarh, Rajasthan	Due to the Procurement of Sulphuric Acid, steam, power and water from existing CLZS Complex	Vide letter F.No. J-11011/350/2016-IA.II (I) dated 05.01.2021.
2.	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 Lead – 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
3.	Kayad Lead Zinc Ore Mine (Expansion of Lead-Zinc Ore Production from 1.0 MTPA to 1.2 MTPA (ML Area- 480.45 ha) at Village & Tehsil- Kayad, District- Ajmer, Rajasthan		Vide letter no. J-11015/47/2012-IA.II (M) dated 05.02.2018)
4.	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, District Rajsamand, Rajasthan		Vide letter no. J-11015/84/2018-IA.II (M) dated 13.04.2020)
5.	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		Vide letter no. J-11015/259/2012-IA.II(M) dated 16.10.2020)

S. No.	Name of the Interlinked projects of Hindustan Zinc Ltd.	Purpose	EC details
	Area- 3620 ha) at village-Zawar, Tehsil- Girwa and Sarada, District-Udaipur, Rajasthan		
6.	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).
7.	Dariba Smelter Complex {Zinc Smelter (2,50,000 TPA), Lead Smelter (1,25,000 TPA), Captive Power Plant (2x85 MW) at Village & Post Dariba, Tehsil Relmagra, District Rajsamand, Rajasthan by Hindustan Zinc Ltd.	Exchange of Calcine & Lead – Zinc Secondaries for reprocessing / metal recovery.	Vide Letter No. J-11011/380/2008-IA II (I) dated 4.11.2009.
8.	Zinc Smelter Debari (Expansion of Zinc Smelter from 80,000 TPA to 1,00,000 TPA) at Village Debari, Udaipur, Rajasthan by Hindustan Zinc Ltd.		Vide letter no. J-11011/479/2006-IA II (I) dated 25.03.2008
9.	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/Lead 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 / Lead Secondaries supplied to the CLZS Complex.	Vide letter no. 10-9(10)/2018 dated 08.02.2019.

## 2.6 PROPOSED SCHEDULE FOR APPROVAL AND IMPLEMENTATION

The project commissioning activities will be started after obtaining all necessary statutory clearances and approvals (including Environmental Clearance (EC) from the MoEFCC, New Delhi, Consent to Establish / Consent to Operate & Hazardous waste Authorization from RSPCB etc.) and the expansion project will be completed within three years.

## 2.7 TECHNOLOGY AND PROCESS DESCRIPTION

The plant consists of the various units as given under:

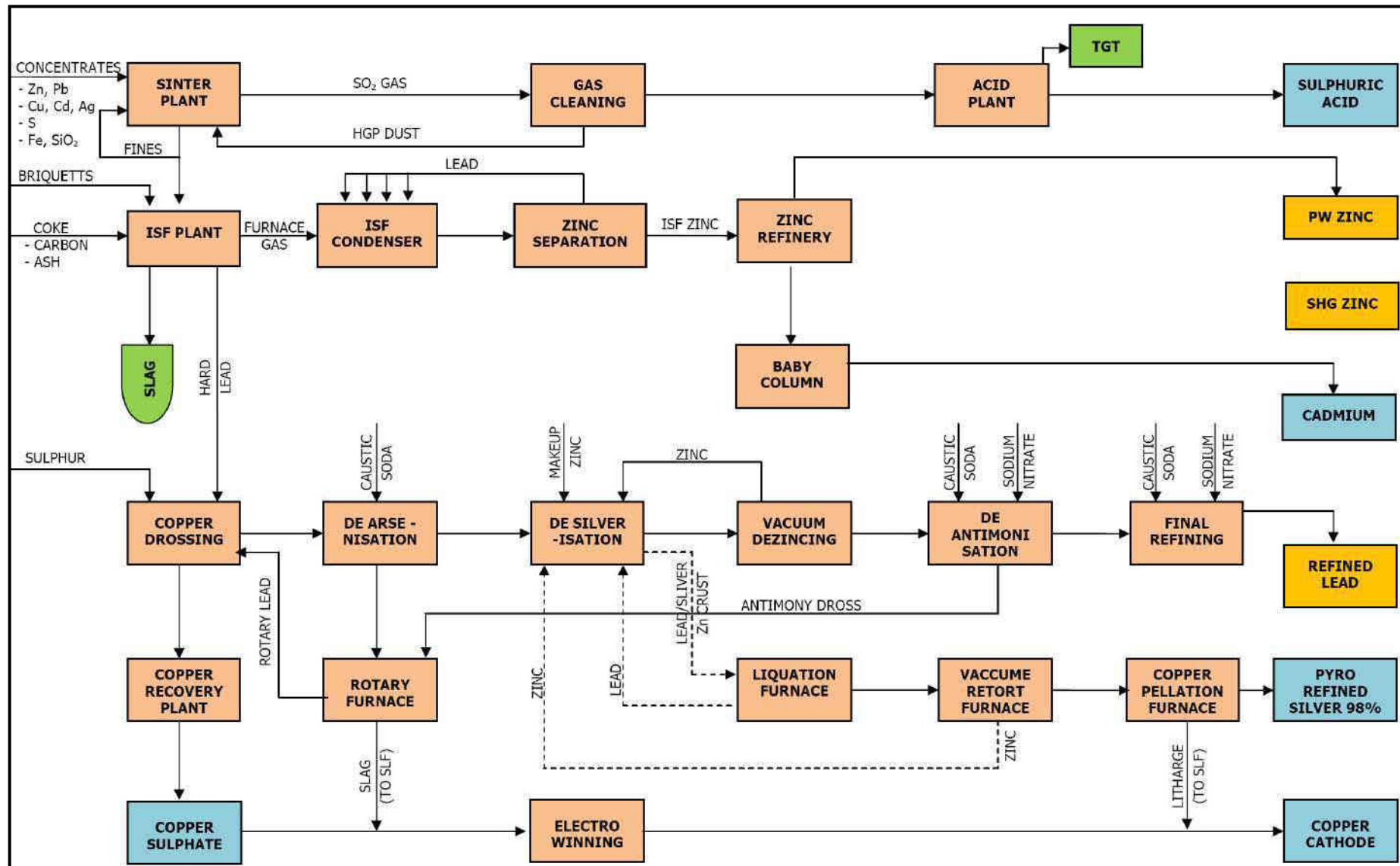
- Pyro Plant and Ausmelt Plant
- Hydro-I Unit
- Hydro-II Unit with Fumer
- Captive Power Plant Unit
- Minor Metal Complex



### 2.7.1 PROCESS DESCRIPTION OF PYRO METTALURGICAL LEAD ZINC SMELTER

Pyro metallurgical plant is based on Imperial smelting process. Imperial Smelting Process enables simultaneous production of Zinc and Lead metals through Pyro-metallurgical process route. The main sections for this process route are Sinter, Imperial Smelting Furnace (ISF) and Refineries. The various process steps in Lead-Zinc smelter comprise of:

- Sintering of Lead-Zinc Concentrates and Oxides in Updraft Sinter Machine;
- Reduction of Sinter to lead Bullion and Furnace Zinc in Imperial Smelting Furnace (ISF);
- Pyro-refining of Furnace Zinc to PW (Prime Western Brand) Zinc (98.65% purity) and SHG (Special High Grade) Zinc (99.99% purity);
- Pyro-refining of Lead;
- Recovery of Cadmium;
- Recovery of Copper;
- Processing of SO<sub>2</sub> gases from sinter plant to produce Sulphuric Acid; and
- Recovery of Silver.



The purpose of sintering is to prepare a solid charge for the ISF having the following properties:

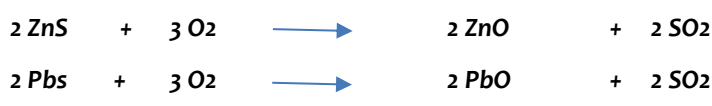
- Porous agglomerate mass with consistency in chemical composition
- Good handling characteristics to prevent disintegration of sinter lumps during handling and its descent in furnace shaft
- Minimum Sulphide sulfur content

The above objectives are met by an updraft sinter machine, having 120 m<sup>2</sup> effective sintering area, based on 1.6 tonnes/ m<sup>2</sup>/day Sulphur burning rate.

The facilities available at sinter plant are:

- Raw material stock yard with unloading station
- Charge preparation section having proportioning bins, mixing drums and conditioning drum
- Sinter machine and auxiliaries
- Sinter crushing, screening and return fines circuit

**The reactions taking place during sintering are as follows:**



### Charge Preparation

The concentrates, limestone, iron fluxes, & secondary (oxide material) are stored in proportioning bins of 50 m<sup>3</sup> capacity in sinter plant. In addition, two bins with a capacity of 25 m<sup>3</sup> each are provided for returned fines. The charge components are discharged from the proportioning bins in accurate amounts by means of micro processor controlled weigh-feeders, and fed to the mixing drum by a common belt conveyor. After being mixed and moistened (water dosing) in the mixing drum, the charge is conveyed to conditioning drum for final rolling and conditioning. Second water dosing is applied to attain moisture content of about 4 to 5 %. The smelter has been designed to take care of the variations in the concentrate compositions.

Sintering is carried out continuously on conventional updraft sinter machine having an effective up-draft area of 120 m<sup>2</sup>.

The mixed and conditioned charge is fed to the machine to give ignition layer of about 40 mm thickness. As this charge moves on pallets, it gets ignited while passing under oil fired ignition hood. During this period, the direction of airflow is maintained downwards. After this layer passes thorough the ignition hood, bulk of the charge (main layer) is put on the top of the ignition layer and total bed depth is maintained at 300-400 mm. At this stage, direction of airflow is inverted and fresh air necessary for sintering, passes thorough sinter bed in upward direction enabling the glooming layer to ignite the main layer. The sinter gases containing SO<sub>2</sub> are drawn via the gas cleaning plant to the acid plant where these are converted into Sulphuric Acid.

### Sinter Crushing and Screening

The de-sulphurized and agglomerate sinter mix tips from the end of the sinter machine in massive lumps are crushed and sieved to a grain size of less than 130 mm. The fractions of 40 to 130 mm are conveyed to two sinter storage bins in ISF plant. The fine material fractions (8-40 mm grain size) are further crushed to less than 8 mm before being used as return fines.

### Gas Cleaning & Sulphuric Acid Plant

The hot waste gases containing 5-6 % of SO<sub>2</sub>, coming out of sinter machine, are made to pass through gas cleaning plant. It comprises a Hot Gas Electrostatic Precipitator, scrubbing tower, gas coolers and Wet Gas Electrostatic Precipitator before entering Sulphuric acid plant. The gas cleaning plant is designed for removal of impurities like fluorine dust and mist from gases. The process comprises following steps:

- Hot Gas precipitator- for removal of dust from gas
- Hot Gas washing- for cooling of gas and removal of dust
- Shell & tube Heat Exchangers- Star Cooler- for cooling of gases
- Fluorine Scrubber- for removal of fluorine from gas
- Wet Electrostatic precipitators- for removal of mist from gas
- Pre-drying tower-for partial removal of moisture

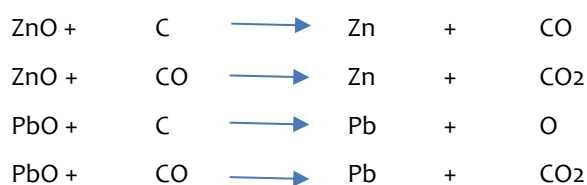
The cleaned gases pass through a highly efficient Double Conversion Double Absorption (DCDA) Sulfuric acid plant to produce Sulfuric acid. The SO<sub>2</sub> is scrubbed through Tail Gas Treatment plant before letting out to atmosphere. The detail process is given in next section below. The acid produced is stored in three storage tanks

### IMPERIAL SMELTING PROCESS: SIMULTANEOUS PRODUCTION OF ZINC & LEAD METAL

Imperial Smelting Furnace (ISF) plant comprises charge preparation and furnace charging, imperial smelting furnace, condenser, cowper stoves, gas washing and Low Calorific Value (LCV) gas distribution system and briquette plant.

The furnace has a 21.5 m<sup>2</sup> shaft area. The coke, preheated to 800°C, is fed, along with agglomerated hot sinter and other process wastes, at the top of the vertical shaft furnace through a double bell charging system. The blast preheated in Cowper stove to 1000°C is admitted through 18 water-cooled tyres at the bottom. The Cowper stove is heated by burning the waste LCV gases leaving the furnace. The furnace is designed to produce both Zinc and Lead metals together.

The reactions in the furnace are as follows:



**PRODUCTION OF ISF LEAD**

Molten Lead trickling down the bottom of the furnace is tapped together with a slag of molten gangue materials. Lead Bullion is separated from the slag in a fore hearth, which is granulated before disposal. Molten bullion is transferred by a ladle to Lead Refinery for production of 99.97% pure Lead.

**Production of ISF Zinc**

At the top of the furnace, Zinc vapours are shock cooled and absorbed in a spray of molten Lead in the condenser attached to ISF. Molten Lead containing absorbed Zinc is pumped out of the condenser into adjacent cooling launder where cooling is performed by water- cooled tubes immersed in the launder above. Molten Zinc-Lead is cooled down from 5300 °C to 4400 °C approximately, which is the temperature for separation of Zinc and Lead. The furnace Zinc thus, produced is sent to Zinc refinery for further refining/ purification.

The waste gases, leaving the condenser, pass into a gas cleaning system, where these are cooled and cleaned. Cleaned gases containing carbon-monoxide have a low calorific value (LCV), which is utilized for preheating the furnace blast air and coke.

**ZINC REFINERY**

The process of refining the Zinc metal in Zinc refinery is based on the differences in physical properties of metals such as volatilizing temperature, density, and solubility in different phases.

The Zinc metal produced in Imperial Smelting Furnace is refined by a process of distillation followed by condensation. The first distillation separates Zinc and Cadmium from a mixture containing the less volatile metals, whilst the second separates the Zinc from Cadmium. Cadmium is refined in campaigns in a separate unit called baby column; SHG quality Zinc is also obtained during refining. The plant comprises following facilities for production of GOB grade Zinc with 98.5% purity, SHG Zinc with 99.99% purity and Cadmium with 99.99% purity.

- Storage and feeding furnaces
- Lead and Cadmium column & baby column
- Liquation and holding furnaces
- Melting and casting arrangements

**LEAD & SILVER REFINERY**

Lead bullion from the furnace is transferred to lead refinery in a ladle of capacity of 10 Tonnes. The metal is refined by removing the impurities in the form of drosses by sequential kettle operations in batches. Refining of Lead bullion is based on MIM technology. First, the Copper from the Lead bullion is separated as dross using sawdust and pyrite. Copper free Lead bullion is treated with Caustic Soda to remove Arsenic from Lead. Silver skimming from Lead is carried out by mixing Zinc into the bath followed by cooling it up to 327°C. Zinc extraction from Lead is carried out using vacuum. Antimony is removed by adding Caustic Soda and Silver Nitrate. Silver crust is purified in Silver plant after Lead & Zinc removal using liquation and electric graphite crucible furnace. Using bottom- blown oxygen cupola furnace, balance impurities like Fe, Lead & Zinc are removed and + 98.5 % Silver is removed.



**COPPER RECOVERY PLANT**

The Copper dross are produced during de-copperization of furnace bullion. It is treated in a stirred batch reactor by an aerated ammonium carbonate solution with the addition of ammonia liquor and carbon dioxide. After leaching, the slurry is filtered in a filter press and the leachate passes to the leachate tank. Lead is present as a mixture of Lead oxide and Lead carbonate in the filter cake, the Lead content being approximately 70% on a dry weight basis. The filter cake is returned to the Sinter plant. Leachate is further filtered before treatment by solvent extraction to recover the Copper. Copper is extracted with MEX K2, a Copper specific diketenene liquid ion-exchange reagent in a hydrocarbon diluent, in two stages of mixer settler. The depleted aqueous phase or raffinate, containing approximately 1.5 g/l Copper is recycled to the leaching circuit for reuse in the leach reactor. The loaded organic is washed with dilute Sulfuric acid to remove impurities before being stripped with depleted electrolyte to remove Copper. The Copper enriched strong electrolyte passes to the electro-winning section in which cathode Copper is produced by electrolysis of the acidic copper sulphate solution. However, at present, the Copper Sulphate solution having 50-60 gpl of Copper is being produced.

**Table –2.19 (A)**  
**Details of Various Processes**

S. No	Existing Process	Proposed Process
1	Sinter and acid plant	Sinter and acid plant (No change)
2	Imperial Smelting Furnace (ISF)	Imperial Smelting Furnace (ISF) (No change)
3	Zinc refining process	Zinc refining process (No Change)
4	Lead refining Process	Lead refining process (No Change)
5	Silver Refining Process	Silver refining process (No change)

The Company is proposing change in product mix in Pyro Plant keeping the total metal production of lead and zinc at maximum 1,40,000 TPA based on availability of concentrate from the Mines.

We will achieve this by increasing the consumption of lead concentrate and reducing the zinc concentrate and further by sintering and smelting inputs materials like Lead Cake /Lead Secondaries/Zinc Oxide or WIP of ancillary units/our other HZL units/ or outsourcing we will be producing various by-products Lead Oxide Concentrate, Copper Matte / Cu residue/ Copper cement /Copper (on equivalent copper basis), Zn-Cd Alloy / Cadmium(on equivalent metal basis), Copper Sulphate, HGM (High Grade Metal), Sulphuric Acid, Calomel (Mercury Chloride) (By Product) and waste like HGP Dust etc. which will in turn be which will used by other recyclers and ancillary units.

The above activities will be envisaged after obtaining clearance from the concerned authority. Same will be completed within One Year after obtaining permission.

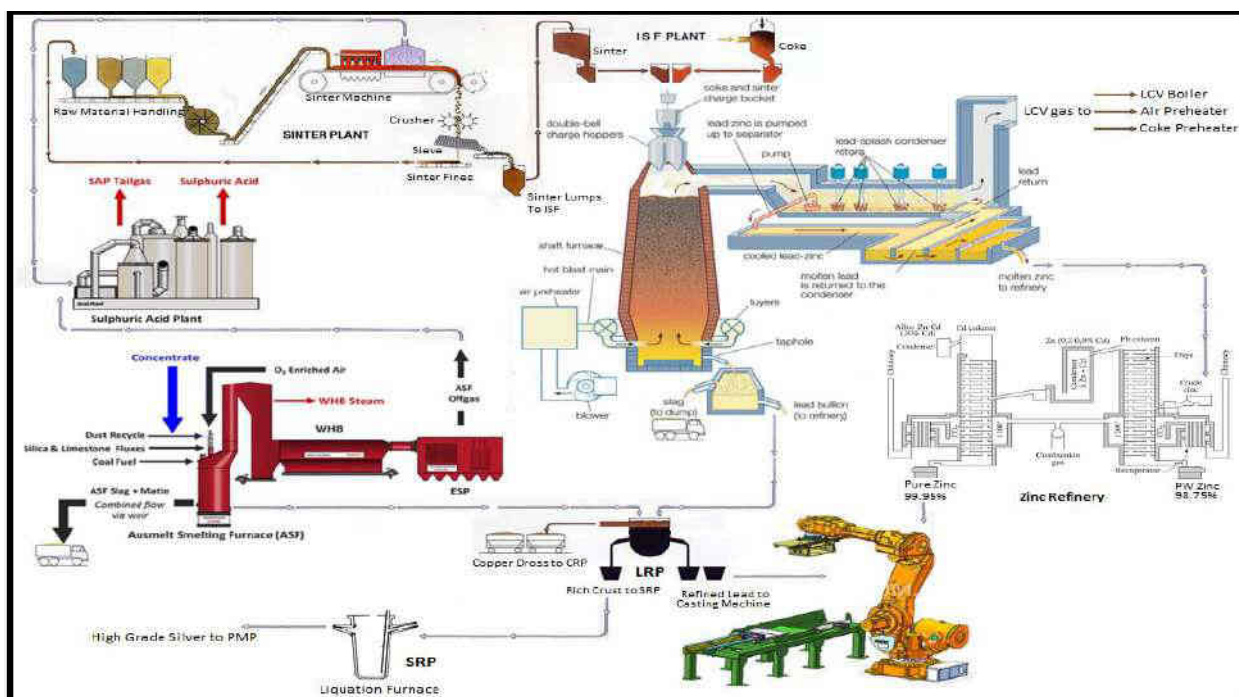
**Table –2.19(B)**  
**Equipment Details ISF**

Machinery	Capacity	Existing	Additional
Boiler	24 TPH	1	NIL
Coker	15 MT (Batch-wise)	3	NIL
Stove	56730 Nm <sup>3</sup> /hr. hot air supply for Furnace	3	NIL

Machinery	Capacity	Existing	Additional
Condenser	375 MT (Holding Capacity)	1	NIL
Soft water cooling tower	2200M <sup>3</sup> /hr. (Water circulation)	1	NIL
Recycle cooling tower	550 M <sup>3</sup> /hr. (Circulation)	1	NIL
Salg cooling tower	650M <sup>3</sup> /hr. (Circulation)	1	NIL
Theisen	67200 Nm <sup>3</sup> /hr. (Gas cleaning)	1	NIL
Main Air blower	56730 Nm <sup>3</sup> /hr.	1	NIL

Table –2.20  
Equipment Details Sinter

Machinery	Capacity	Number
Sinter Machine	Sulphur Burning : 1.8 MT/m <sup>2</sup> /day	1
Smooth Roll Crusher	150 MT/hr.	1
ESP	88000 Nm <sup>3</sup> /hr. gas flow with outlet dust load <= 200 mg/Nm <sup>3</sup>	1
SO <sub>2</sub> Blower	Gas Flow : 103000 Nm <sup>3</sup> /hr.	1



- Addition of 07 no. of kettles in lead refinery plant and
- 100 KT Lead Refinery Unit

Figure 2.8: Process Flow Diagram of Proposed Lead Refinery in Existing Pyro Plant

At present CLZS is having a capacity of refining 95 KTPA of lead. HZL needs to increase this capacity to 200 KTPA at CZLS due to increase its lead bullion production capacity as the ISF plant will be operated at different product mix mode as per availability of lead & zinc concentrate.

Enhancement of refinery will be accomplished by installing 7 new kettles in the existing Lead Refinery plant alongwith two EOT cranes. Furthermore one Lead Electro-refining Plant (LEP) will be installed with a capacity to produce 100 KTPA refined lead from it.

This new proposed LEP plant will be comprising of lead kettles for its copper removal section and a series of electrolytic cells for electrolysis process. The major equipment will be as following:

1. Kettles along with burner system
2. Anode casting machines
3. Electrolytic cells along with its recirculation system
4. Cathode starter machine
5. Melting and casting machine
6. EOT cranes
7. Anode Slime handling system
8. Hygiene system along with bag filters and stack
9. Two stacks are being envisaged as of now in the new lead refinery system and one stack in the Old refinery plant.

#### **2.7.2 Process Description of Lead Electro refining Plant (Lead Refinery unit)**

The main processes of the lead refinery plant include: preliminary refining of lead bullion and anode casting, cathode preparation, anode-cathode automatic rowing, electrolysis, cathode washing and rod drawing out, residual washing, tank cleaning, anode slime filtering and washing, electrolyte circulation, cathode lead refining and ingot casting.

##### **Preliminary Refining**

The purpose of preliminary refining of lead bullion is to remove some of the copper, tin and other impurities in the lead bullion, and adjust the content of the Sb in the lead bullion to cast anode plate suitable for electro-refining.

When filling the pot, the lead bullion from different sources should be mixed into the pot according to the composition. In particular, matching with each other the raw materials containing high Sb and low Sb.

After the preliminary refining, the Pb content should be above 98% in the lead liquid.

The copper dross from the preliminary refining is sent to the copper dross treatment plant.

##### **Anode Plate Casting**

The liquid lead after preliminary refining is pumped into the casting pot and heated to 400-420°C along with the lead generated from part of the residual melting, then the liquid lead is pumped into anode die casting unit for constant casting. The anode plate is continuously adjusted, taken out and elevated via binding line of the anode casting unit. Then the anode plates are rowed based on 110mm distance. The rowed anode plates are lift out by crane putting on the anode rack for use or lift to anode-cathode automatic rowing unit by travelling crane.

##### **Cathode Preparation and Anode-Cathode Automatic Rowing**

The preparation of starting sheets is comprised of three steps including oxidative refining or electrolyzed lead refining, lead plate production and starting sheets production which are finalized

in the starting sheet melting pot, casting machine and cathode production and anode- cathode automatic rowing unit respectively.

The cathode lead is oxidized, refined and eliminated the impurities in the starting sheet melting pot, then the liquid lead is pumped to the heat retaining pot of the casting machine by lead pump. The molten lead is brought to the cooling drum via the traction belt to make the lead plate roll. When producing the starting sheets, the lead roll is hoisted into the cathode preparation unit by travelling crane. The lead roll is unrolled on the rewinding machine of the cathode preparation unit, and is then made into a starting sheet by shearing, inserting, flanging, pressing, welding and embossing. The prepared starting sheets are sent to the correcting and transfer machine and anode-cathode automatic rowing unit, and together with anode plate are automatically arranged with a distance of 110 mm. The cathode and anode plates arranged in rows are lifted and loaded into the cells.

### **Electrolysis**

The electrolysis is performed in an aqueous solution composed of lead silico fluoric acid ( $\text{PbSiF}_6$ ) and silico-fluoric acid ( $\text{H}_2\text{SiF}_6$ ).

The electrolysis uses direct current. Lead is dissolved from the anode into the electrolyte and is discharged on the cathode. Metals such as antimony, arsenic, copper, gold, silver, etc., which are more positive than lead, are rarely dissolved to form anode slime. Most of the anode slime adheres to the anode plate. A small amount sinks into the bottom of the tank and needs to be cleaned regularly. The cleaning cycle is determined according to the production situation.

The cathode and anode cycles of lead electro-refining are 7 days.

In order to ensure the quality of the electrolyzed lead, appropriate gelatin (bone glue) and sodium ligno sulfonate should be added to the electrolyte.

Considering the local climatic conditions, a copper coil is placed in the electrolyte circulation tank or the high tank, steam is introduced in the winter, and cooling water is supplied in the summer to adjust the electrolyte temperature.

### **Cathode Washing and Rods Drawing Out**

Cathode washing, rods drawing out, cathode plate stacking and other work are automatically performed on the cathode washing and the rod drawing out unit. The extracted copper rods are automatically fed into the anode-cathode automatic rowing unit for use after cleaning and grinding.

### **Residual Washing**

The residuals are cleaned in the residual washing unit. Clean the anode slime on the surface of the residual with a roller brush and high-pressure water, then automatically collects it to the other end of the unit. The crane is used to send the residuals to the storage yard for drying. The residuals after initial drying are returned to lead melting pot.

### **Tank Cleaning and Anode Slime Filtering and Washing**

A vacuum pump and a movable self-priming pump are used to perform the cleaning of the electrolyte in the cells and the anode slime at the bottom of the tank. The pressure filtration and washing of anode slime adopts pressure filtration + slurry + pressure filtration.

#### **Cathode Lead Refining and Casting**

After the rod is drawn out, the cathode lead is hoisted into the lead melting pot by a crane. When refining, the melting temperature should not be too high to prevent the lead oxide slag from agglomerating or forming a loose slag. The cathode lead is completely melted, and when the temperature rises to 480 °C, the slag tray is lifted by a hook bridge crane to collect the slag. After the slag is removed, is hoisted into the agitator, and the height and center position of the agitator are adjusted to form a good vortex when agitation. Raise the temperature to 510 - 530 °C, start the agitator, after 1 - 2h, the impurity metal in the lead liquid and a small part of the lead is oxidized by air into oxide to float on the surface of the lead liquid, and then hang out the agitator, remove the oxidation slag. At this time, the content of antimony and tin in the lead liquid is reduced to 0.0003%. The oxidized slag is sent to a dross treatment plant for treatment to recover lead therein. Keep the lead liquid temperature at 450 - 500 °C, hoist the lead pump, and pump the lead liquid into the lead box of the casting unit for ingot casting. When casting, manual slag removal and shovel is adopted. The lead ingot is mechanically stacked and transported.

#### **2.7.3 PROCESS DESCRIPTION OF AUSMELT LEAD SMELTER**

The Ausmelt metallurgical Lead plant is designed to produce 60,000 MT of refined lead annually from lead concentrate. The Ausmelt metallurgical route based on Top Submerged Lance Technology is a proven process for manufacturing lead metal. The Lead plant is based on 'Top Submerged Lance Technology' designed by M/s Ausmelt Limited, Australia. In this technology, smelting of Lead concentrate is done directly to produce Lead bullion and slag, and hence, conventional sintering of Lead concentrate can be avoided. The plant consists of the following sections:

- (i) Feed material handling system
- (ii) Ausmelt furnace
- (iii) Off gas handling system
- (iv) Sulphuric acid plant (combined with Sinter plant)
- (v) Refineries (combined with ISF Lead refinery)
- (vi) Oxygen plant



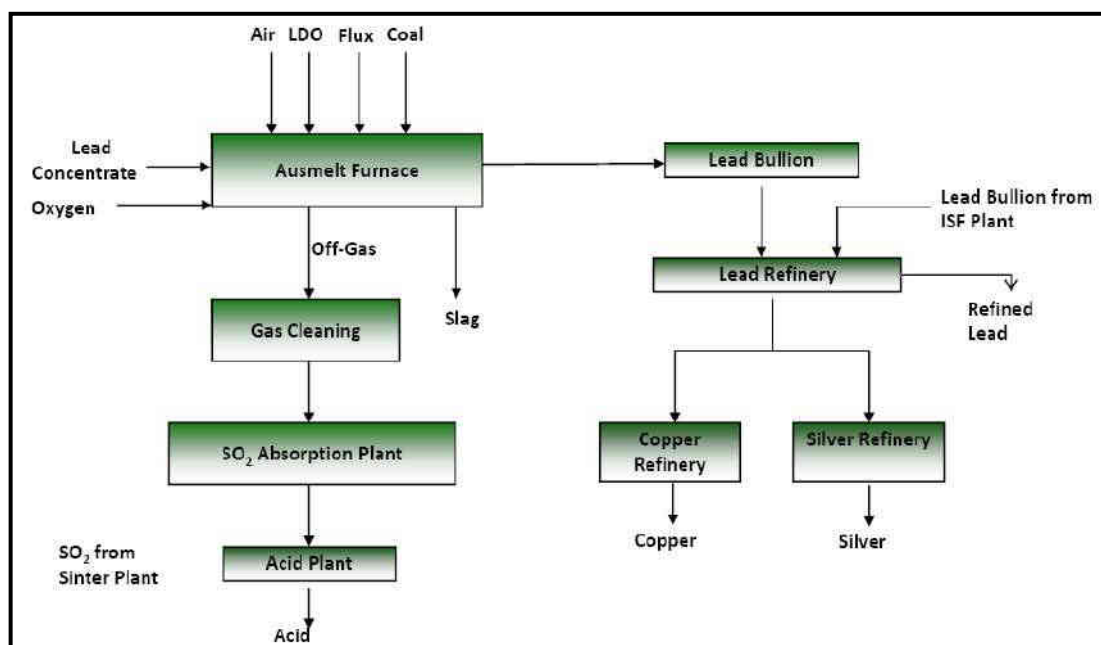


Figure 2.9: Process Flow Chart Ausmelt Plant

Table -2.21  
Equipment Details

S. No.	Machinery	Capacity	Number
1.	Furnace	60000 MTPA	1
2.	Boiler	23.3 TPH	1
3.	ESP		1
4.	Gas Cleaning Section	25000nm3/hr. with 12% SO2	1
5.	Cansolve	25000nm3/hr. with 12% SO2	1
6.	Utility - Oxygen Plant	3220 NM3/Hr.	1
7.	Utility - Blowers	13000 nm3/Hr.	2
8.	Utility Cooling Towers	-	2

**2.7.4 PROCESS DESCRIPTION OF HYDROZINC SMELTER (I&II)**

Hydro metallurgical zinc extraction process is conventionally known as Roast-Leach-Electro win process which can broadly be divided into following processes.

1. Roasting
2. Leaching and Purification
3. Electro winning
4. Melting & Casting
5. Fumer

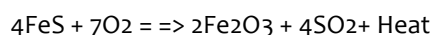
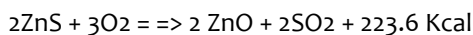
**ROASTING PLANT**

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<sub>2</sub> 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 1050 Tonnes of concentrate per day (Dry) with a hearth area of 123 m<sup>2</sup>.

The principal roasting reactions are as follows:



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<sub>2</sub> 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<sub>2</sub> 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.

## **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:

- a) Hot gas cleaning;
- b) Wet gas cooling/condensing;
- c) Acid mist precipitator; and
- d) Mercury Removal System (Calomel Process)

### **Hot Gas Cleaning**

The dust loaded SO<sub>2</sub> 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.

### **Wet gas cooling/Condensing**

#### **❖ 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 ESP's, as well as condensed volatile impurities. Excess liquid will be discharged to a stripper for SO<sub>2</sub> removal.

#### **❖ Cooling Tower**

The cooling of the SO<sub>2</sub> 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.

#### **Acid mist precipitator**

From the washing and cooling section, the gases are forwarded into two wet gas ESP's for mist elimination arranged in two stages. These ESP's 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.

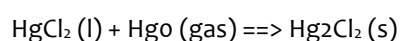
#### **Mercury Removal System (Calomel Process)**

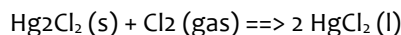
The mercury contained in zinc concentrate is transferred mainly into metallic mercury vapour during roasting. Some of the mercury may condense or re-combine with other components in the gas to form insoluble compounds. These particles or compounds may be separated in the conventional unit for gas cleaning 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 vapour 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 vapour 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 HgCl<sub>2</sub> solution is sprayed over the packing by nozzles. The mercury vapour 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 further 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:





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  $\text{H}_2\text{SO}_4$ .

### **SULPHURIC ACID PLANT**

The  $\text{SO}_2$  gas from the gas cleaning section is converted to Sulphuric acid by first converting the  $\text{SO}_2$  to  $\text{SO}_3$  in converter in presence of  $\text{V}_2\text{O}_5$  as catalyst. The converter has four layers of  $\text{V}_2\text{O}_5$  catalyst. After 3<sup>rd</sup> mass, the gas is withdrawn and passed on to intermediate absorption tower where the  $\text{SO}_3$  gas is absorbed to produce Sulphuric acid. The residual  $\text{SO}_2$  is further converted to  $\text{SO}_3$  gas in 4<sup>th</sup> mass in order to achieve maximum conversion efficiency. The withdrawal of  $\text{SO}_3$  gas after 3<sup>rd</sup> mass and converting it to  $\text{H}_2\text{SO}_4$  accelerates conversion of  $\text{SO}_2$  to  $\text{SO}_3$  in fourth mass. Conversion of  $\text{SO}_2$  to  $\text{SO}_3$  in two stages and absorbing  $\text{SO}_3$  in two stages is known as double conversion and double absorption (DCDA). In this process, the conversion of  $\text{SO}_2$  to  $\text{SO}_3$  gas is very high (more than 99.7%) thus allowing very low  $\text{SO}_2$  emission (less than 650 mg/Nm<sup>3</sup>).

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; and
- The product acid tank farm.

### **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%  $\text{H}_2\text{SO}_4$  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.

### **Converter section with the gas-to-gas heat exchangers**

In the converter, the  $\text{SO}_2$  bearing gas is converted to  $\text{SO}_3$  (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 following outlet of the 3<sup>rd</sup> 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  $\text{SO}_2$  to  $\text{SO}_3$  is arranged on these layers. The  $\text{SO}_2$  gas flows up stream through layer 1 and downstream through layer 2, 3, and 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 out let chambers, the 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 pre heating SO<sub>2</sub> gas to the inlet temperature of layer 1.

❖ **SO<sub>2</sub> Gas Blower:** The SO<sub>2</sub> 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.

❖ **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 SO<sub>2</sub>-concentrations can be compensated. The separate pre-heater preheats air or, in the start phases, SO<sub>2</sub>-gas to the required temperature.

#### **Product Acid Tank Farm**

For the production of the sulphuric acid, SO<sub>2</sub> 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
- Absorption of SO<sub>3</sub>
- Heat balance
- Conversion of SO<sub>2</sub> to SO<sub>3</sub>
- O<sub>2</sub>/SO<sub>2</sub> ratio

#### **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 two hoppers 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**

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 flocculent. 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 ferrite 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 the Conversion section of leaching stage while the overflow is pumped to Pre-neutralization of zinc leaching section.

**Pre-Neutralization (PN)**

This section receives solution from weak acid leaching and from Jarosite section. This solution is neutralized and impurities are precipitated and sent back to weak acid leaching section for further treatment. The unreacted zinc going along with the precipitate slurry is also leached and recovered in Jarosite section. The overflow solution is sent to neutral leaching section.

**Jarosite Precipitation (JP)**

This section receives slurry from weak acid leaching section which contains mainly the zinc ferrites. These are treated at high temperature of  $> 95^{\circ}\text{C}$  and high acidity of 30 gpl. In this section, ferritic zinc is leached, wherein Zn is recovered and impurities are precipitated in the form of Jarosite with the help of Sodium Sulphate.

**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; and
- 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 plant 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); and
- Zn, Cu, Co, Cd, analyzers.

The purification section consists of the following stages:

- ❖ Pre-filtration;
- ❖ Copper removal;

- ❖ Hot purification; and
- ❖ Polishing/Gypsum removal.

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 over flow solution (containing app. 150 gpl of Zn as Zinc sulphate) produced in the leaching plant at >65°C temperature is sent to remove any suspended solids 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 mixture flows by gravity in reactors, from there it flows by gravity into the pumping tank. The mixture is pumped to the automatic filter presses, where the solid matter containing the removed impurities, is retained.

The filtrate from filter press is collected in a tank and pumped to the hot purification stage for further treatment.

The copper removal cake is treated with spent electrolyte (at controlled pH) in separate reactors to allow for the selective leaching of 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 Conversion section of Leaching Plant.

#### Hot Purification/Cobalt Removal

The Cu removal filtrate is pumped through heat exchangers to the first of a series of tanks. The temperature at the entrance of this tank is a constant 82°C, and is regulated by controlling the supply of steam to the heat exchangers. In the first tank both a solution containing Potassium Antimony Tartrate (PAT) (premixed in the preparation tanks) and Copper sulphate 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 four to twelve hours. Once the cycle has been completed the filter press is isolated from the circuit and the cakes is discharged onto re-pulping tank, and then to the first tank of the Enrichment Plant for further recovery of excess Zn dust. 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.

### **ELECTRO-WINNING**

The purified and cooled zinc sulphate solution is electrolyzed in cell house (electrolytic cells) using aluminium cathodes and Lead anodes. The zinc metal gets deposited on the cathodes and the spent electrolyte containing sulphuric acid with depleted level of zinc is returned to leaching section. The zinc deposited on cathodes will be pulled out and stripped off with automatic stripping machines as per input current.

For the proposed plant, large size cells have been selected for reducing floor area requirement. The current density, temperature etc. have been selected to optimize the area required, deposit quality and power consumption while rendering high operational efficiency.

This plant consists of the following sections:

- a) Cooling and Basic Salt Separation (Gypsum Removal)
- b) Cell house;
- c) Automatic handling and stripping of cathodes

### **Cooling and Basic Salt Separation (Gypsum Removal)**

The purified solution from the hot 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 purified electrolyte storage tank. The cooler cake obtained while periodical cleaning of cooling tower is discarded.

### **Cell House**

The purified solution, after having been treated for basic salt, is stored in the purified electrolyte solution tank. The tank house will be designed according to the latest commercial technology using 3.5 m<sup>2</sup> cathodes as well as an automatic cathode transport system and full automatic stripping of the zinc deposits.

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.

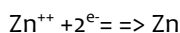
The major portion of the spent electrolyte is pumped to atmospheric cooling towers, where the spent electrolyte is cooled down to approximately 35°C - 40°C. The cooling towers are of the same design as those for the neutral solution. The mixing of neutral leach solution and spent electrolyte takes place in the circulation tanks.

The electrolytic recovery of zinc is brought about by passing continuously electric current through the aqueous zinc sulphate electrolyte acidified with H<sub>2</sub>SO<sub>4</sub> and the insoluble electrodes, 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 lined and insulated cells equipped with 115 anodes and 114 cathodes each. The tank house contains 132 cells. The electrodes of each cell are coupled in parallel 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;



#### **Automatic handling and Stripping of Cathodes**

During the electrolysis process as already mentioned the zinc is deposited on aluminium cathodes, which in a cycle as per input current have to be taken out from the cells in order to remove the zinc deposit. The cathodes are automatically stripped in stripping machines.

The transport of the cathodes to the stripping machines is performed by a cathode and anode transport system provided with a special grab device, which is able to lift unstripped cathodes from the cell.

The cathodes are washed in a washing device prior to being distributed to the stripping unit of the stripping machine. The feeding of the inlet chain conveyors of each stripping machine with the cathodes is automatically regulated by the control system.

The stripped zinc sheets are stacked below the stripping machine, weighed and transported by forklift to the storage platform inside the melting and casting plant. The cathode transport system is also used for the anode cleaning operation.

#### **MELTING AND CASTING PLANT**

The zinc sheets coming from the stripping machines are first stored on the storage platform in order to ensure that they are completely dry prior to feeding them into the melting furnaces.



**a) Melting of Zinc Cathodes**

The zinc sheets are fed into the induction furnaces via charging conveyers by means of forklifts. 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

**b) Casting of Zinc Slabs**

The zinc ingot production will be cast into standard 25 kg slabs / 1,000 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 and skimming devices 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 1000 kg are collected on bundle conveyors from where they are strapped and transported to the storage section by forklift. Some of the Zinc metal along with Aluminum, Magnesium and Copper is used for production of Zinc alloy.

**Integration in New Furnace and Slab casting line Hydro -II, The zinc ingot production will be cast into standard 25 kg slabs / 1,000 kg zinc blocks.**

**c) 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; whilst the fine dust is collected and conveyed to the raw-material storage. The metallic zinc is sent for melting/ charging in the induction furnace.

**ZINC DUST PLANT**

The zinc dust plant consists mainly of three sections:

- ❖ Atomizing furnace;
- ❖ Expansion chamber with a de-dusting bag house; and
- ❖ Dust screening and storage.

Zinc slabs are charged into the gas/electric heated atomizing furnace. This furnace has at its lowest point a special plug which permits to drain about 1 to 2 TPH of liquid zinc. A special designed compressed air jet nozzle atomizes these 5 to 8 liquid zinc streams by blowing them into the expansion chamber/cyclone.

In the expansion chamber/cyclone, which is under slightly negative pressure the solid zinc dust will precipitate and collect in a bin, which discharges onto vibration conveyors that extract the zinc dust, from the expansion chamber.

The main quantity of zinc dust, which is precipitated in the expansion chamber, is transported to the zinc dust screening station. At this screen, oversize zinc dust is separated which is recycled to the induction furnace. The clean air passes through bag filter before it leaves into the atmosphere through stack.

## **FUMER**

### **a) Zinc Calcine leaching**

The modified zinc Calcine leaching plant includes two parts which are neutral leaching and weak acid leaching. Zinc Calcine from the calcination plant is stored in the existing neutral leaching Calcine bin then charged into the neutral leaching tank through the existing charging belt. Weak acid leaching over flow, spend electrolyte, manganese dioxide and other reaction reagents are simultaneously added to the neutral leaching tank. After reaction the slurry flows by gravity into the existing neutral leaching thickener and the overflow flows by gravity into the overflow tank and then is pumped to the existing purification plant. The thick underflow is then pumped into the weak acid leaching tank, after reaction the pulp automatically flows into the existing weak acid thickener, and the overflow returns to the neutral leaching tank, the underflow is sent to the acid leaching residue filtration and drying plant.

### **b) Leaching residue treatment**

- Acid leaching residue filtration and drying

Thickened underflow from the zinc Calcine leaching plant goes into four agitated tanks ( $\phi 3500 \times 3800$ ) and the slurry produced after agitation is pumped into eight membrane filter presses ( $F=220m^2$ ). The filter residue is discharged through hopper to eight belt conveyers ( $B=1400$ ,  $L=8m$ ) and then transferred to the feeding bin on the top of two drying kilns by one reversible belt conveyer ( $B=1400$ ,  $L=53.8m$ ). Then the leaching residue is dried in the drying kiln. The filtrate is returned to leaching thickener overflow tank in the zinc Calcine leaching plant.

After filtering operation, acid leaching residue (moisture content 25%) is sent into a mix drum by belt conveyer for mixing with limestone then to fed into one drying kilns ( $\phi 2.2m \times 18m$ ).

The fuel for drying kiln is from pulverized coal preparation plant, and air is provided by primary fan and secondary fan. The pulverized coal is sent to the burner by coal feeder pump before injected into the kiln for combustion. Secondary air is adjusted to control the temperature of hot off-gas at the inlet of the kiln to be about 800Deg C. Hot off-gases and the residue flows in the opposite direction to dry the residue.

Off-gas from drying kiln is about 150Deg C. The volume of off-gas is about 26427 m<sup>3</sup>/h. The off-gas goes directly into the dust collection system. The residue after being dried (moisture content 15%) is discharged from the tap-hole at the bottom of the hood in the front of the kiln, and sent to the leaching slag blending storage by belt conveyor.

- **Leaching residue blending storage**

The leaching residue blending storage is used to store and mix the leaching residue and flux. The leaching residue after being dried is delivered into the storage bin after weighing by belt weigh feeder the residue was send to fuming plant by belt conveyor. The flux is transported by trucks to the stacking area of the blending storage, the flux is fed into the blending storage bins by Front end Loader, the leaching residue is fed by belt weight Feeder, the flux is fed through a belt weight feeder, and the mixed material is sent into the fuming furnace plant through feeding belt.

**c) Fuming furnace plant**

The fuming furnace plant is equipped with two 18 m<sup>2</sup> box fumers, in which the leaching residue will be charged for smelting and fuming processes.

The two box fumers in the fuming furnace plant are respectively equipped with a separate feeding system, the leaching residue after mixing with flux is sent from the leaching residue blending storage through belt conveyor to furnace front bin in the fuming furnace plant, after weight by belt weigh feeder the mixed material fed into the box fumer through two feeding ports by moveable belt feeder in front of the box fumer.

Box fumer is equipped with an off-gas outlet directly connected with the membrane wall of the WHRB, and on one side of the diaphragm walls is provided two feeding ports for uniform distribution of material inside the furnace, box fumer are equipped with slag tap holes at both the end. Two tap holes (upper one and lower one) are arranged at one end with the upper one for slag tapping during normal operation; and emergency slag tap-hole is arranged at the other end.

On both sides of the box fumer are equipped with lances (tuyer), air and pulverized coal will be evenly distributed into the furnace through multi-layer distribution pipes. Moreover, the pulverized coal can be used as fuel and reductant.

The coal feeding systems have been set for the box fumer that include the injection system and storage bin, including proper control and measuring system.

The fuming furnace plant is equipped with one 4.99m<sup>3</sup> fuel tank and two diesel pumps to provide diesel for Start-up of Box Fumer as well as for maintaining the furnace temperature.

The box fumer slag is transported to the intermediate storage bin/Yard by bucket crane after granulation. And then is transported by trucks to a temporary slag field for storage. The hot water after cooling tower will go into the slag circulating water pool.

**d) WHRB of box fumer**

Each box fumer has a WHRB for recovering the waste heat from high-temperature off-gas, and also the off-gas will get cooled after the WHRB.

The box fumer WHB has its drum arranged in the main smelting building, including box fumer hood, uptake, down-comer, radiation cooling chamber and convection zone. The box fumer WHRB has its cover connected to the off-gas outlet of the box fumer through a flexible expansion joint, and the off-gas passes through the box fumer hood, uptake, down-comer, radiation cooling chamber and convection zone and discharged from the WHRB into the dust collecting system after it has been

cooled about below 380°C. The WHRB is equipped with rapping devices to dislodge the dust from boiler walls/bundles which can effectively remove the dust on the heating surface in time to ensure normal operation of the boiler. At the bottom of the dust hopper on the WHRB is equipped with a drag chain conveyor for dust removal, collection and transportation. The boiler body is supported on a steel frame made from structural steel.

In order to guarantee the normal operation of the boiler and the supporting thermodynamic system and WHRB system are designed for water circulation, steam production, off-gas discharge, DM water and Steam sampling test system for safe operation of the WHRB.

#### **e) Dust collecting system**

Dust collection system mainly includes dust collection systems for drying kiln and box fumer.

The dust collection for drying kiln is for removing dust in off-gas from drying kiln. The off-gas at the kiln outlet is about 150Deg C and goes directly into bag house for cleaning before it is sent to off-gas desulfurization system.

The bag filter for dust collecting system is used for removal of the dust in the box fumer off-gas, after reduction of temperature using surface cooler. The temperature of gases from WHRB is about 380°C when discharged into the surface cooler and the purified off-gas is delivered to the off-gas desulfurization system, in which the zinc oxide dust collected by the WHB and the dust collecting system is used as an absorbent.

#### **f) Off-gas desulfurization and zinc oxide dust treatment**

Zinc oxide dust from box fumer and Dariba Lead Plant/Calcine is used as absorbent for off-gas desulfurization and zinc oxide dust treatment. The de-dusted and dried off-gas from drying kiln and box fumer is sent for desulfurization. Slurry containing zinc sulfite is produced during off-gas desulfurization.

Off-gas desulfurization and zinc oxide dust treatment system is mainly composed of seven parts: slurry preparation and supply, off-gas cleaning, sulfur dioxide absorption, process water, zinc sulfite leaching, Cl& Fe removal and residue filtration.

The smelted off-gas, after dust collection, is pressurized by booster fan, washed in the scrubber, enters into three ZnO absorption towers and then is vented to air through 80-metre-high chimney after series absorption& purification.

After pressurization by booster fan, the off-gas from drying kiln and box fumer flows into the scrubber for washing to remove As, F, Cl and dust. After preliminary cleaning, the off-gas flows into absorption tower for scrubbing. The zinc oxide dust is delivered mechanically from the dust collecting system to the zinc oxide blending storage bin in this system. After weighing and proportioned fed in the slurry proportion tank, the zinc oxide is quantitatively fed into the absorption tower by pumping. Two spray absorption towers and one rotating stream tray tower are designed in series operation to treat the SO<sub>2</sub> in the off-gas, the slurry solution sprayed in the absorption tower is zinc oxide slurry made from zinc oxide dust in a suitable concentration, and the slurry solution from the absorption tower is then

sent to the zinc sulfite slurry thickener (CN-02 Co20) in the existing Calcine leaching plant. The off-gas after treatment by these three towers and wet ESP is vented to air through 80 meters high chimney. After liquid-solid separation of slurry in thickener, the clear overflow returns to the desulfurization device for reutilization. The dense underflow is pumped to the zinc sulfite one-stage leaching tank (CN-02 Co03 and CN-02 Co04 in the existing Calcine leaching plant is reutilized). The zinc sulfite one-stage leaching is carried out by adding two-stage leaching filtrate and spend electrolyte. High-concentrated SO<sub>2</sub> off-gas produced during one-stage leaching, which is sent to the drying tower of Hydro#1 and Hydro#2 in the existing sulphuric acid system by SO<sub>2</sub> blower. After one-stage leaching, the slurry is pumped to the one-stage leaching filter press in the new filtration plant for filter pressing. The filtrate returns to the neutralization leaching tank or Cl removal tank in the existing Calcine leaching plant (the conversion tanks CN-02 Co01 and CN-02 Co01 in the existing Calcine leaching plant are reutilized). Zinc sulfite second-stage leaching is carried out by adding spent electrolyte and concentrated sulphuric acid. After second-stage leaching, the slurry is pumped to the two-stage leaching filter press in the new filtration plant for filter pressing. The filtrate returns to the zinc sulfite one-stage leaching tank (CN-02 Co03). The filter residue is lead and silver residue, which is sent to lead plant to recover Lead and Silver.

When F and Cl content in the zinc sulfate solution is higher, the one-stage leaching solution is pumped into the chlorine removal tank in the existing Calcine leaching plant for Cl removal (the conversion tanks CN-02 Co01 and CN-02 Co02 in the existing Calcine leaching plant are reutilized). The CuCl sediment is produced by adding copper sulphate and zinc powder. The slurry after reaction is sent to the Cl removal filter press in the new residue filtration plant. The filter residue is CuCl residue, which is stockpiled. The filtrate is sent to the goethite tank in the existing Calcine leaching plant (the CN-02 Co09 and CN-02 Co10 conversion tanks are reutilized) for Fe removal. Limestone slurry, air is added to the Fe removal tank to produce goethite residue from Fe, F and other impurities in the solution and make goethite settled. After reaction, the slurry flows by gravity to goethite thickener for liquid and solid separation (the CN-02 Co20 conversion thickener in the existing Calcine leaching plant is reutilized). The thickener overflow returns to the existing neutral leaching tank for Calcine leaching; and the underflow is sent to the goethite underflow filter press in the new residue filtration plant. The filter residue is stockpiled, and the filtrate returns to the goethite thickener overflow tank (CN-02 Co26).

**Table- 2.22**  
**Equipment List Fumer**

Drive Name	Rated Capacity	Operating Capacity	UOM
Rotary Drying Kiln	30	25.5	Tonne/h
Centrifugal Blower-1A	750	660	m <sup>3</sup> /min
Centrifugal Blower-1B	750	660	m <sup>3</sup> /min
Saturated Steam Turbine	8.6	8.6	Mega Watt
Vertical Grinder	25	21.25	tonne
Booster Fan	8100	7290	m <sup>3</sup> /min



Drive Name	Rated Capacity	Operating Capacity	UOM
Fuming Furnace-1	18	17.1	m2
Fuming Furnace-2	18	17.1	m2
Fuming Furnace Waste Heat Boiler-1A	46.5	44.175	tonne/h
Fuming Furnace Waste Heat Boiler-1B	46.5	44.175	tonne/h

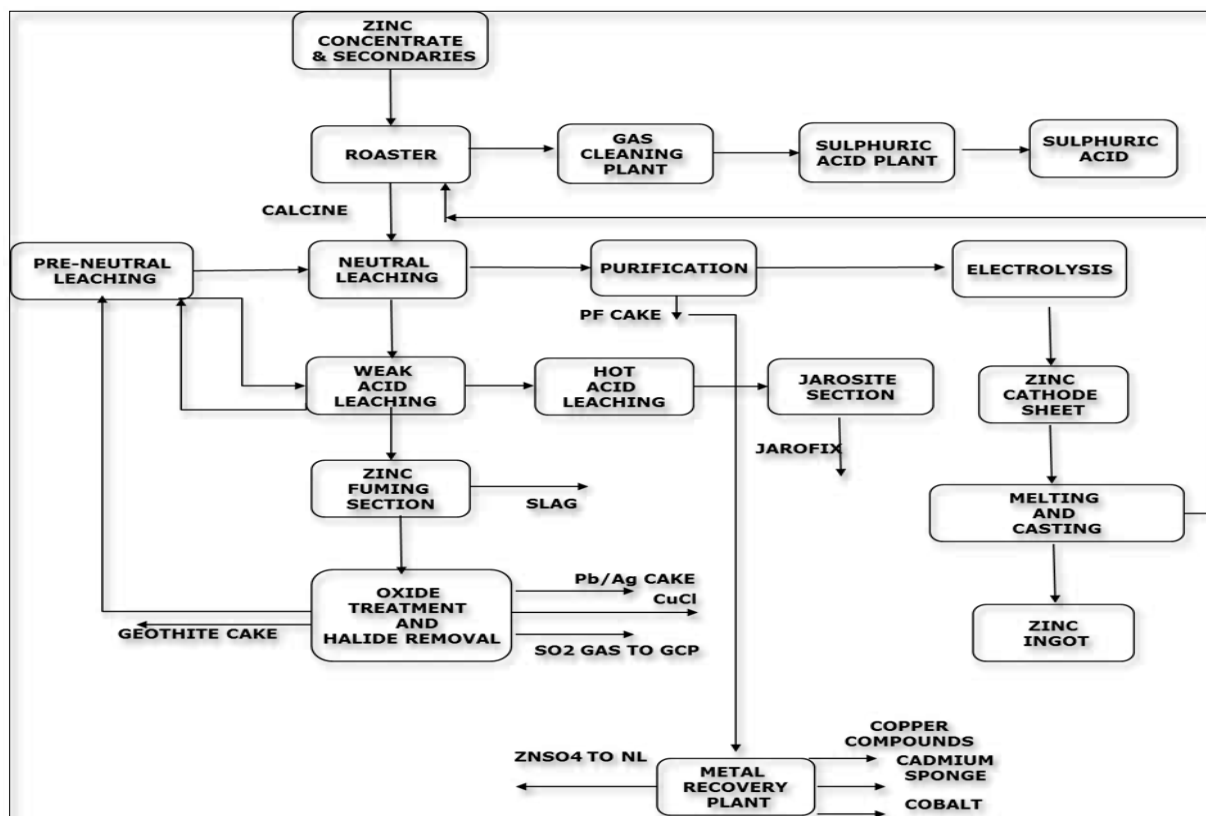


Figure 2.10: Process Flow Diagram of Zinc Smelter (Including Fumer Plant)

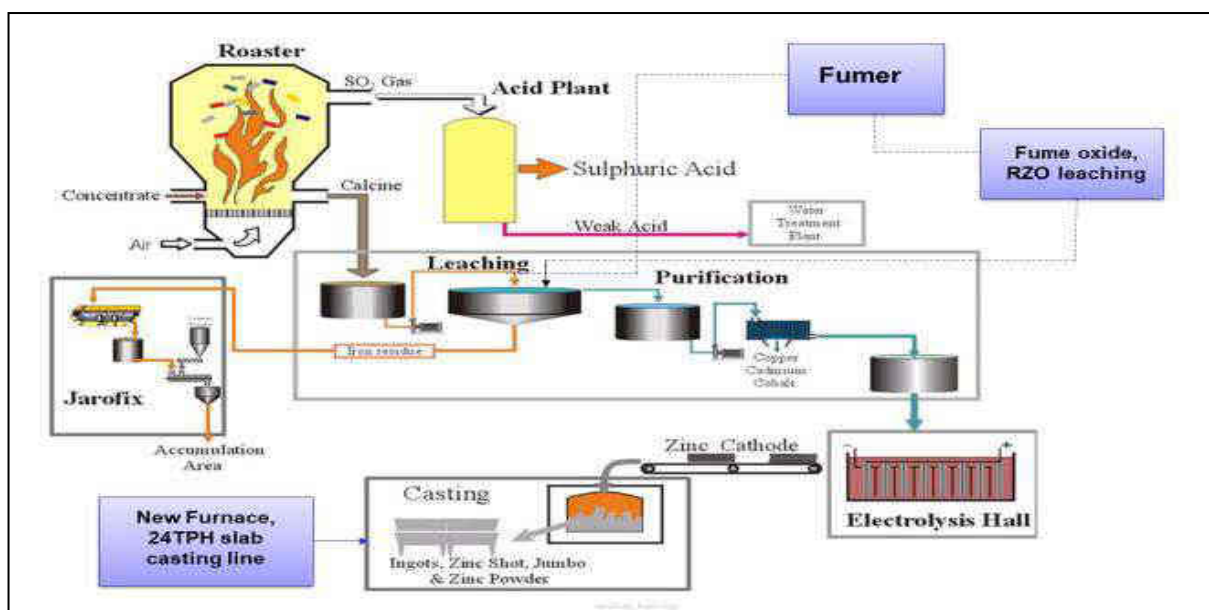


Figure 2.11: Proposed Process Flow Diagram of Zinc Smelter (After Including New Furnace line and Casting Line and RZO unit)

**Following activities are planned in Hydro Metallurgical Smelter Unit:**

1. Expansion in melting capacity section of existing Hydro Zn smelter by adding 1 induction furnace (24TPH) and 1 slab casting line (175000 MTPA) thereby increasing existing capacity from 504000 MTPA to 630000 MTPA.
2. For Environment expects separate Ventilation system Bag filters are provided for furnace and work zone and stack has been provided.
3. Provision of dust control system/ bag filters has been provided at material transfer points
4. This capacity enhancement will reduce the transportation of Zn cathode to Pantnagar metal plant.
5. Separate Contract manpower will be engaged for this casting line project.
6. Installation of 750 KVA DG set for emergency purpose for back up.

**Integration of RZO Unit with Existing Hydro Unit:**

RZO (Raw Zinc Oxide) is generated at Dariba Lead Smelter and Debari Zinc Smelter. At Dariba, it is generated from Blast Furnace Slag and at Debari it is generated from Ausmelt Slag. It contains mainly Zinc and Lead. Zinc content is around 50% and Lead content is around 20%. Other metals like Iron, Copper, Cadmium, Arsenic, Calcium, Magnesium, Chlorine and Fluorine are present in small amounts. In the Proposed RZO unit, This RZO will be treated using leaching process wherein Zinc will be converted to Zinc Sulphate Solution and Lead will remain in the unleached cake. Zinc Sulphate will be sent to Zinc Smelter for further conversion to Zinc metal and Lead Cake will be sent to Pyro smelter for conversion to lead metal. The conversion process will have mainly three stage leaching and Chlorine and Fluorine removal steps. The Chlorine and Fluorine steps will be necessary as these elements will have detrimental effect on Zinc Electrolysis. The complete RZO Conversion Process will be integrated in the Leaching Plant leveraging some inherent additional capacity to treat this material and some additional equipment like reactors and filter presses will also be added.

Below is the process flow diagram of treatment:

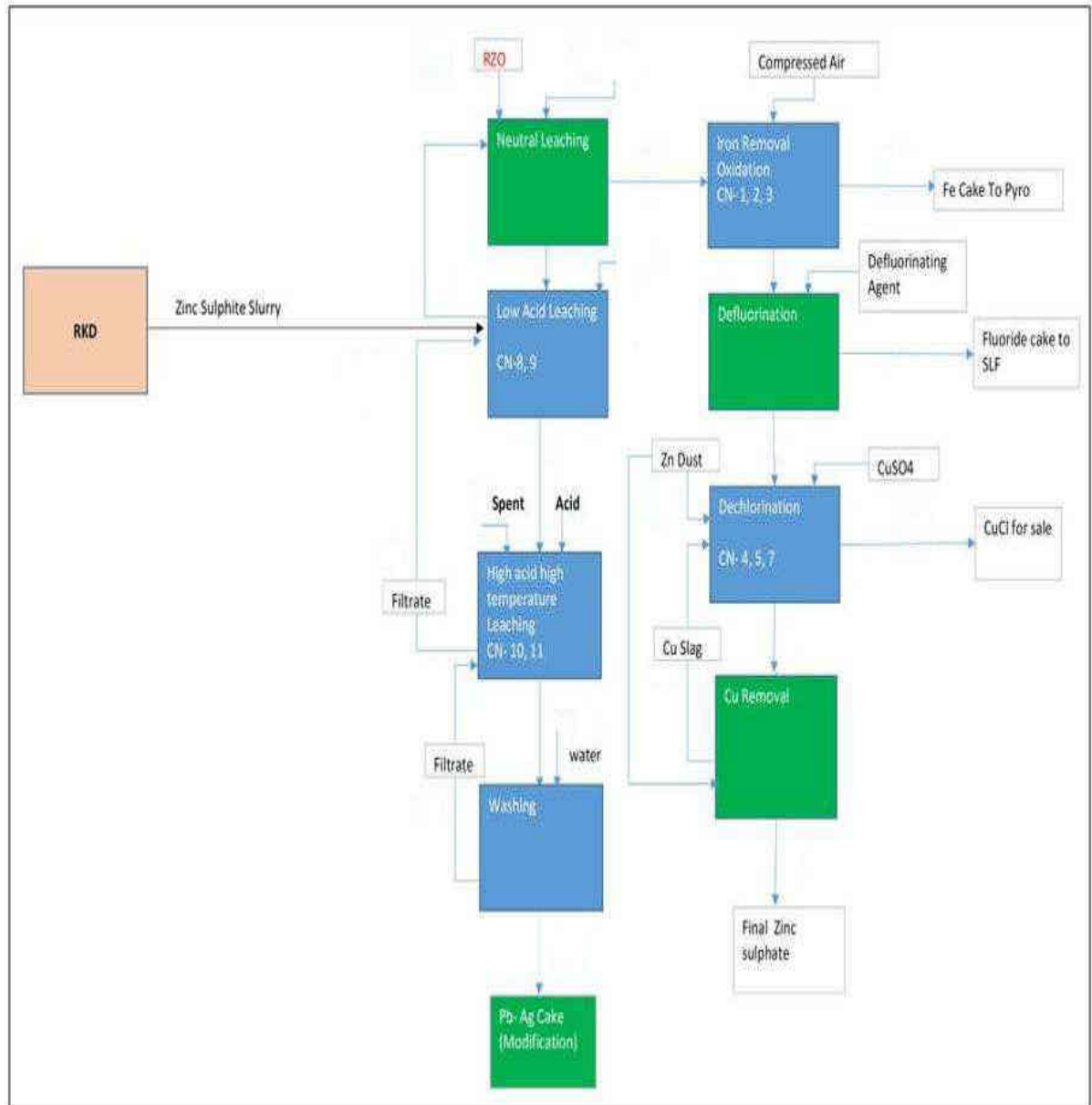


Figure 2.12: Process flow diagram of RZO Unit



Figure 2.13: Location of Proposed Site for RZO Unit at Hydro-II Plant

**Table – 2.23**  
**Utilities and Chemicals for RZO Unit**

S. No.	Detail	kg/MT
1.	De-Fluorination agent	17
2.	Copper sulphate	40
3.	Zinc dust	9
4.	Sulphuric acid	92
5.	Sodium hydroxide	21
6.	Calcium hydroxide	48
7.	Steam	2500
8.	Power	600

**Table – 2.24**  
**Equipment Details for Hydro Plant**

S. No.	Name of the Equipment	Number / Capacity
1.	Calcining acid leaching reaction tank	6
2.	Acid leaching thickener	2
3.	Acid leaching overflow tank	2
4.	Acid leaching overflow pump	2
5.	Acid leaching underflow pump	4
6.	neutralize reaction tank 1 # -2 #	2
7.	neutralize reaction tank 3% -5%	3
8.	neutralize thickener 1 #	1
9.	Neutralize	1
10.	neutralize thick overflow pump	4
11.	neutralize thickener underflow pump	4
12.	neutralize thickener 2 #	1
13.	2 # neutralize underflow pump of thick machine	2
14.	Acid leaching underflow stirring tank	2
15.	Acid leaching underflow pressure filter pump	3
16.	Acid leaching underflow filter press	3
17.	Acid leaching filtrate storage tank	1
18.	Acid leaching filtrate delivery pump	2

#### 2.7.5 PROCESS DESCRIPTION OF CAPTIVE POWER PLANT

In captive Power Plant, power generates by the utilization of thermal energy of steam in turbine that in turn rotates an alternator. The steam generates in the boiler by burning of various fuels. In Captive power plant coal is used as the fuel & it burns in the boiler to generate steam. The generated steam utilizes to rotate the Steam Turbine, which in turn rotates an alternator. Process flow diagram of CPP is given as followed:

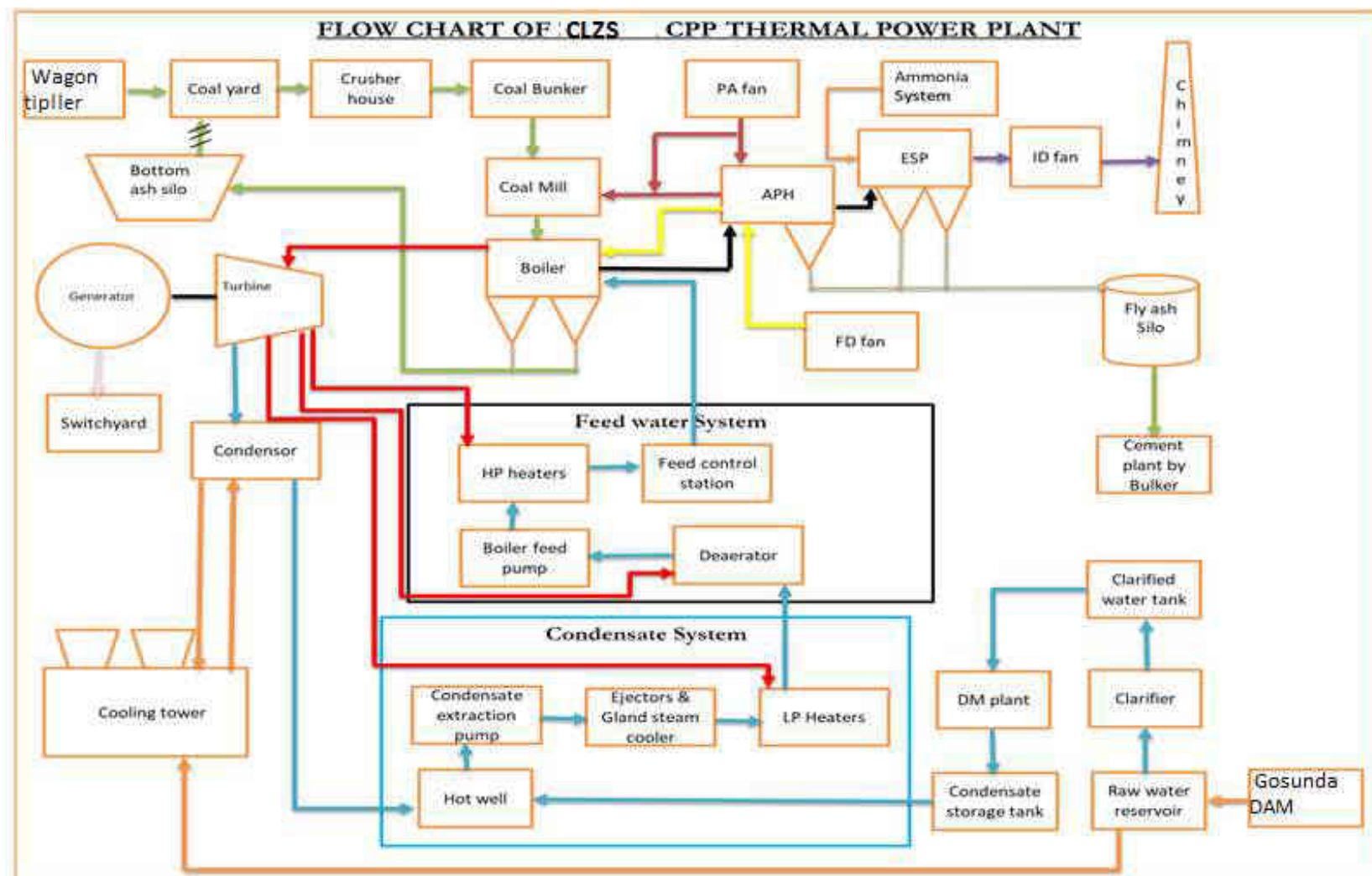


Figure 2.14. Process Flow Diagram Showing CPP



### **WORKING PROCESS OF CAPTIVE POWER PLANT:**

Coal is fired in a high pressure boiler to produce steam which is fed to steam turbine which drives the generator connected rigidly to it. The power output from the generator through appropriate electrical system is fed to the grid for distribution to consumers. The stepwise description of the whole process proceeds in the order as given below:

#### **Fuel system**

Coal is used as the primary fuel for the power plant. 40000 Tons coal storage capacity has been provided. In the crusher, coal is crushed from 200 mm to 20 mm size of coal which is further conveyed to pulveriser. Medium speed operated, bowl mill type pulverisers are installed to pulverize the crushed coal. The pulverized coal is further transported pneumatically and admitted in the combustion chamber with excess hot air. The draft system used in the power plant is a balanced draft with a set of induced and forced draft fans.

#### **Details of Coal Handling:**

- a) Source of coal- Indigenous and Imported coal
- b) Unloading- Wagon Tippler
- c) Heavy metals – negligible
- d) Storage- Coal Storage in coalyard
- e) Coal Handling system - 210 TPH Capacity
- f) Crusher – 2 Nos - 210 TPH Capacity ring granulator Type
- g) Conveyor Belts – 210 TPH Capacity

#### **Pulverized coal conveying system**

The system for direct firing of pulverized coal utilizes bowl mills to pulverize the coal and a fixed tangential firing system to admit the pulverized coal together with the air required for combustion (secondary air) to the furnace. As crushed coal is fed to each mill by its feeder, primary air is supplied from the primary air fans, which dries the coal as it is being pulverized and transports the pulverized coal through the coal piping system to the coal nozzles in the wind box assemblies. The pulverized coal and air discharged from the coal nozzles is directed towards the center of the furnace to form a fire ball. Fully preheated secondary air for combustion enters the furnace around the pulverized coal nozzles and through the auxiliary air compartments directly adjacent to the coal nozzle compartments. The pulverized coal and air streams entering the furnace are initially ignited by a suitable ignition source at nozzle exit. Above a predictable minimum loading condition the ignition becomes self-sustaining. Combustion is completed as the gases spiral up in the furnace.

#### **Boiler and its auxiliaries**

The boiler used in the power plant is a radiant, non-reheat, natural circulated by-drum, dry bottom type unit. Direct tangential firing of coal is employed, and hot gas is used for drying and transporting the coal, which is part of the primary air. Excess air is supplied in the form of secondary air. The furnace is internally fired as there is a water wall tube surface at the furnace. Apart from this, following important auxiliaries are the part of boiler.

**Boiler Drum:** To separate the water from the steam generated in the furnace walls and to reduce the dissolved solid contents of the steam to below the prescribed limit

**Economizer:** To preheat the boiler feed water before it is introduced into the steam drum by recovering heat from the flue gas leaving the boiler.

**Super Heater:** To heat the steam to increase the pressure and temperature of the steam.

**Soot blowers:** To clean the soot formed on the boiler surfaces.

#### **Steam turbine & auxiliaries**

A turbine requires in-order to function, a suitable working fluid, a source of high-grade energy and a sink for low-grade energy. Here the steam is supplied as suitable working fluid with high grade energy. When steam flows through the turbine, part of the energy content is continuously extracted and converted into useful mechanical work. The main advantage of a steam turbine is that steam can be expanded down to a lower back pressure thereby, making available a greater heat drop. It contains the following auxiliary systems to improve the turbine efficiency.

**Vacuum system:** The equipment's in this system maximize the work done of turbine by maintaining the rated vacuum limits

**Details of the Turbine Modification** - The Capacity addition is being achieved by modifying the steam flow path by modifying the blade profiles and clearance between the static and rotary blade, the major components which will be replaced/ modified are Complete Rotor Assembly, Inner Casing Assembly including stationary blades, Guide Blade Carrier Assemblies including stationary blades, Labyrinths seals for rotor and stationary blades, Front, rear & Balance piston glands.

**Condensate system:** The function of the condensate system is to pump out the condensate to the de-aerator which is provided to remove the gasses.

**Feed water system:** This system plays an important role in the supply of feed water to the boiler at requisite pressure and steam-water ratio.

**Turbine lube oil system:** It seeks to provide proper lubrication of turbo-generator bearings and operation of barring gear.

#### **Generator and electrical system**

A generator consists of a rotor and a stator. The rotor must be in mechanical balance so that it runs at normal speed without vibration. Generator cooling system avoids excessive heating and consequent wear and tear of its main components during operation. The electric power generators require direct current excited magnets for its field system.

Electrical system consists of transformers to step up the voltage, and other related systems like isolators, circuit breakers, earthing system.

Electrical scheme is the heart of a power station as it maintains supply to auxiliary equipment. Hence maximum efforts are made to choose an extremely reliable system. There are unit auxiliaries and station auxiliaries. Unit auxiliaries are the ones directly associated with the generating unit such as ID & FD fans, boiler feed pumps, coal mills, mill fans, circulating water pumps etc. Station auxiliaries are those which

are required for general station services such as coal and ash handling system, lighting system, water purifying system etc.

#### Water treatment plant

The objective of water treatment is to produce a boiler feed water so that there is no scale formation causing resistance to passage of heat and burning of tube, no corrosion, no priming or foaming problems. This ensures that the steam generated is clean and the boiler plant will provide trouble free uninterrupted service. The capacity of D. M. plant is 15cum/hr. This plant has pretreatment section, activated carbon filters, strong acid cation exchanger, degasifier, weak base anion exchanger, strong base anion exchanger, mixed bed exchanger and ultra-filtration units.

#### Ash Handling System

Ash handling Unit in CPP are used to cooled down the ash to manageable temperature, transferred to a disposal area or storage which is further utilized in Cement & bricks manufacturing. Hydro I and II plant has ash handling unit area, which is provided with water sprinklers to arrest the fugitive sources of dust. The same will suffice for the proposed expansion project.

#### EQUIPMENT DETAILS

This is an existing plant no additional machinery has been proposed for this expansion except modification in turbine.

**Details of Turbine Modification** - The Capacity addition is being achieved by modifying the steam flow path by modifying the blade profiles and clearance between the static and rotary blade, the major components which will be replaced/ modified are Complete Rotor Assembly, Inner Casing Assembly including stationary blades, Guide Blade Carrier Assemblies including stationary blades, Labyrinths seals for rotor and stationary blades, Front, rear & Balance piston glands.

**Table –2.25**  
**Main Plant and Machinery along with their Capacity**

Machinery	Capacity	Number
Boiler	310 TPH	2
Steam Turbine	77	2
Water cooled condenser	11150m <sup>3</sup> /hr. cooling water	2
Fuel handling plant	210 TPH	1

**Table – 2.26**  
**Proposed Changes in Turbine**

Description of components	Existing	New
Type of seals (HP casing and BP Gland )	Labyrinth	Brush seals
LP annulus area ( M2)	3.2	4
Type of blades	Conventional Blade	Advanced 2 <sup>nd</sup> Generation Blade
<b>Boiler Expansion:</b> The boiler expansion is proposed to increase the steam flow of each boiler to maximum of 360TPH, the required modification for increase the boiler capacity are burner block modification, SOFA arrangement, Addition of Final		

SH coil, addition of platen SH coils and modification in Bank tubes. Along with the control dampers and its drives. This will increase the capacity of the boiler by 10%. This does not require any extra area, as the modification shall be done in the existing boiler. The Boiler modification is technically proposed by Boiler OEM licensee.

#### Back Pressure Turbine:

The Steam required for the Fertiliser is 60 TPH which will be supplied by the boiler after its modification as proposed above will be made go through the back-pressure turbine so that the high-pressure steam is used to produce power of 6MW before leaving to Fertilizer unit as required. This BPTG requires a new installation of Back Pressure Turbine Generator (BPTG) near the existing Boiler along with the TG building. This Installation requires construction of TG Building infrastructure.

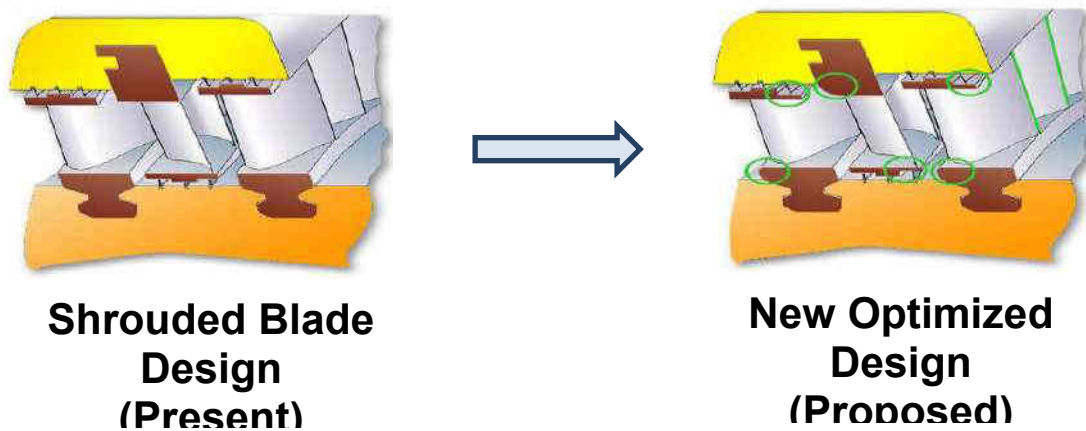
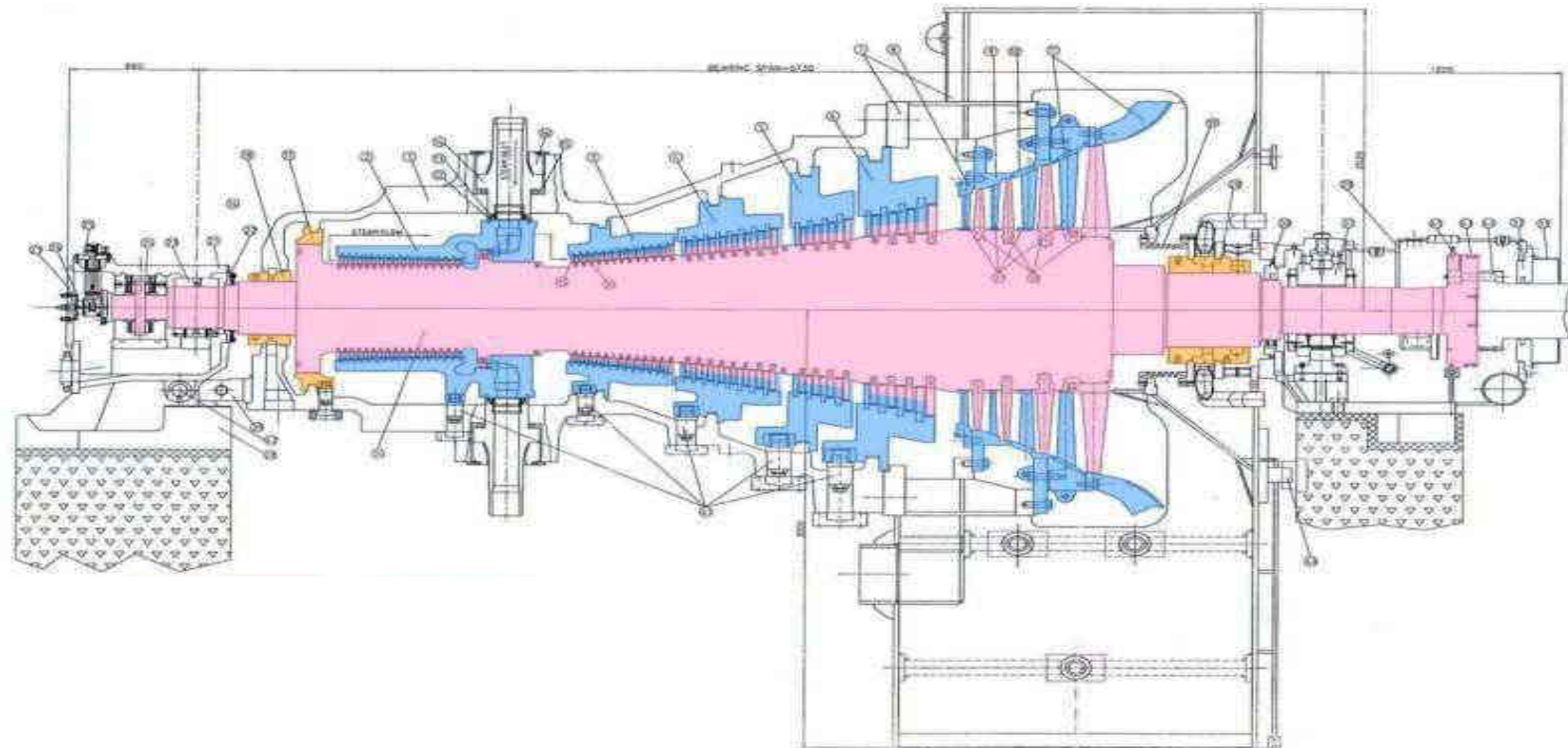


Figure 2.15: Comparison Of Turbine



Figure 2.16: Key Changes in Sealing and Blade Profile



- |                               |                                   |   |
|-------------------------------|-----------------------------------|---|
| 1. OUTER CASING               | 18. FRONT LABYRINTH GLAND         | 35. HP GUIDE BLADES                     |
| 2. INNER CASING               | 19. BELLOW                        | 36. HP MOVING BLADES                    |
| 3. GUIDE BLADE CARRIER-1      | 20. REAR LABYRINTH GLAND          | 37. LP GUIDE BLADES                     |
| 4. GUIDE BLADE CARRIER-2      | 21. FRONT BEARING HOUSING         | 38. LP MOVING BLADES                    |
| 5. GUIDE BLADE CARRIER-3      | 22. OIL GLAND (FRONT)             | 39. GUIDE BETWEEN OUTER CASING & FBH    |
| 6. GUIDE BLADE CARRIER-4      | 23. FRONT JOURNAL BEARING         | 40. GUIDE OF EXHAUST HOOD               |
| 7. EXHAUST HOOD               | 24. THRUST BEARING                | 41. ECCENTRIC GUIDE ASSY FOR CARRIERS   |
| 8. LP GUIDE WHEEL-1           | 25. TRIPPING DEVICE               | 42. GUIDE BETWEEN BED PLATE & FBH       |
| 9. LP GUIDE WHEEL-2           | 26. WHEEL FOR SPEED PICKUP        | 43. PIN FOR HAND BARRING DEVICE         |
| 10. LP GUIDE WHEEL-3          | 27. FRONT PLATE                   | 44. COUPLING BOLTS & NUTS               |
| 11. LP GUIDE WHEEL-4 - MASTER | 28. BED PLATE UNDER FRONT BEARING | 45. BLADE WHEEL FOR OIL TURBINE BARRING |
| 12. ANGLE RING INLET          | 29. REAR BEARING COVER            |   |
| 13. THREADED RING INLET       | 30. OIL GLAND (REAR)              |   |
| 14. INLET INSERT              | 31. REAR JOURNAL BEARING          |   |
| 15. SEAL RING INLET           | 32. OIL GLAND                     |   |
| 16. LOCK RING INLET           | 33. COUPLING COVER                |   |
| 17. BALANCE POSITION OF ANGLE | 34. ROTOR                         |   |

- Turbine rotor with optimized blading (items 34, 36, 38)
- Guide blade carriers with optimized blading (items 2,3,4,5,6,8,9,10,11,35,37)
- Gland sealing (brush seal design) including inner partition (items 17,18,20)

Figure no.2.17: Efficiency and power Enhancement by Modernization of Turbine internal and rotor

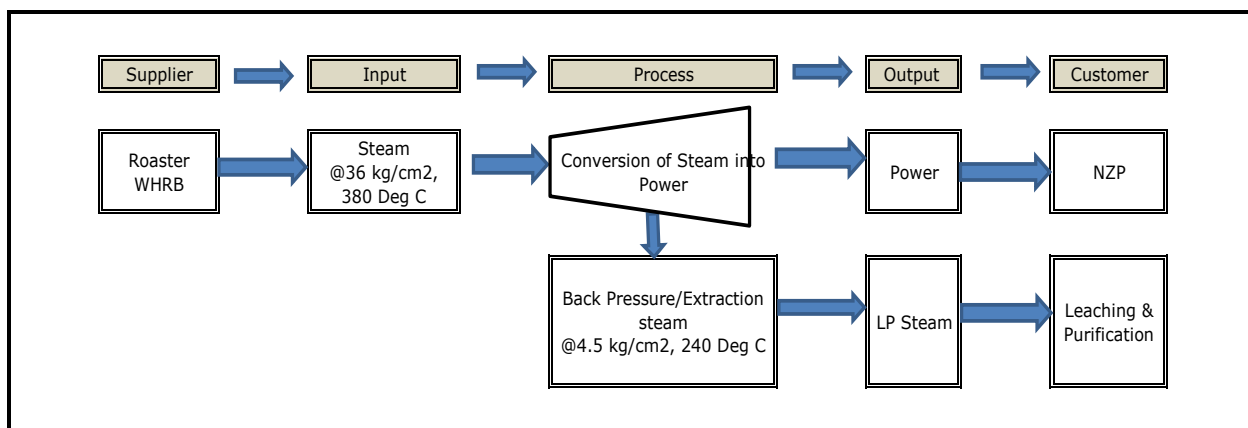


**i. WHRS (Waste Heat Recovery System)**

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 34.7 MW capacity.



**Figure 2.18: Process Flow Chart for WHRS**

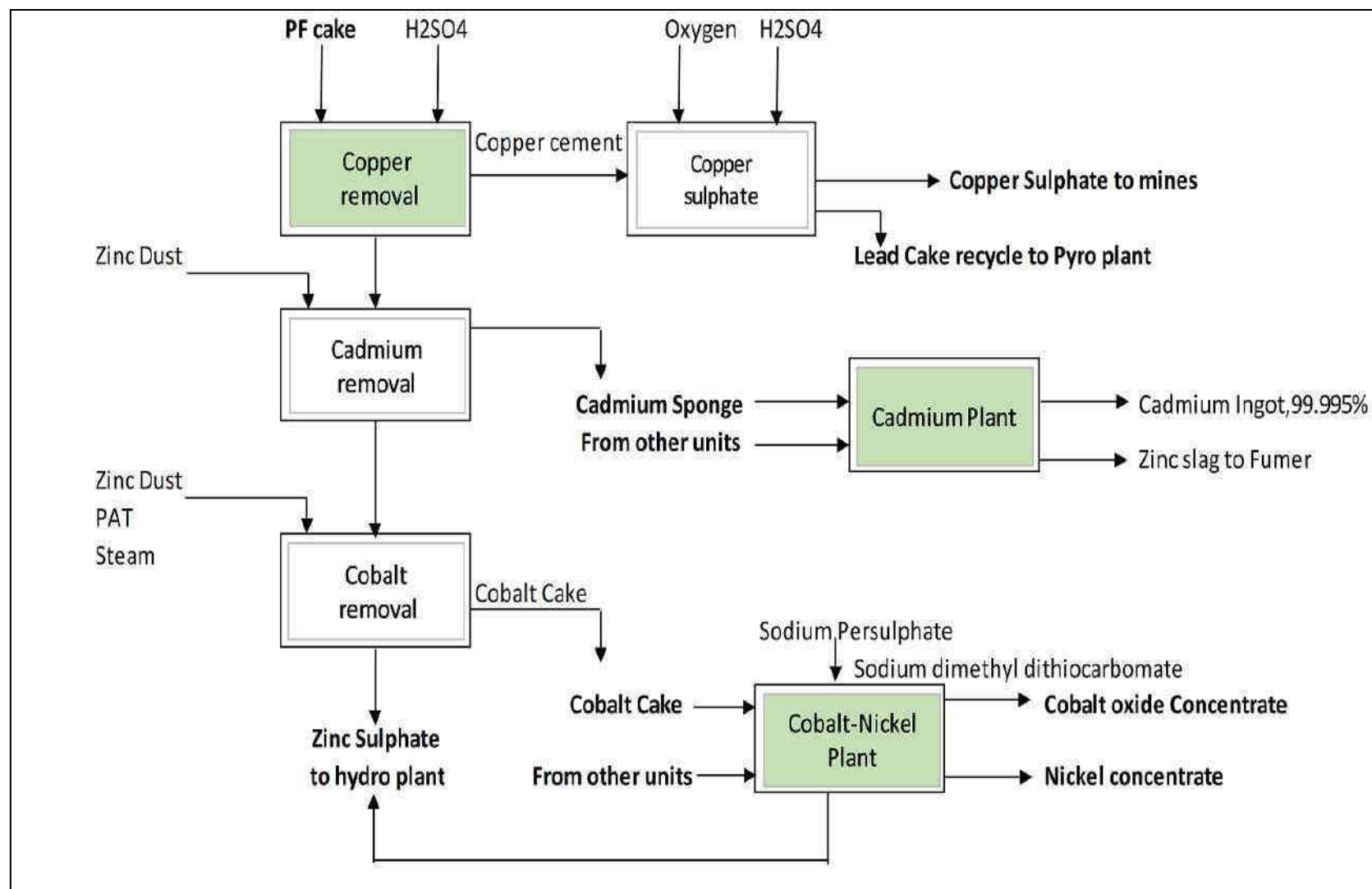
**ii. D.G. SETS Process of Power Generation:**

- 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 8 Emergency DG sets with total capacity of 23.53 MW exist in Existing Chanderiya lead zinc smelter Complex.
- Three DG are proposed in this project out of which Three DG of 1500 KVA, 625 KVA & 750KVA at Pyro and One DG 750 KVA will be installed at Hydro & one at CPP of 500 KVA with FGD additionally for Emergency Back-up purpose only.

**iii. MINOR METAL RECOVERY UNIT**

**Recovery of Precious Metal like Cadmium, Copper, Cobalt & Nickel**

Various metals will be recovered from various processes of the CLZS complex like Copper, Cadmium, Cobalt and Nickel. Cobalt and Antimony Slag (on metal basis).



**Figure 2.19: Process Flow Chart & Mass Balance Minor Metal Unit [Cadmium, Cobalt, Copper and Nickel]**

Brief description of Cd sponge to Cd ingot (99.995) and other Minor metal recovery process:

(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<sup>3</sup>. 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) Copper**

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) Cobalt**

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) Nickel**

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 Sherriett-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%.

**Table – 2.27**  
**List of equipment for Pyro (2 Rotary) Plant**

Sr. No.	Description	Qty.
1.	Rotary Furnace and Accessories	2
2.	Pollution control Equipment	2
3.	Cyclone and cooling ducts	2
4.	Pulse jet bag house	2
5.	ID fan without motor	2
6.	Chimney	2
7.	SO <sub>2</sub> scrubber system	2
8.	Hygiene hood system	2
9.	Rotary Charging Mechanism	2
10.	Oil storage tank	2
11.	Oil Service day tank	2
12.	Compressor	2
13.	Compressed air line with pulse jet system	2
14.	EOT crane with baby hoist	1
15.	Oil fired burner set including oil and air line	2
16.	Heating and pumping unit	2
17.	Metal and slag tray	40
18.	Trolley for tray	2
19.	Drive Motors	LS
20.	MCC panels, Cables and Local control	LS
21.	5MT Weighing Scale and crane mounted digital weigh	2
22.	Electrical transformers	2

**Table – 2.28**  
**List of Equipment for PF Cake**

Sr. No.	Description	UOM	Qty
1.	Reactor & Mother liquor Tank +SPT	Nos	12
2.	Washing Tank 20M <sup>3</sup>	Nos	4
3.	3 MT Monorail crane	Nos	2
4.	Pump for filter press feed & Circulation	Nos	24
5.	Intermediate Storage tank	Nos	2
6.	H <sub>2</sub> SO <sub>4</sub> dosing Tank -10KL	Nos	1
7.	Other dosing tank - 2KL FRP	Nos	4
8.	Storage Tank ZnSO <sub>4</sub>	Nos	2
9.	Storage Tank CuSO <sub>4</sub>	Nos	2
10.	Electrical cables with cable Tray	LS	LS
11.	Electrical Panels	LS	LS
12.	Structure for agitator, Platforms inc painting	MT	150
13.	Filter Press	Nos	4
14.	Agitators etc	Nos	12
15.	Blowers	Nos	6
16.	Oxygen Plant	NM <sup>3</sup> per hour	150
17.	Boiler for steam generation	TPH	5



## 2.8 Details of STP and ETP

**Table 2.29**  
**Details of ETP and STP**

Type / Source	Quantity of Waste Water Generated (KLD)	Treatment Capacity (KLPD)	Treatment Method	Mode of Disposal	Quantity of Treated Water Used in Recycling / Reuse (KLD)
Industrial	7598 (1500 KLD Pyro, 450 KLD Ausmelt, 3296 KLD H-I & 2352 KLD H-II)	2 existing ETPs (8400 KLD and 4200 KLD)	ETP	Zero liquid discharge	Total Recycled water after treatment for existing complex is 7069. ETP-1 <ul style="list-style-type: none"> <li>• 1037 KLD Reused in Lime Slurry preparation /slag cooling (Pyro)</li> <li>• 1099 KLD Reused in slag Granulation (Ausmelt)</li> <li>• 2486 KLD Reused in process (H 1) from RO-1 Permeate</li> <li>• 550 KLD reused in process (H 1) from RO3 Permeate</li> </ul> ETP-2 <ul style="list-style-type: none"> <li>• 72 KLD Reused in Lime slurry preparation</li> <li>• 1825 KLD Reused in process (H<sub>2</sub>) in RO-2 from Ro Permeate</li> </ul> In additional to the above, after proposed expansion project, 500 KLD treated water from RO <sub>3</sub> will be used for Mino Metal Recovery Complex
Domestic & Drinking	300	1000	STP		290 KLD used in Gardening/Irrigation

### 2.8.1 Effluent Treatment Plant

#### Description of ETP Process

The effluent generated from all Acid plant (Pyro, Hydro and Ausmelt) are collected in ECT-east and all other streams except Mg bleed plant effluents are collected in the ECT-west having a retention time of 24 hrs. Complete mixing of the all effluent is ensured by supplying air through air blower and HDPE air grid provided in Equalization tank. The equalization tank is in RCC with Acid alkaline proof tiling.

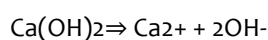
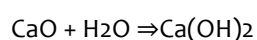
#### ETP Process

This mixed effluent from ECT-east is transferred to fluoride reaction tank where pH of effluent is increased up to 9.5 by auto addition of hydrated lime slurry and then pumped to Cd thickener. The overflow of Cd thickener is going to PRT & SRT. The underflow slurry which is having Pb(OH)<sub>2</sub> & Zn(OH)<sub>2</sub> is transferred to filter press. The filtrate water from filter press is taken in PRT & SRT and filter press cake is sent to Sinter plant for its reuse.

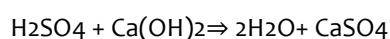
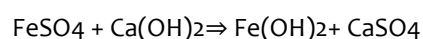
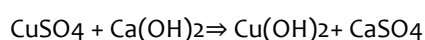
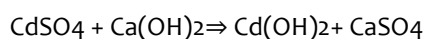
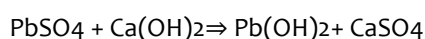
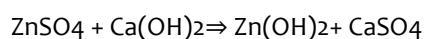
The Mg bleed effluent (leaching process) is being taken in Gypsum removal tank and pH is increased up to 11.5 by auto addition of hydrated lime slurry. All Mg gets precipitate in form of Mg(OH)<sub>2</sub>, then it pumped to filter press. The filter press cake is disposed to SLF. The filtrate water from filter press is taken in PRT & SRT.

The ECT-west effluent is neutralized in a primary reaction tank (PRT) with controlled addition of lime to attain a desired pH between 8-8.5. Further increase of pH to 10.5 is attained in the next secondary reaction tank (SRT).

In PRT pH is adjusted to 8.5 at these pH heavy metals such as zinc, lead and iron gets precipitated. The partially treated effluent and the precipitated solids are pumped to SRT where the pH is adjusted to 10.5 by the addition of further lime slurry for the precipitation of cadmium. Solution from SRT is pumped to primary thickener. The overflow from this thickener flows by gravity to the TRT where sulphuric acid is added to reduce the pH to 9.0. The underflow from the thickener is pumped to the filter-press to increase the density prior to its transport. The flow chart of the process is shown below. Hydrated lime is fed to the process as slurry. The hydrated lime then dissolves to increase pH. The two following equations illustrate these reactions:



The increased pH then provides hydroxide ions which combine with the dissolved metals to produce precipitates. The following equations show the precipitation reactions with different metals:



All reaction tank having auto lime dosing system to maintain desired pH, schedule cleaning/calibration of all pH electrode is being done.

The characteristics of effluent at inlet and outlet are as given below: -

**Table 2.30**  
**Characteristic of effluent at inlet and after treatment at outlet**

S. No.	Parameters	ETP Inlet	ETP Outlet	Standard
<b>Hydro-2 Unit</b>				
1.	pH	1-7	8.10	6.5-8.5
2.	Total Suspended Solids (TSS) in mg/l	10 gpl	BDL	100
3.	Biochemical Oxygen Demand (BOD) in mg/l	25-80	3.5	30
4.	Chemical Oxygen Demand (COD) in mg/l	80-200	26.4	250
5.	Oil & Grease in mg/l	less than 20	3.0	10.0
<b>Pyro Unit</b>				
6.	pH	1-7	8.32	5.5-9.0
7.	Total Suspended Solids (TSS) in mg/l	10 gpl	12	100
8.	Biochemical Oxygen Demand (BOD) in mg/l	25-80	8.0	30
9.	Chemical Oxygen Demand (COD) in mg/l	80-200	38.4	250
10.	Oil & Grease in mg/l	less than 20	5	10.0
Source: Pre - Feasibility Report				

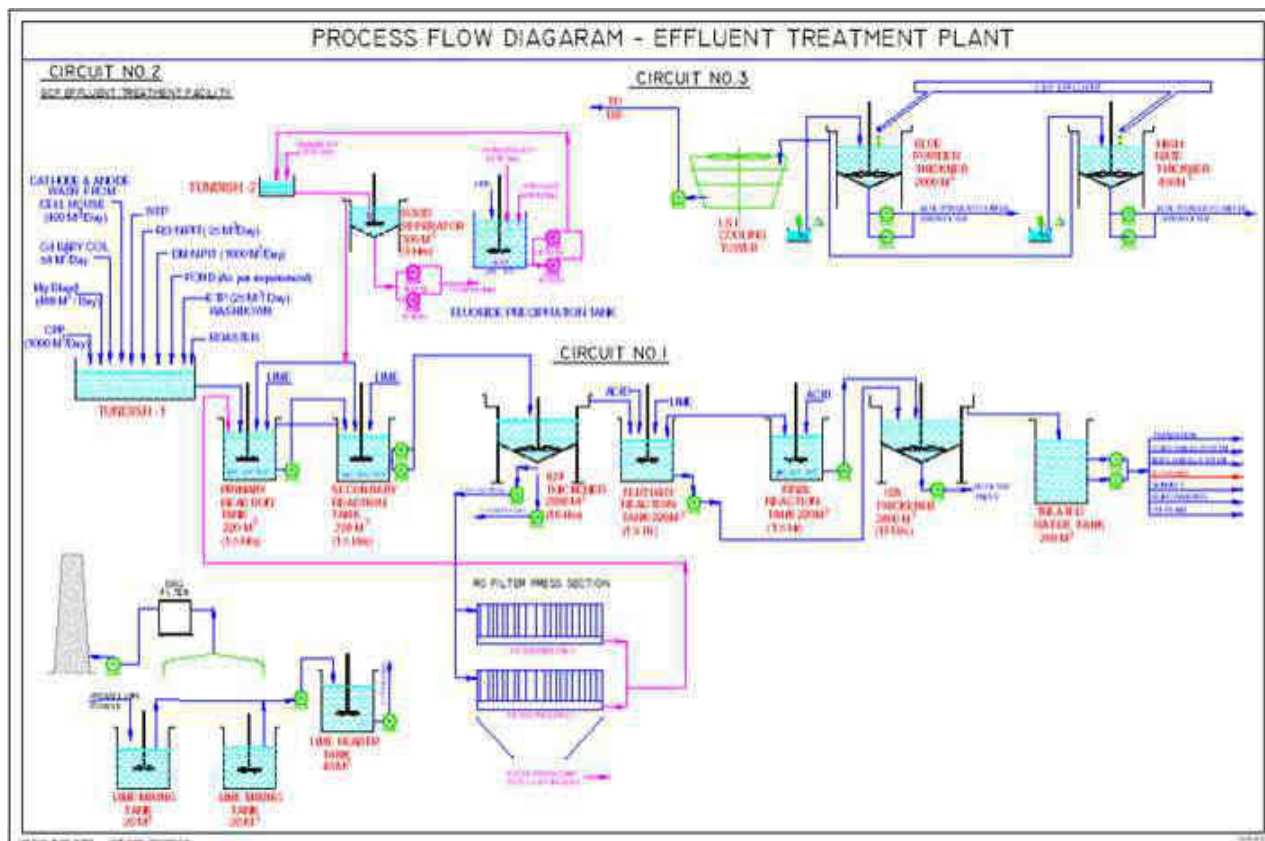


Fig: 2.20 Process flow diagram of ETP

### Filter Press operation

Sludge from thickener 24, 25, Cd and Mg reaction tank are pumped to filter press for reduction of water content in the sludge. Four units of filter press are provided. Filter press system is designed for all Sludge generated from ETP.

These units consist of series of rectangular plates, recessed on both sides that are supported face to face in vertical position on a frame with fixed and movable head. A filter cloth is hung or fitted over each plate.

The plates are held together with sufficient force to seal them so as to withstand the pressure applied during the filtration process. Hydraulic powered screws are provided to hold plates together.

Sludge is pumped into the space between the plates, and pressure required for the system is maintained, forcing the liquid through filter cloth and plate outlet ports. Then plates are separated and the sludge cake shall be removed.

The filtrate from the ETP is recycled to the reaction tank which is helpful for optimizing the water consumption of the plant.

### LIME PREPARATION TANK

Lime solution is prepared manually in the Lime mixing tank which is underground and constructed in the Civil. Lime mixing tank having a total capacity of 30 m³. Lime mixing tank is in two compartment of having capacity of 15 m³ each.

Lime solution is pumped to the Lime header tank of having capacity 20 m<sup>3</sup>. Lime solution from the header tank is dosed to the all the reaction tank and dosages of the lime control with the help of the PH Transmitter and auto control valve in the reaction tank.

Hood is provided at both lime mixing tank, common bag filter and stack in the MS of the height of 10m from the ground level for the lime system.

## 2.8.2 Sewage Treatment Plant

### BAR SCREEN:

The sewage effluent will be passed through a bar screen chamber where over size floating materials are separated and restricted to move towards operational zone.

### OIL & GREASE TRAP:

Effluent from bar screen will be taken oil separation chamber where oil if any would get trapped and removed by slotted oil pipe with help of oil skimmer.

### EQUALIZATION TANK:

The sewage would be collected in collection Equalization Tank where the variations in flow and characteristics are homogenized with through mixing before feeding to MBBR reactor.

### MBBR REACTOR:

This is called Moving Bed Bio Reactor. The equalized sewage will then be pumped to the MBBR where BOD/COD reduction is achieved by virtue of aerobic microbial activities. The oxygen required will be supplied through mechanical aerator and air blower. The main objective of adding this media is to make available more surface area for bacteria to grow on, thereby maintaining and retaining maximum possible bacterial population in a limited volume. High concentration of biomass enables reduction of aeration tank and in turn reduction in overall cost.

In MBBR, raw sewage enters at the top of the tank. Air is introduced at the bottom of the tank through fine bubble diffusers. Media will be in suspension because of the turbulence created by the air. The bacteria required for the oxidation of the organic matter is attached to the media and some part is suspended in the tank. After oxidation, the bacteria grow in numbers and need to be separated from the aeration tank liquor.

### TUBE SETTLER TANK:

Aerated water will feed into tube settler tank by centrifugal pump in upward flow. Here biological sludge generated in aeration tank will settle down, and come to sludge holding tank from where it will be removed periodically for suitable disposal after passing through filter press or it will be accumulated in sludge drying bed, which after drying will be used as manure plantation and green cover development. The tube settler helps in clarification and separation of the bacteria (sludge) and clear overflow flows into chlorine contact tank. In chlorine contact tank, Sodium hypo Chlorite (NaOCl) is added for disinfecting the clarified sewage.

#### SLUDGE HOLDING TANK:

The sludge from tube settler tank will be collected in this tank and the aerobic reaction will be continuing here. After reaction completion this sludge will deliver to filter press or sludge drying bed. Here total sludge will become dry and it will be used as manure for lawn and plantations.

#### CHLORINE CONTACTING TANK:

Here sodium hypo chlorite will be the dose for disinfecting the water and making it suitable and save for gardening. A suitable chemical dosing pump will be installed here to fulfill the requirement.

#### DUAL MEDIA FILTER:

It is a gravel & sand filter which helps to remove the turbidity from treated effluent.

#### ACTIVATED CARBON FILTER:

The un-turbid water will pass through ACF for removing bad odors, excess chlorine and maintain freshness of treated water.

#### FILTER PRESS:

Total excess sludge will pass through this mechanism and convert the sludge into dry cakes and will be used as manure in gardens.

#### TREATED WATER TANK:

The treated sewage effluent will be collected in Treated Water Tank (TWT) for further use in gardening and plantation area.

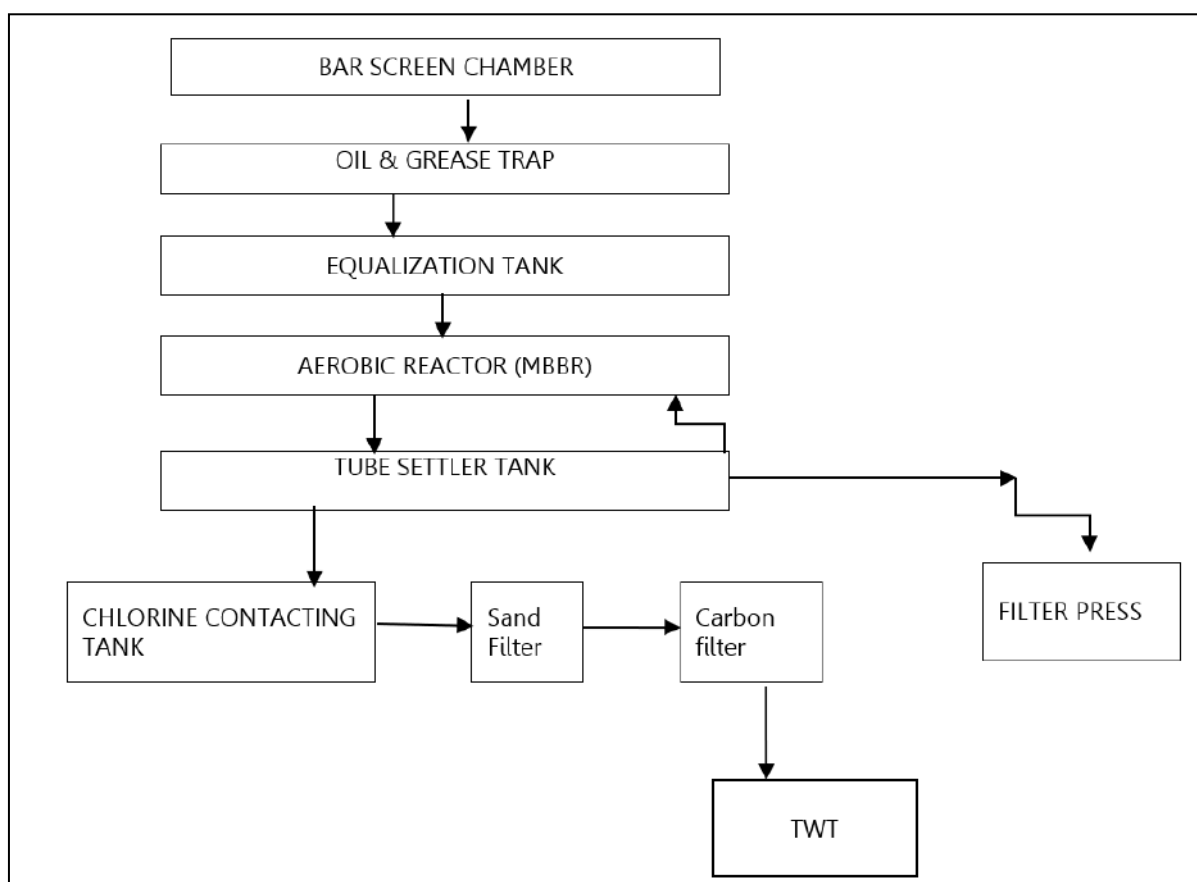


Fig. 2.21 Process flow diagram of Sewage Treatment Plant



## 2.9 MAJOREQUIPMENTS AND MACHINERIES

### 2.9.1 Equipment Selection

A list of equipment and storage capacities are given below. In selecting a particular type of equipment or storage for the project, among others, the following issues have been considered:

- ✓ Equipment costs
- ✓ Energy consumption
- ✓ Raw materials characteristics
- ✓ Sizes in which the equipment is available
- ✓ Lead times for particular types of equipments
- ✓ Operating experience with various types of equipments
- ✓ Ease of operation of equipment
- ✓ Product to be manufactured
- ✓ Site conditions
- ✓ Local skills available
- ✓ Environmental issues.

Details of the major equipment are given in para 2.7.

### 2.9.2 Storage Facilities

Adequate storage facilities have been already provided within the plant premises separately for raw materials and fuels, and PNG have metering station as supply through pipeline. No additional storage facilities will be required for the proposed Expansion and existing facilities will suffice for the proposed expansion. Details of existing storage facilities are given in table- 2.31:

**Table - 2.31**  
**Storage Facilities**

S.NO.	Material/ Facility	Unit	Existing Capacity	Additional	Total After Change in Product Mix
1.	Zinc Concentrate	MT	8000	NIL	8000
2.	Lead Concentrate	MT	7000	NIL	7000
3.	Bulk Concentrate	MT	3500	NIL	3500
4.	Lime stone	MT	1000	NIL	1000
5.	Iron Ore	MT	700	NIL	700
6.	Blue Powder	MT	1500	NIL	1500
7.	Copper Bearing secondaries Compounds	MT	500	NIL	500
8.	ISF dross	MT	1500	NIL	1500
9.	Sinter Fines/Sinter product	MT	5000	NIL	5000
10.	Acid Storage Tanks	Tons	5000	NIL	5000
11.	FG Yard Pyro	Tons	4000	NIL	4000
12.	FG yard Hydro	Tons	2500	NIL	2500
13.	Coal Yard CPP	Tons	40000	NIL	40000
14.	Fly-ash Silo	MT	400	NIL	400
15.	Bottom Ash Silo	Tons	150	NIL	150

Source: Pre-feasibility Report

## 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 Lead Zinc Smelter Complex are PM, SO<sub>2</sub>, Acid Mist, Lead, NO<sub>x</sub>, Hg & its compounds, NMHC & CO from various stacks.

- Emissions generated from production process as well as the prescribed limits from CPCB & MOEFCC are as PM (Pyro: 150mg/Nm<sup>3</sup>, Ausmelt: 50mg/Nm<sup>3</sup>, Hydro: 30 mg/Nm<sup>3</sup>, DG Sets: 75mg/Nm<sup>3</sup>), SO<sub>2</sub> (Pyro & Ausmelt: 2kg/ton of 100% conc. Acid produced; Hydro: 1kg/ton of acid produced; CPP: 600mg/Nm<sup>3</sup>), Acid Mist (Pyro & Ausmelt: 50mg/Nm<sup>3</sup>; Hydro: 30mg/Nm<sup>3</sup>); Lead (Sinter&Ausmelt: 10m/Nm<sup>3</sup>); NO<sub>x</sub> (CPP: 300 mg/Nm<sup>3</sup>, DG Sets: 710mg/Nm<sup>3</sup>), Hg & its compounds (CPP: 0.03mg/Nm<sup>3</sup>); NMHC (DG Sets: 100mg/Nm<sup>3</sup>) & CO (DG Sets: 150mg/Nm<sup>3</sup>).
- The SO<sub>2</sub> emission from Acid Plant (At Pyro Plant) will be reduced upto 1.5 Kg/ton of Acid production. The same will be achieved by improving the acid plant converter (SO<sub>2</sub> conversion efficiency by using super cesium catalyst in 4th bed). The same will be achieved by December, 2023.
- In Pyro plant, HZL will reduce the PM emission by replacement of existing bag filter bags with upgraded/ PTFE coated bags, which will bring down PM emission from existing 150 mg/Nm<sup>3</sup> to 100 mg/Nm<sup>3</sup>. The same will be achieved by December, 2024.
- 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
- Cansolv technology for Sulphur capture from Ausmelt Lead Furnace.
- Spraying of water is being continuously carried out at the various location viz., Lead concentrated bays, 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
- State-of-The-Art DCDA Acid Plants & Tail Gas Treatment Plant.
- Adequate stack height has been maintained for the existing DG set for better dispersion of the emissions, same will be followed for the proposed DG sets.
- Concentrate shed, Coal yard and Ash handling unit disposal area, concentrate 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;
- 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;
- Preventive & periodical maintenance of transportation vehicle is being /will be done.

- All existing Stacks have been provided with CEMS and the same are connected to CPCB & RSPCB Server. Continuous monitoring system for SO<sub>2</sub>
- Greenbelt / plantation at site helps to restrict the emission within the premises.

#### 2.10.1.1 Air Pollution Control Measures

Table - 2.32

Air Pollution Control Measures

S. No.	Section	Name of the Pollutant	Control Systems
1.	Roaster (Hydro I & II)	PM	Ventilation system has been provided in the Roaster Calcine handling and Storage Section followed by bag filters to maintain stack emission less than 30 mg/Nm <sup>3</sup> of PM
2.	Acid Plant (Hydro I & II)	SO <sub>2</sub> , Acid Mist & PM	With DCDA technology-based Acid Plant, SO <sub>2</sub> emissions is maintained less than 1 Kg of SO <sub>2</sub> /MT of Acid produced and Acid Mist is maintained less than 30 mg/Nm <sup>3</sup> .
3.	Zinc Melting & Dross Milling and Zinc Atomizing Unit (Hydro I & II)	PM	Bag filters at stacks are provided to trap PM to attain emission rate of 30 mg/m <sup>3</sup> .
4.	Leaching Plant (Hydro I & II)	-	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 short vent.
5.	Casting Areas (Hydro I & II)	PM	Fume extraction and Bag filters are provided to meet the stipulated limit of 30 mg/Nm <sup>3</sup> for PM.
6.	Fugitive Emissions (Hydro I & II)	PM	Concentrate shed, Coal yard and Ash handling unit, disposal area, and concentrate unloading point area provided with water sprinklers to arrest the fugitive sources of dust.
7.	Sinter and Gas Cleaning Plant (Pyro)	PM and Lead	<p>Sinter crushing buildings are provided with suction hoods and dust is recovered in bag filters or venturies and sent back to sinter bed through mixing and conditioning drums.</p> <p>In Pyro plant, HZL will reduce the PM emission by replacement of existing bag filter bags with upgraded/ PTFE coated bags, which will bring down PM emission from existing 150 mg/Nm<sup>3</sup> to 100 mg/Nm<sup>3</sup>. The same will be achieved by December, 2024.</p> <p>Further reduction in the PM Emissions from Pyro Plant is not technically feasible as the Bag filter technology installed in the plant is more than 30 years old, any updation in this will required change</p>

S. No.	Section	Name of the Pollutant	Control Systems
			<p>in whole plant design viz. installation of all new design Bag filters along with suctions and duct modification etc. As this expansion project involves only product mix change in pyro plant and no major structural modification is involved, therefore, it is not possible to reduce the PM emissions below 30 mg/Nm<sup>3</sup>.</p> <p>The hot gases coming out of the sinter machine hood, containing SO<sub>2</sub> gases along with other impurities will pass through gas cleaning plant comprising of hot gas electrostatic precipitator, scrubber tower, gas coolers and wet gas electrostatic precipitators, before entering the Sulphuric acid plant</p>
8.	Acid Plant (Pyro)	SO <sub>2</sub> , Acid Mist & PM	<p>The SO<sub>2</sub> emission from Acid Plant (At Pyro Plant) will be reduced upto 1.5 Kg/ton of Acid production. The same will be achieved by improving the acid plant converter (SO<sub>2</sub> conversion efficiency by using super cesium catalyst in 4<sup>th</sup> bed). The same will be achieved by December, 2023.</p> <p>The existing TGT is designed at 1.5 Kg/ton SO<sub>2</sub> emission and this expansion project involves only product mix change and no major structural modification or changes are involved. Therefore, it will not be feasible to achieve SO<sub>2</sub> emission &lt; 1 kg/t of acid with the existing TGT.</p> <p>The existing TGT is designed at 50 mg/Nm<sup>3</sup> Acid Mist emission and this expansion project involves only product mix change and no major structural modification or changes are involved. Therefore, it will not be feasible to achieve Acid Mist emission &lt; 50 mg/Nm<sup>3</sup> with the existing TGT. Therefore, the emission limits given as per CTO Conditions for Units will continue to be complied with.</p>
9.	ISF Plant	PM and Lead	<p>Extensive dust extraction network consisting of venturi scrubbers and bag filters are provided.</p> <p>Gas wash tower and Thiessen disintegrator are provided to capture furnace gas.</p>
10.	Ausmelt	PM and Lead	<p>Spraying of plain water is being continuously carried out at the various location viz., Lead concentrated bays, Belt conveyors, etc., to suppress the dust particles.</p> <p>Ventilation system followed by bag filters, are provided in the metal tapping area to control work zone emissions</p>

S. No.	Section	Name of the Pollutant	Control Systems
11.	Zinc Melting & Dross Milling and Zinc Atomizing Unit	PM	Stacks of these units are provided with bag filters to trap PM to meet the stipulated limit of 150 mg/m <sup>3</sup> at Pyro and 30mg/nm <sup>3</sup> at Hydro.
12.	Fugitive Emissions	PM	Concentrate shed, Coal yard and Ash handling unit disposal area, concentrate unloading point area are provided with water sprinklers to arrest the dust and fugitive sources of dust.
13.	Cadmium Recovery Plant in Pyro	PM	Bag filter will be provided before letting out the gases to atmosphere to ensure the stipulated standards.

#### 2.10.2 Water Quality Management

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

- 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. At present we are treating average 7598 m<sup>3</sup> or less effluent per day while we have treatment facility for 12600m<sup>3</sup>/d so increment if any in wastewater will be treated in existing system.
- Total wastewater generated from CLZS complex is 7598 KLD (1500 KLD Pyro, 450 KLD Ausmelt, 3296 KLD H-I & 2352 KLD H-II), which is being treated in two existing ETPs (8400 KLD and 4200 KLD, respectively).
- In ETP-1, 1037 (KLD) Reused in Lime Slurry preparation /slag cooling (Pyro), 1099 (KLD ) Reused in slag Granulation (Ausmelt), 2486 (KLD) Reused in process (H<sub>1</sub>) from RO-1 Permeate & 550 KLD from RO-2 Permeate. In ETP-2, 72 (KLD) Reused in Lime slurry preparation, 1825 KLD Reused in process (H<sub>2</sub>) in RO-2 from RO Permeate.
- All the Treated trade effluent is being used for Slag Granulation and Lime slurry preparation and remaining treated trade effluent will be further treated through three stage reverse osmosis (R.O.) plants and R.O. permeate will be recycled/ reused in the process within the premises.
- RO reject is being evaporated in solar evaporation pond and also used for spraying on waste disposal area; and
- 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.
- Mist evaporators are already installed at site.
- Effluent treatment plant followed with Three stage RO Plant and Multiple Effect Evaporator (MEE/MVR) Plant is already Commissioned at site;



- Blow down water from CPP is being/will be treated in neutralization pit and further reused in dust suppression.
- Domestic Waste water (300 KLD) generated from the office toilets is being/will be treated in existing STP (1000 KLD) and treated water (290 KLD) is being /will be used in process/Plantation.
- No wastewater is being /will be discharged outside the plant. Hence, Zero Liquid discharge will be maintained.

### 2.10.3 Noise Mitigation

The company will take following measures for noise Mitigation: -

- Scheduled preventive maintenance practice is being / will be adapted for servicing and smooth running of machines. Effort will made to integrate the criteria at procurement stage of the equipment.
- PPEs (e.g., ear muffs, ear plugs) are being / will be provided to workers attending the running noisy equipment of the plant.
- Periodic monitoring is being / will be carried out to evaluate the status.

### 2.10.4 Details of Solid and Hazardous Waste Generation and their mitigation

The type of solid & hazardous waste generated with their quantity and utilization is tabulated below:

**Table -2.33**  
**Solid and Hazardous Waste Generation**

S. No.	Type of Waste Quantity (Unit)	Cat. Code	Granted Quantity/ Latest EC	Additional	Total after Expansion	Method of Treatment and Disposal
Hazardous waste						
1.	Cooler cake (TPA)	7.2	6,000	NIL	6,000	Reuse/Recycle/Sale to registered recycler/Co-processing/ Disposal in SLF
2.	Anode mud (TPA)	7.2	2,200	NIL	2,200	Reuse/Recycle/Sale to registered recycler /Disposed in SLF
3.	Used/Spent oil (KLA)	5.1	96	NIL	96	Reuse/ Sale to registered recycler
4.	Waste oil (KLA)	5.2	270	NIL	270	Reuse/Sale to registered recycler
5.	Cobalt cake (TPA)	7.2	1,000	NIL	1,000	Reuse/Recycle/Sale to registered recycler /Disposed in SLF
6.	Purification cake / Enrichment cake (TPA)	7.2	12,520	NIL	12,520	Reuse/Recycle/Sale to registered recycler /Disposed in SLF
7.	Spent catalyst (KL)	17.2	60	NIL	60	Sale to registered recycler/disposed in SLF
8.	Non-ferrous Sludge from ETP and scrubbers (TPA)	7.4	13,600	16400 *	30000	Reuse/Recycle/Sale to registered recycler /Disposed in SLF/Co

S. No.	Type of Waste Quantity (Unit)	Cat. Code	Granted Quantity/ Latest EC	Additional	Total after Expansion	Method of Treatment and Disposal
						processing in Cement industries
9.	Discarded containers/barrels/liners used for Haz. Waste/chemicals (Nos./yr)	33.1	1,400	NIL	1,400	Reuse/Recycle/Sale to registered recycler /Disposed in SLF
10.	Flue gas cleaning residue (TPA)	37.2	2.0	NIL	2.0	Reuse/Recycle/Sale to registered recycler /Disposed in SLF
11.	Spent ion exchange resin containing toxic metal (TPA)	35.2	1.0	NIL	1.0	Sale to registered recycler/disposed in secure land fill
12.	Water purification Resin (TPA)	34.2	2.0	NIL	2.0	Sale to registered recycler/disposed in secure land fill
13.	Exhaust Air or Gas Cleaning Residue (Kg/Year)	35.1	100	NIL	100	Approved Incinerator
14.	Copper Bearing Lead Residue / Process Residue (TPA)	7.2	11000	NIL	11000	Sale to registered recycler /Disposed in SLF
15.	HGP Dust/HGP Cake (TPA)	7.2	7500	NIL	7500	Sale to registered recycler
16.	Filter and Filter material which contain organic compound (TPA)	-	100	NIL	100	Sale to registered recycler/disposed to secure land fill/approved Incinerator
17.	Oil Soaked Jute/cotton waste/Used PPE's	5.2	10.0	NIL	10.0	Sale to registered recycler/disposed to secure land fill/approved incinerator
18.	MEE Salt (TPA)	33.2	5,000	NIL	5,000	Recovery of Glauber Salt/ Disposal in SLF
19.	Process Residues and wastes / <b>Geothite Cake/ (MTPA)</b>	7.2	11471	NIL	11471	Captive SLF/Co processing/Sales to registered recyclers
20.	De Fluorination Cake (T)	7.2	NIL	2000	2000	Disposal in SLF
21.	ISF Dross (TPA)	7.2	NIL	10000	10000	Sale to registered recycler/disposed to secure land fill
22.	Lead Acid Battery Plates and other lead scarp /ashes/residues not covered under Battery	7.2	18000	NIL	18000	Recycling /reprocessing

S. No.	Type of Waste Quantity (Unit)	Cat. Code	Granted Quantity/ Latest EC	Additional	Total after Expansion	Method of Treatment and Disposal
	Management and handling rules 2001 (TPA)					
23.	Zn Dross,	7.2	0	12000	12000	Recycling /reprocessing
Non Hazardous Waste						
24.	Ausmelt Slag (MTPA)	Non Haz	26000	-	26000	Reuse in process
25.	Fly ash (TPA)	Non Haz	180312	276933	457245	100% in cement
26.	Bottom Ash (TPA)	Non Haz	80657	124772	205429	Cement & bricks manufacturing
27.	Gypsum (TPA) { FGD}	Non Haz	-	120000	120000	Utilization in Cement and other Industries.
28.	Slag (Fumer)	Non Haz	150000	NIL	150000	Utilization in Cement and other Industries
29.	Jarosite Cake (TPA) (Hydro Plant)	Non HAZ	306000	81000	387000 [81000 To be used in Fumer]	Utilization in Cement Manufacturing / Road / Rail embankment / Concrete construction / disposal in Lined Jarofix yard
30.	ISF Slag (MTPA)	Non Haz	85000	55000	140000	Cement /highway /reuse in process

\*{Against usage of Lime instead of Caustic & treatment of blow down}

## 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 Chanderiya Lead 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 Chanderiya Lead 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 Expansion within the existing Chanderiya Lead Zinc Smelter Complex 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 with respect to the components of the environment, viz. land, meteorology, air, noise, water, soil, biological and socio-economic. The baseline monitoring has been conducted during post monsoon season (Oct. to Dec., 2020) and One Month additional study for AAQ during (October, 2021) covering an area of 10 km radius from the plant site in accordance with the guidelines of MoEF&CC and approved ToR granted for the proposed expansion project for preparation of EIA/EMP report.

#### 3.2 STUDY AREA

An area of 10 km radius (aerial distance) from the plant site is marked as study area. The study area for the project is rural and falls in Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan). 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 project site is considered as buffer zone.

The major environmental settings of the study area are as given in Table - 3.1 and shown in Figure - 3.1.

**Table - 3.1**  
**Environmental Setting Details**

S. No.	PARTICULARS	DETAILS (with approximate aerial distance & direction from the nearest plant boundary)
1.	Nearest Villages	<ul style="list-style-type: none"> <li>• Putholi (~0.5 km in SW direction from plant site)</li> <li>• Ajoliya Ka Khera (~ 1 km in West direction from plant site)</li> <li>• Biliya (~ Adjacent in North direction from plant site)</li> </ul>
2.	Nearest Town/City	<ul style="list-style-type: none"> <li>• Chittorgarh (~7.0 km in South direction from plant site)</li> </ul>
3.	Nearest Railway Station	<ul style="list-style-type: none"> <li>• Chanderiya Railway station (~2.5 km in SW direction from plant site)</li> <li>• Chittorgarh Railway Station (~9.25 km in SSW direction from plant site)</li> <li>• Gangrar Railway Station (~9.5 km in NNW direction from plant site)</li> </ul>
4.	National Highway	<ul style="list-style-type: none"> <li>• NH-79 (~0.5 km in West direction from plant site)</li> <li>• NH-76 (~2.5 km in ESE direction from plant site)</li> </ul>
5.	Nearest Air port	Maharana Pratap Airport – Udaipur (~85 km in SW direction from plant site)
6.	National Park, Wildlife	<ul style="list-style-type: none"> <li>• Dadiya RF (~9.5 km in NNW direction from plant site)</li> </ul>

S. No.	PARTICULARS	DETAILS (with approximate aerial distance & direction from the nearest plant boundary)
	Sanctuary, Biosphere Reserve, Tiger Reserve, Wildlife Corridors, Reserved / Protected Forest (PF) etc. within 10 km radius	<ul style="list-style-type: none"> <li>• Baramagra RF (~9.5 km in NNW direction from plant site)</li> <li>• Shikargarh Salera RF (~1.5 km in NW direction from plant site)</li> <li>• RF (~7.5 km in NNW direction from plant site)</li> <li>• Kabra RF (~4.0 km in NW direction from plant site)</li> <li>• Modia Magra RF (~3.5 km in WNW direction from plant site)</li> <li>• Era RF (~6.5 km in NW direction from plant site)</li> <li>• RF (~3.5 km in SSW direction from plant site)</li> <li>• Bir Salarmala RF (~1.5 km in WNW direction from plant site)</li> <li>• Nilia Block RF (~4.5 km in East direction from plant site)</li> <li>• Samra RF (~6.5 km in East direction from plant site)</li> <li>• Dundaniya RF (~9.0 km in East direction from plant site)</li> <li>• Bhugariya Block RF (~10 km in East direction from plant site)</li> <li>• Barkhera Block RF (~8 km in SE direction from plant site)</li> <li>• Reserved Forest (~4 km in SSE direction from plant site)</li> <li>• Chittorgarh Fort RF (~5.5 km in South direction from plant site)</li> <li>• Sadi Block RF (~10 km in SE direction from plant site)</li> <li>• Nagari PF (~2.0 km in SE direction from plant site)</li> </ul>
7.	Water Body within 10 km radius	<ul style="list-style-type: none"> <li>• Putholi Nala (Passing through the plant site)</li> <li>• Berach River (Adjacent in East from the Plant site)</li> <li>• Gambhir Nadi (~4.0 km in South direction from the Plant site)</li> <li>• Nagdi ka Nala (~8.5 km in NNE direction from the Plant site)</li> <li>• Canal (~8 km in WNW direction from the Plant site)</li> </ul>
8.	Archeological Sites within 10 km radius study area	<ul style="list-style-type: none"> <li>• Chittorgarh Fort (~6 km in South direction from the Plant site)</li> </ul>
9.	Seismic Zone	Zone - II [as per IS 1893 (Part-I): 2002] i.e., Low Damage Risk Zone

Source: Pre-feasibility Report

Details of the major Industries falling within 10 km radius study area are given as under:

**Table 3.1a**  
**List of major industries falling within the 10 km radius study area**

S.No.	Industries	Type of Industries	Approx. Distance from the project boundary (km)	Direction from center of the project site
1.	Swastik Polytex Pvt. Ltd.	Fabric	~ 1.9	North
2.	Chittor cement works	Cement	~ 2.69	SW
3.	Birla cement works	Cement	~ 3	SW
4.	RIICO Industrial area		~ 4.5	SW
5.	Chittor Polyfab Pvt. Ltd.	Fabric	~ 5.8	South
6.	Star Cotspin LTD.	Synthetic	~ 5.8	North
7.	Inani marbles & granites	Marble & Granites	~ 6	WSW
8.	Wonder cement-Basant Enterprises	Cement	~ 10	SSW
9.	Apart from the above, various medium & small industrial units are there within the study area			



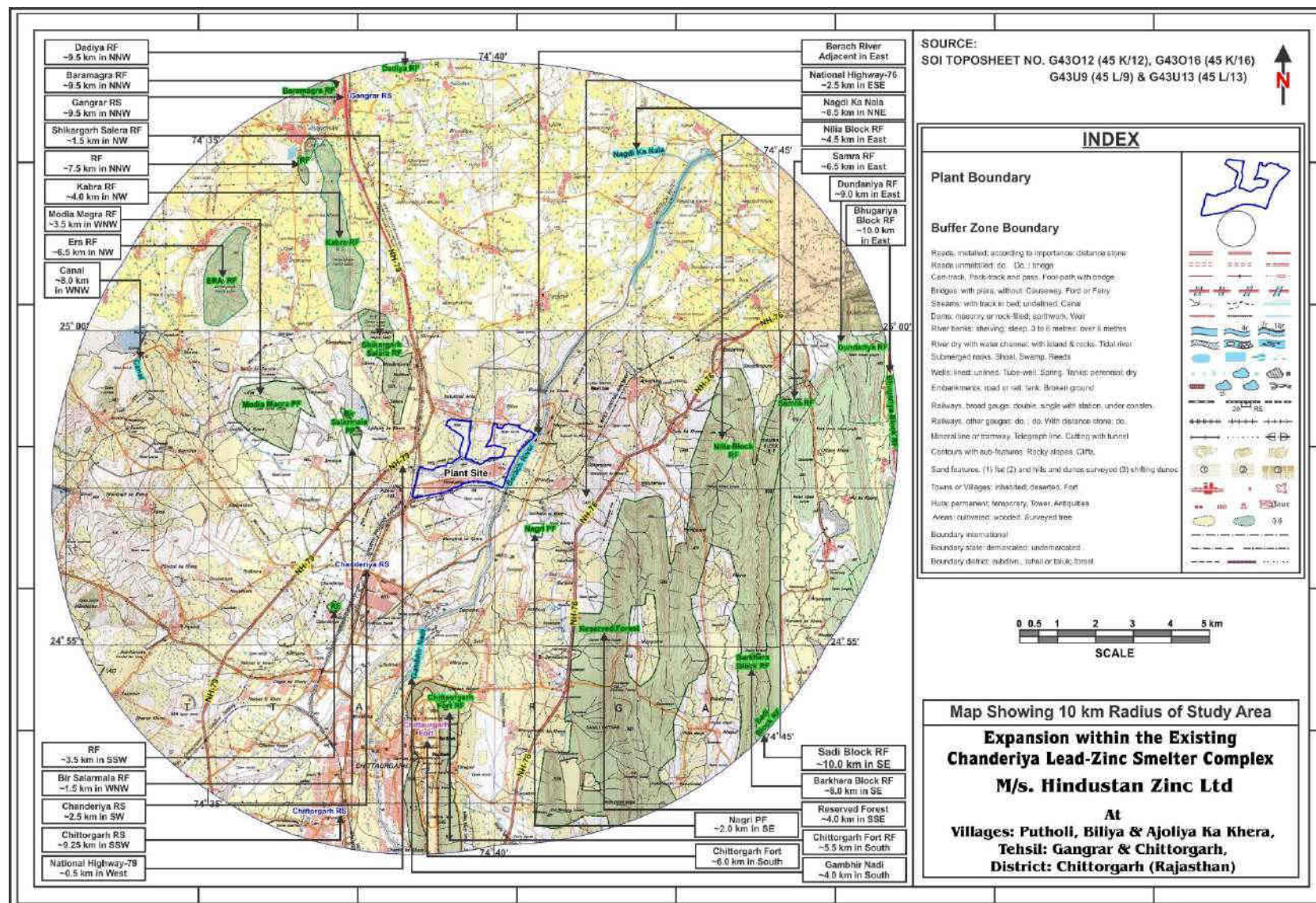


Figure 3.1: Map Showing Environmental Settings of 10 km radius Study Area

### 3.3 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 post monsoon season (Oct. to Dec. 2020) and One Month additional study for AAQ during (October, 2021) in accordance with the guidelines for preparation of EIA studies in order to assess the impacts of proposed expansion project on existing physical, biological and social environment.

### 3.4 ENVIRONMENTAL COMPONENTS

Information on the following components / parameters were 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., post monsoon Season (Oct. to Dec., 2020) and One Month additional study for AAQ during (October, 2021). Details are given in the Table 3.2 given below.

Sampling, preservation, transportation/storage and analysis of samples were carried out by J.M. EnviroLab Pvt. Ltd. under the supervision of respective EC/FAE concerned.

Table - 3.2

## BASELINE DATA COLLECTION (POST MONSOON SEASON – OCT. TO DEC. 2020) &amp; OCT. 2021

S. No.	Environmental Component	Primary data				Secondary data
		Parameters	Frequency	Monitoring / Sampling Locations	Methodology	
1.	Land	Agriculture Habitation Industry Stony waste/ Quarries Forest area Plantation/ Vegetation Open scrub Water bodies Land use/ Land Cover	Once in a Study period 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
2.	Meteorology	Temperature, Relative Humidity, Wind Speed, Wind Direction Rainfall	Daily	01 (Plant site)	Automatic Weather monitoring station	IMD book (Climatological normals 1981-2010), Past year Rainfall data for Chittorgarh district.
3.	Air	PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>2</sub> , CO, Lead, Nickel.	One Season Study (Twice a week) (As per NAAQS)	09 (Oct. to Dec., 2020) &	Sampling: CPCB Guidelines/NAAQS / IS 5182 and Instrument Manual Analysis: CPCB Guidelines / IS 5182	–
		O <sub>3</sub> , NH <sub>3</sub> , Benzene, Benzo(a)pyrene (BaP)-Particulate phase only, Arsenic, Zinc	Once in a season	13 (Oct., 2021)		
4.	Noise	Equivalent noise levels in Leq in dB (A) Day time & Night time	Once in a season	09	Sampling: IS 9989 Analysis: CPCB Guidelines/IS 9989	--
5.	Water					
a.	Surface Water	Parameters as per IS 10500 - 2012	Once in a season	05	Sampling: CPCB Guideline & APHA 22nd edition 2012	--

S. No.	Environmental Component	Primary data				Secondary data
		Parameters	Frequency	Monitoring / Sampling Locations	Methodology	
b.	Ground Water		Once in a season	08	Analysis: IS 10500-2012/ IS 3025/APHA 22 <sup>nd</sup> edition 2012	--
7.	Soil	Parameters As per IS 2720/USDA	Once in a season	08	Sampling: USDA Analysis: As per IS 2720/USDA	Indian Agricultural Research Institute Handbook
8.	Biological Environment	Flora and fauna	Once in a season	Study area	Quadrat sampling method/ random sampling	Forest working plan and Local Information forest.rajasthan.gov.in
9.	Socio-Economic Environment	Socio-Economic Demography	Once in a season	Study area	<b>Economic Parameter</b> Random Sampling of the villages. Survey Conduction, Through Questionnaire approach.	<ul style="list-style-type: none"> <li>• Demographic Data: Census data, 2011.</li> <li>• Basic amenities Data: Census data, 2011.</li> </ul>

### 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 attached Glass midglets impingers 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.
- ✎ Water Level Indicator and
- ✎ Global Positioning System (GPS).

The collected samples of air, water, noise and soil as given in above section were collected from the representative 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 site visit team through interaction with a large number of local inhabitants from the study area and also with different government departments for preparation of additional studies such as Land use Land cover study; Biological Environment, Socio-economic study etc.

Based on the primary and secondary data obtained from the 10 km radius buffer area and the core area, the Analysis interpretation and conclusion of the baseline conditions within the core zone and buffer zone is given below:

### 3.6 BASELINE STATUS OF THE VARIOUS ENVIRONMENTAL COMPONENTS

#### 3.6.1 Land

##### 3.6.1.1 Land Use Pattern

To study the land use pattern of the core as well buffer zone, land use / land cover maps have been prepared in accordance to ToR Point no. A-4 (ix) Stating: "A list of major industries with name and type within study area (10 km radius) shall be incorporated. Land use details of the study area".

Current vintage data of Indian Remote Sensing Satellite ResourceSat-2A L4FMX (False Color Composite) has been used for Land Use / Land Cover study. Satellite image has been procured from National Remote Sensing Centre, Hyderabad.

##### **Objectives:**

The objectives of the LULC study are as follows:

- To develop the Land use & Land cover map using land coordinates of the plant area (Core Zone) and 10 km radius from the plant site (Buffer area).
- To Identify and mark the important Land use and Land cover features using the primary and secondary data collected.
- To evaluate the impacts on existing land use/cover features of the buffer area by the Proposed expansion Project activities.
- To identify the mitigative measures for the sustainable use of land and to protect the buffer zone from the adverse impacts.

##### **Technical Specification of Satellite Imagery Data Used:**

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 for geo-referencing of satellite image.

☞ Satellite Image: RESOURCESAT-2A (L4FMX)

☞ Satellite Data Source: NRSC, Hyderabad

☞ Satellite Vintage: 19<sup>th</sup> Feb., 2021

☞ SOI Toposheet No.: GA3012, GA3016, GA3009, GA3013

☞ Software Used: Earth Resources Data Analysis System (ERDAS) Imagine 1

##### **Methodology**

- ☞ Preliminary / primary data collection of the study area
  - Satellite data procurement from NRSC Hyderabad
  - Primary field survey
- ☞ Secondary data collection from authorized bodies
  - Survey of India Toposheet (SOI)



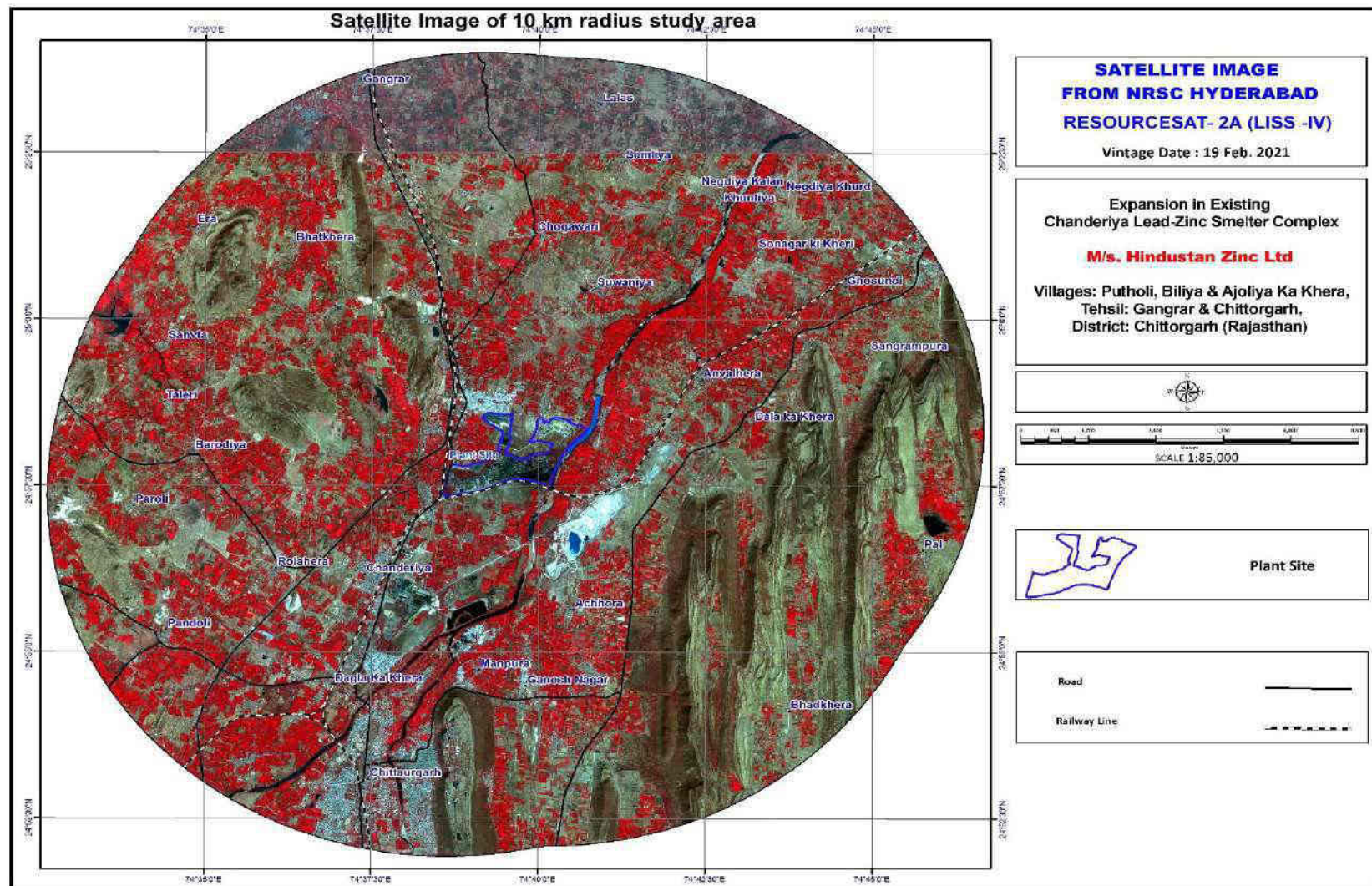
- Plant Layout
- Cadastral / Khasra map
- GPS Coordinates of Project Boundary

**Image Processing methods:**

Processing of satellite data using ERDAS Imagine 14 and to prepare the land use & Land cover maps (e.g. Water Bodies, River/ Nallah, Agriculture Land, Forest Land, Vegetation/ Plantation, Open Land, Open Scrub Land, Human Settlement and Industry etc. etc.) by digital image processing (DIP) technique.

- Geo-Referencing of the Survey of India Toposheet
- Geo-Referencing of satellite Imagery with the help of Geo-Referenced Toposheets
- Enhancement of the Satellite Imagery
- Base Map layer creation (Roads, Railway, Village Names and others Secondary data etc.)
- Data analysis and Classification using Digital interpretation techniques.
- Ground truth studies or field verification
- Error fixing / Reclassification
- Final Map Generation

Satellite Image (FCC) for 10 km radius study area is given in Figure - 3.2(a).



Source: NRSC, Hyderabad

Figure 3.2 (a): False Color Composite (FCC) Satellite Imagery of the Buffer Zone

### 3.6.1.2 Land Use Pattern of the Buffer Zone (Study area)

Details of the same are given in Table - 3.3 and map shown in Figure - 3.2 (b).

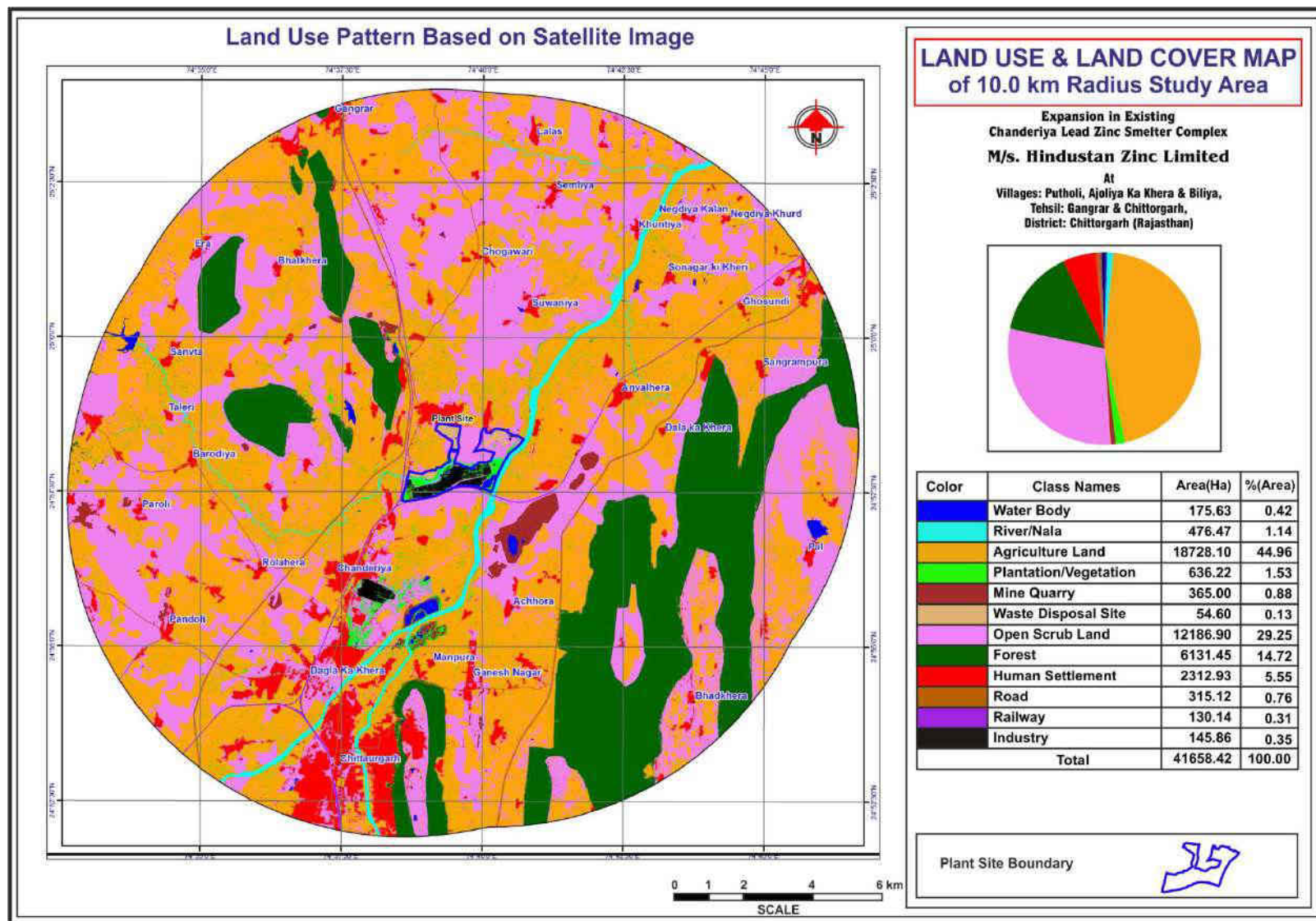
**Table - 3.3**

**Land Use / Land Cover Details of Study Area**

S. No.	Legend	Area (in ha)	% Area
1.	Water Body	175.629	0.42
2.	River/Nala	476.473	1.14
3.	Agricultural Land	18728.100	44.96
4.	Forest	6131.450	14.72
5.	Plantation	636.217	1.53
6.	Mine Quarry	419.603	1.01
7.	Open scrub Land	12186.900	29.25
8.	Industry	145.859	0.35
9.	Human Settlement	2312.930	5.55
10.	Railway	130.139	0.31
11.	Road	315.122	0.76
<b>Total</b>		<b>41658.422</b>	<b>100.00</b>

Source: LU/LC Map for Buffer Zone





Source: Satellite Imagery

Figure 3.2 (b): Land Use / Land Cover Map of the Study Area (Source: bhukosh)

### **Interpretation and Conclusion of Land Use / Land Cover Study**

- ∞ The 10 km radius study area mainly comprises of Agricultural land (44.96 %), Open Scrub land (29.25%) & Forest Land (14.72 %) respectively, of the total study area.
- ∞ Rest of the land use classes cover only 11.7% of the study area including Water Body, River/Nala, Plantation, Mine Quarry, Waste disposal site, industry, Human Settlement, Railway and Road.
- ∞ 17 no. of RFs & 1 PF are there within the study area as mentioned in table-3.1. The buffer zone studied has no ecological sensitive area (National Park, Wildlife Sanctuary, Biosphere Reserve/ etc.).
- ∞ 0.35 % of the total study area is majorly occupied by industrial establishments. Details of the other industries have been mentioned in table-3.1(a) of this chapter.

#### **∞ Cropping pattern of the Buffer Zone:**

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 project 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>)

### **3.6.1.3 Digital Elevation Model**

Digital Elevation Models are data files that contain the elevation of the terrain over a specified area, usually at a fixed grid interval over the "Bare Earth". The intervals between each of the grid points will always be referenced to some geographical coordinate system. This is usually either latitude-longitude or UTM (Universal Transverse Mercator) coordinate systems. The closer together the grid points are located, the more detailed the information will be in the file. The details of the peaks and valleys in the terrain will be better modeled with small grid spacing than when the grid intervals are very large. Elevations other than at the specific grid point locations are not contained in the file. As a result, peak points and valley points not coincident with the grid will not be recorded in the file. For practical purpose this "Bare Earth" DEM is generally synonymous with a Digital Terrain Model (DTM). DEM has been prepared for the proposed Expansion within the existing Chanderiya Lead Zinc Smelter Complex for 10 km radius study area.

#### **(A) DATA USED**

DEM Data: Shuttle Radar Topographic Mission (SRTM) data  
Data Source: <http://srtm.csi.cgiar.org>



Software Used : Arc GIS

**(B) METHODOLOGY**

Shuttle Radar Topographic Mission (SRTM) data has been used for creation of Digital Elevation Model of the study area. The SRTM data has vertical accuracy of 16 m and the spatial resolution is of 90m.

**1st Stage:**

The first processing stage involves importing and merging the 1-degree tiles into continuous elevational surfaces in Arc GRID format.

**2nd Stage:**

Resampling the data at 23 m is done and a contour interval of 20 m through the usual process of interpolation is created.

**3rd Stage:**

SRTM data is converted in grid format through Arc GIS 9.2 to obtain elevation information of study area. Contours are then generated at 20 m interval through 3D analyst of Arc GIS and then are interpolating with raster data.

**4th Stage:**

Integration of DEM with contour map showing 3D view for analysis of surface is done.

**C) INTERPRETATION**

It is very clear from the DEM that the elevation varies from 380 m to 610 m in the whole study area. And the core zone is in the range of 390-400m.

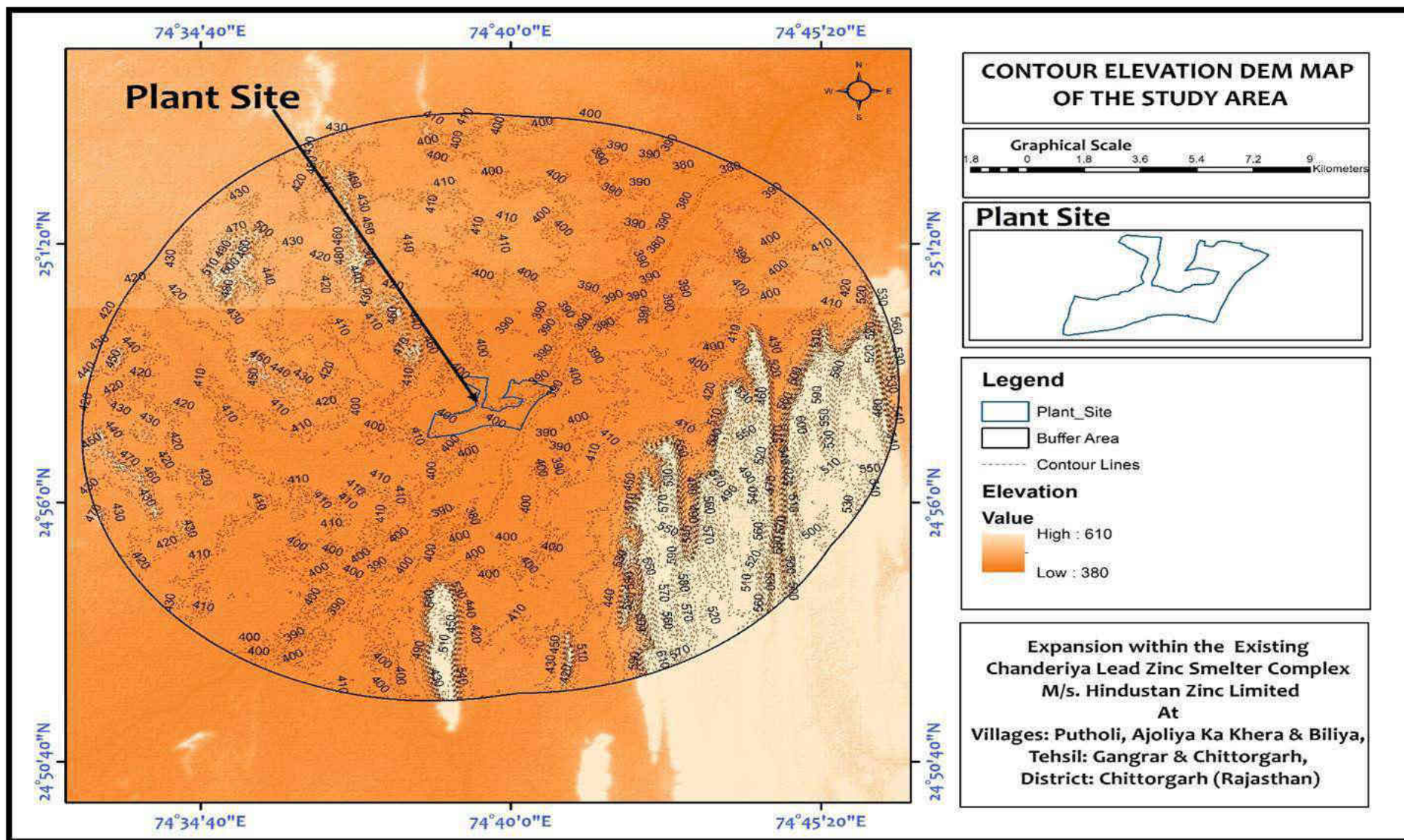


Figure 3.2c. Digital Elevation Model (DEM) of the Study Area

### 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 - 3.4 (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:** [www.ndma.gov.in/images/guidelines/earthquakes.pdf](http://www.ndma.gov.in/images/guidelines/earthquakes.pdf)

The Rajasthan State falls in a region of low Seismic hazard zone with the exception being moderate hazard in areas along west state border. It mainly lies in Zones II and III. Several faults have been identified in this region out of which many show evidence of movement during the Holocene epoch. The Cambay Graben terminates in the south-western part of the state. The Konoil Fault near Jaisalmer trends in a north-south direction and was associated with the 1991 Jaisalmer earthquake. Several active faults criss-cross the Aravalli range and lie parallel to each other. The most prominent of them is the north-south trending Sardar Shahar Fault and the Great Boundary Fault which runs along the Chambal River and then continues in the same direction into Uttar Pradesh. However, it must be stated that proximity to faults does not necessarily translate into a higher hazard as compared to areas located further away, as damage from earthquakes depends on numerous factors such as subsurface geology as well as adherence to the building codes.

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 - 3.3(b)]

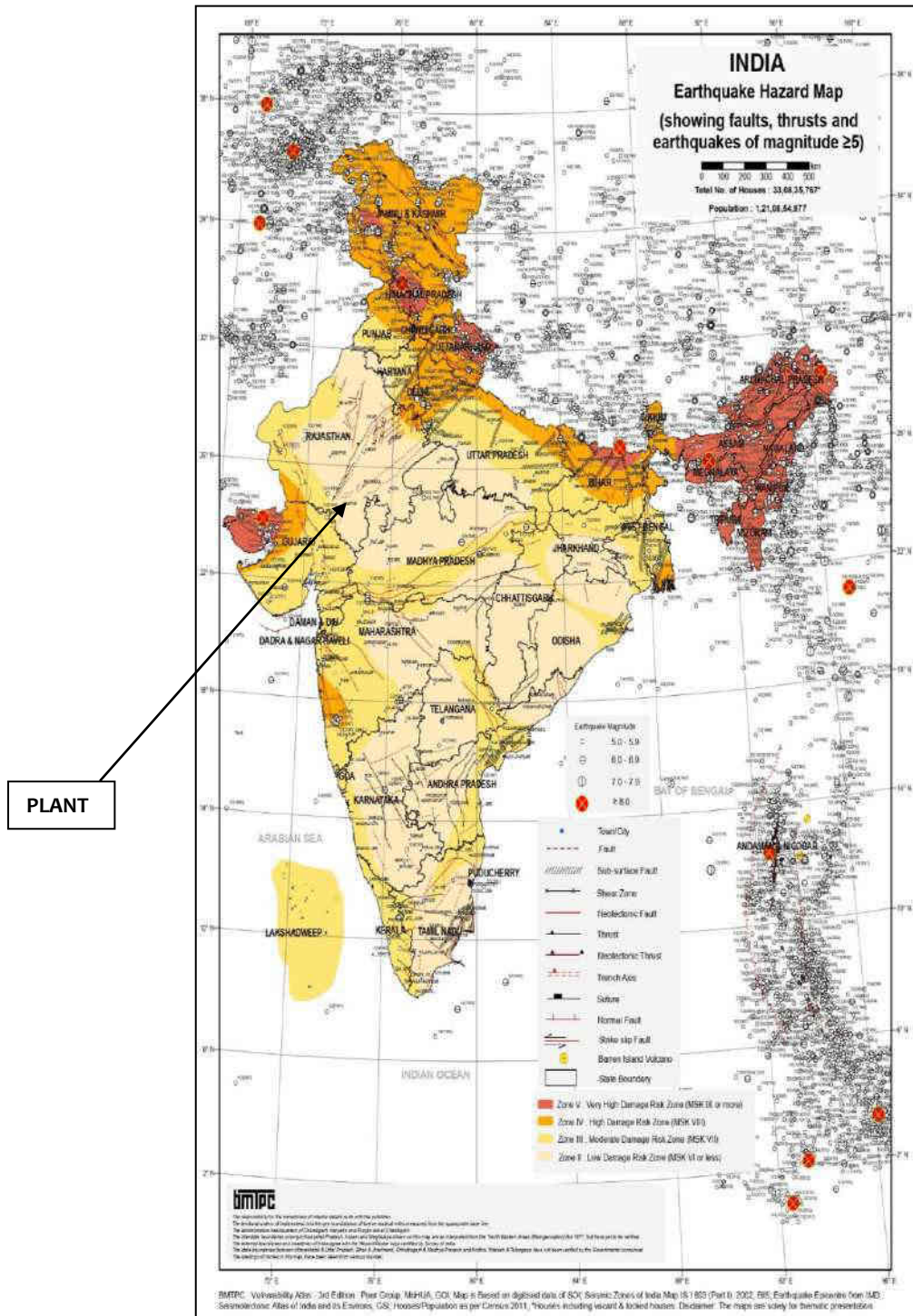


Figure 3.3(a) Seismic Zone Map (Plant site falls in Seismic zone II)

Classification of districts of Rajasthan as per seismic zones [IS - 1893 (Part-1): 2002] is given in Table 3.6 (b) & figure 3.3(a)



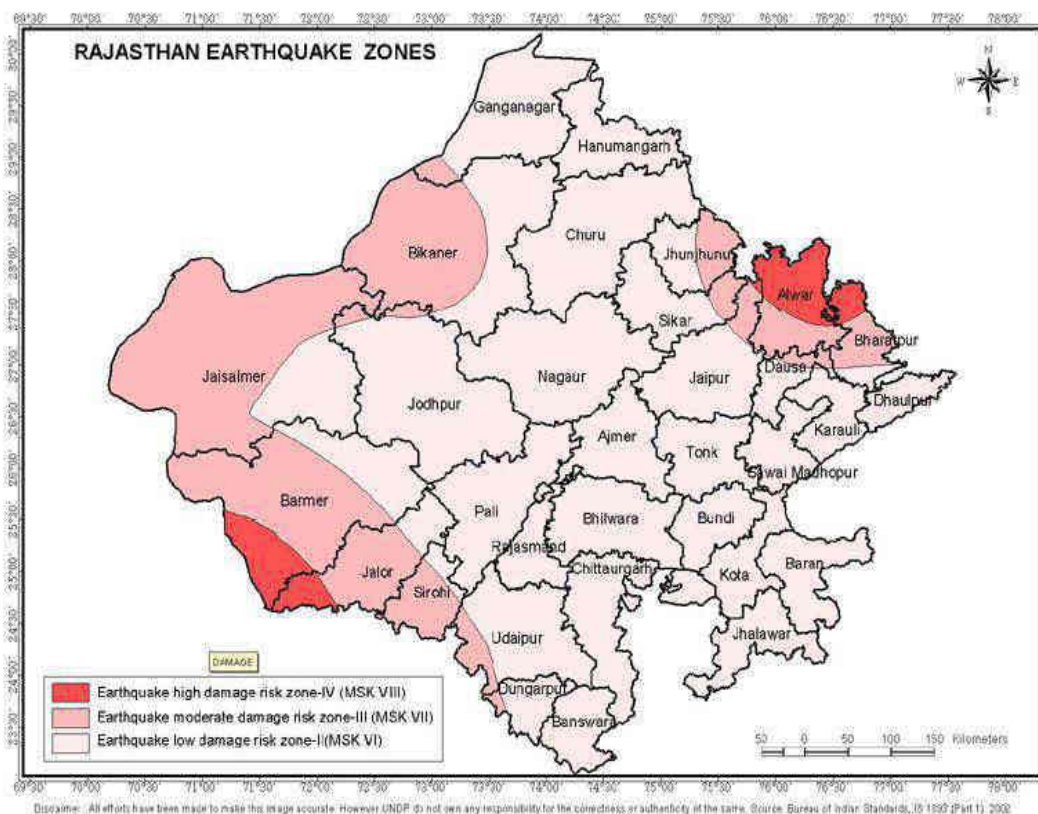


Figure 3.3(b) District wise Seismic Zone Map (Plant site falls in Seismic zone II)

Table - 3.4 (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, <b>Chittorgarh</b> , 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 (Sanchoore Block), Alwar (Tijara Block), Bharatpur (Block nagar, Pahari)

The Plant site as well as 10 km study area lies in Zone-II Low Risk Zone of Seismic Zoning Map of India, updated by “Vulnerability Atlas – 3<sup>rd</sup> Edition (updated on 2<sup>nd</sup> March, 2019); Peer Group, Ministry of Health (MoH) and UPA; based on digitized data of SOI, GOI; Seismic Zones of India Map, IS 1893 – 2002, BIS, GOI, Seismic tectonic Atlas of India and its environs, GIS, GOI”ss

{Source: (<https://www.rajras.in/seismic-zones-faults-earthquake-hazard-rajasthan/>)}

#### Flood Hazard Zonation of the Area

As per -the “BMTPC: Vulnerability Atlas – 3<sup>rd</sup> Edition (updated on 2<sup>nd</sup> 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” the proposed plant site does not fall under “area liable to flood”. Flood Hazard Zonation Map of India showing the plant site is given in Figure-3.4 (a)



However, as per the Flood hazard vulnerability map of the Chittorgarh District (source: <https://bhuvan-app1.nrsc.gov.in/nfvas/#>) the site lies between Moderate to High Vulnerability (Figure-3.4 c).

As the project site is located at villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan) is within 1 km radius of Berach River. Water bodies namely Berach River (Adjacent from the Plant Site) is marked as yellow category or “Above Normal” situation as per Central Water Commission which flood forecasting site touches or crosses its warning level, but remains below the danger level of the site exists within the 10 km radius of the study area.

And as per the historic rainfall data of past 30 years from Chittorgarh District the peak discharge season is July to August and lean discharge season is October November.

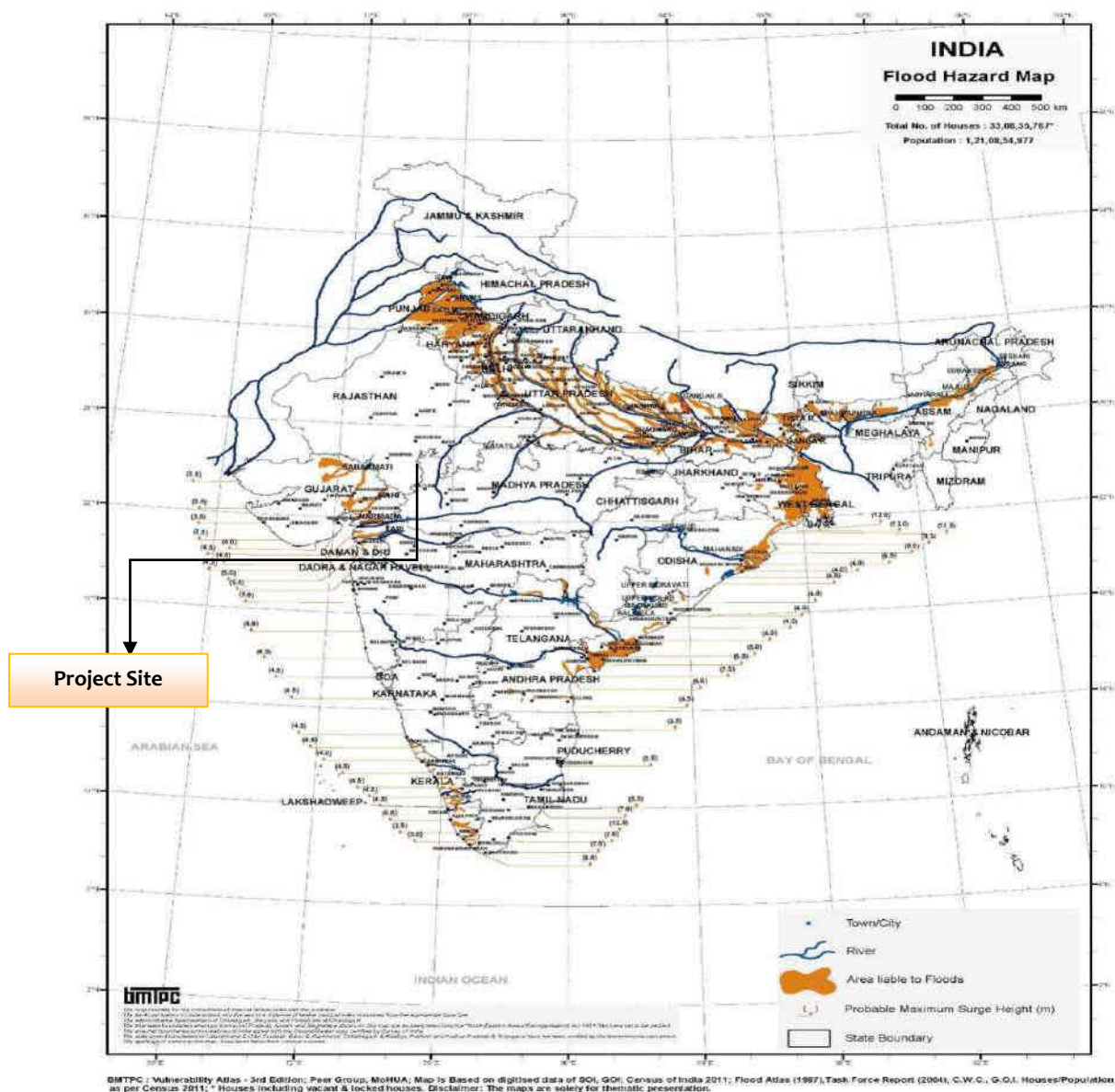


Figure 3.4 (a): Flood Hazard Zonation Map of the Area

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 viz.: Shekhawati, Ruparail, Banganga, Gambhiri, Parbati, Sabi, Banas, Chambal, Mahi, Sabarmati, Luni, West Banas, and Sukli. Out of these, Luni, Banas, and Chambal basins are the largest and are divided into several subbasins. While the Luni river flows through parts of Ajmer, Barmer, Jalore, and Jodhpur, its sub basins of Bhund Hemawas, Sukri, Jawai and Bendi cover parts of Pali, Jalore, and Sirohi. Similarly, the Banas basin falls in Udaipur and Bundi districts and its sub basins of Berach, Morel and Mashi cover parts of Chittorgarh and Jaipur districts. Chambal is the largest basin of the State. Along with its sub basins of Kali Sindh and Parwati, it covers parts of Bundi, Kota, Jhalawar and Baran districts.

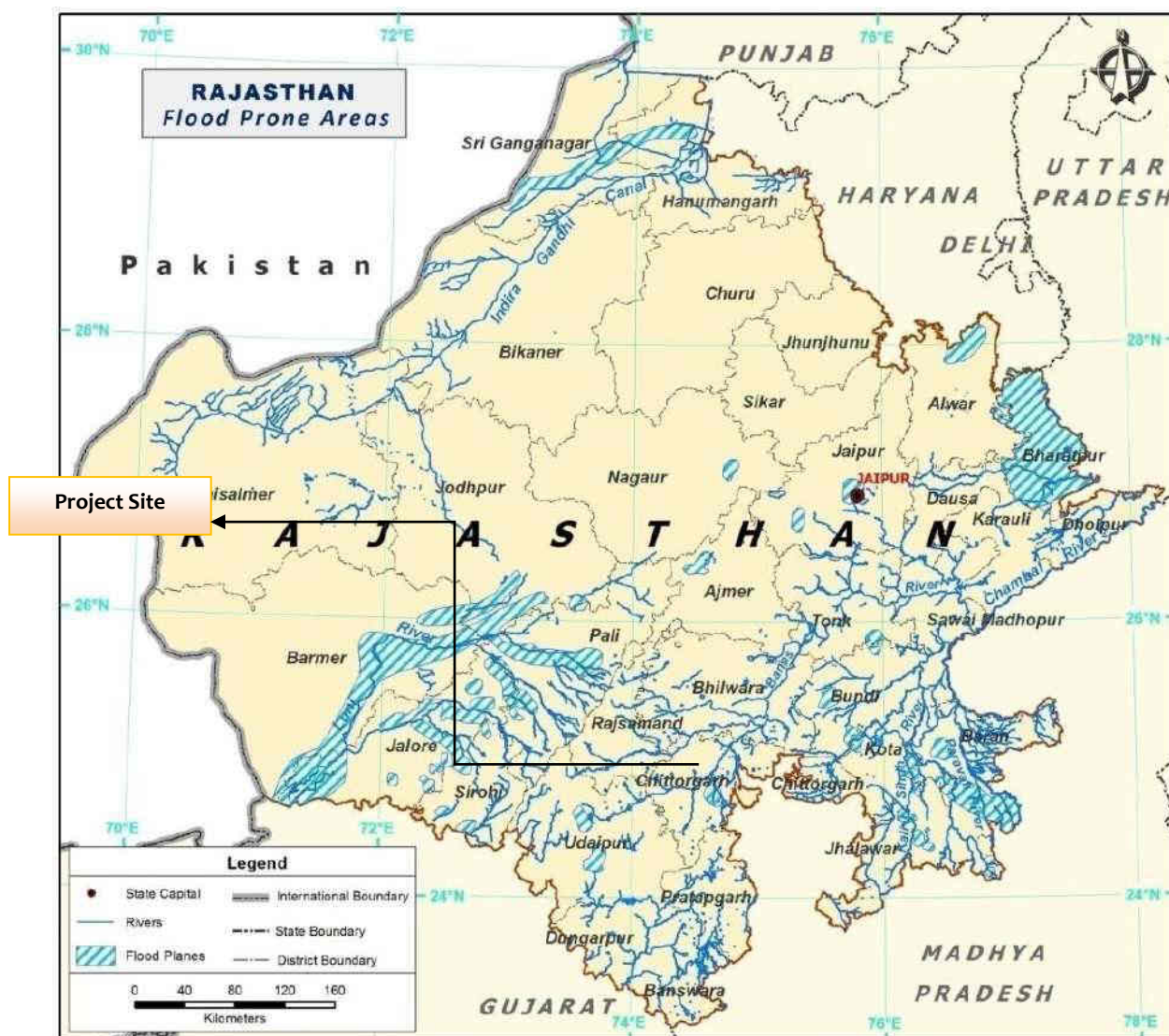


Figure 3.4 (b): Flood Zone Map of the Area (Source: <http://www.dmrelief.rajasthan.gov.in>)

Table 3.4(C)

Climate Sensitivity of Chittorgarh

Name of the District	Wind	Flood	Drought	Earthquake	Industrial Accident
Chittorgarh	Moderate	Moderate	Moderate	Low	Low

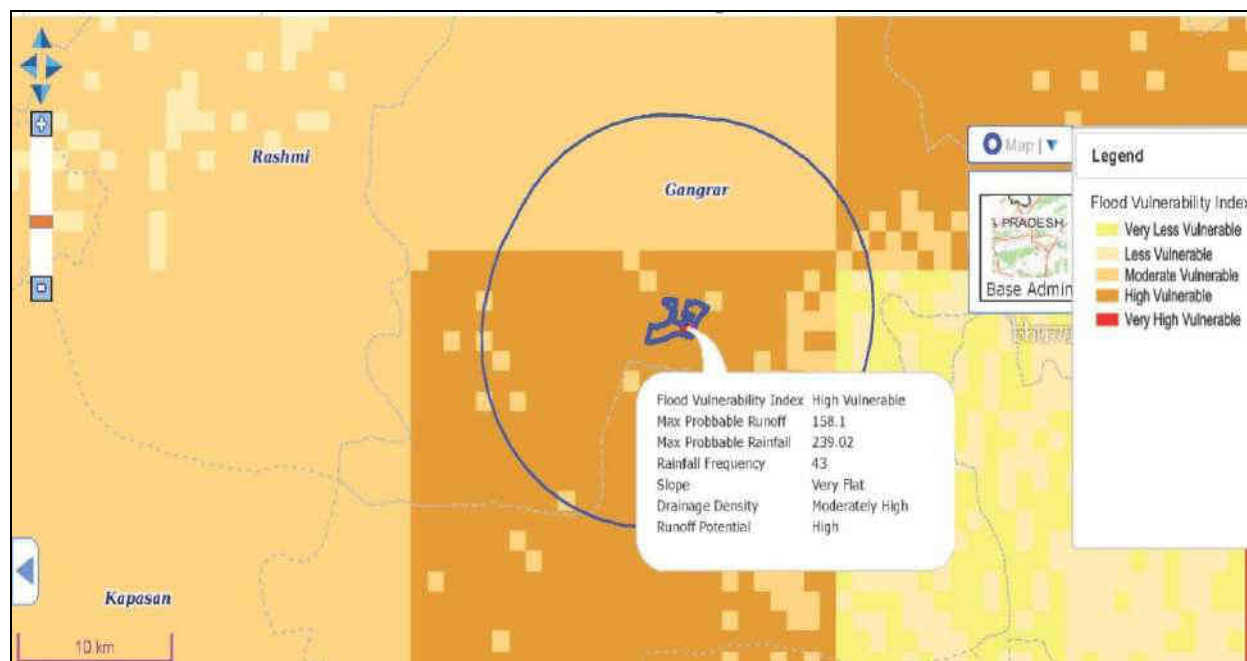


Figure 3.4 (C) : Flood Vulnerability Index of the Study Area for M/s Hindustan Zinc Ltd. (Source: Bhuvan)

### 3.6.3 GEOMORPHOLOGY, TOPOGRAPHY AND DRAINAGE PATTERN

#### Geomorphology

Geomorphologically the district is divided into following units:

Table 3.5(A)

Geomorphic Units of the Study Area

Origin	Landform Unit	Description
Denudational	Buried Pediment	Pediment covers essentially with relatively thicker alluvial, colluvial or weathered materials.
	Intermontane Valley	Depression between mountains, generally broad & linear, filled with colluvial deposits.
	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.
Fluvial	Alluvial Plain	Mainly undulating landscape formed due to fluvial activity, comprising of gravels, sand, silt and clay. Terrain mainly undulating, produced by extensive deposition of alluvium.
	Alluvial Plain (Sandy)	Flat to gentle undulating plain formed due to fluvial activity, mainly consists of gravels, sand, silt and clay with unconsolidated material of varying lithology, predominantly sand along river.
	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.
	Ravine	Small, narrow, deep, depression, smaller than gorges, larger than gulley, usually carved by running water.
Structural	Dissected Plateau	Plateau, crisscrossed by fractures forming deep valleys.
	Plateau	Formed over varying lithology with extensive, flat, landscapes,

Origin	Landform Unit	Description
		bordered by escarpment on all sides. Essentially formed horizontally layered rocky marked by extensive flat top and steep slopes. It may be criss crossed by lineament.
Hills	Denudational, Structural Hill, Linear Ridge	Steep sided, relict hills undergone denudation, comprising of varying lithology with joints, fractures and lineaments. Linear to arcuate hills showing definite trend-lines with varying lithology associated with folding, faulting etc. Long narrow low-lying ridge usually barren, having high run off may form over varying lithology with controlled strike.

Two third area of the district is covered by hilly terrain. The soils of the district falls under the following broad categories • Black Soils • Yellowish brown soils • Grayish brown alluvial soils • Hilly soils. Black soils are found in Dungla, Kapasan, Begun and parts and Rashmi tehsils. Yellowish brown soils are predominant in Chittorgarh, Nimbahera, Bhopalsagar, Bhainsorgah and Bhadesarpanchatsamities. The hilly soils occur in Bhainsorgarh, Begun, Chittorgarh, Dungla, Chotti Sadri, and Nimbahera Panchayat samities. There are broad stretches of light sandy loam soils along banks of river.

The district has the regional slope from south to north. The height varies from 317m to 617m, amsl. Pal khera hill is the highest, having height of 617m.

The total plant area is 335.89 Ha. The terrain of the lease is usually flat having general sloping trend towards north direction. The highest elevation in the plant area is 419 mRL and lowest is 385 mRL. The highest altitude is in the west of the area and gradually sloping in all directions. The lowest altitude is in NE part of the area.

The Geomorphological map of the core and buffer zone is shown in **Figure 3.5B**

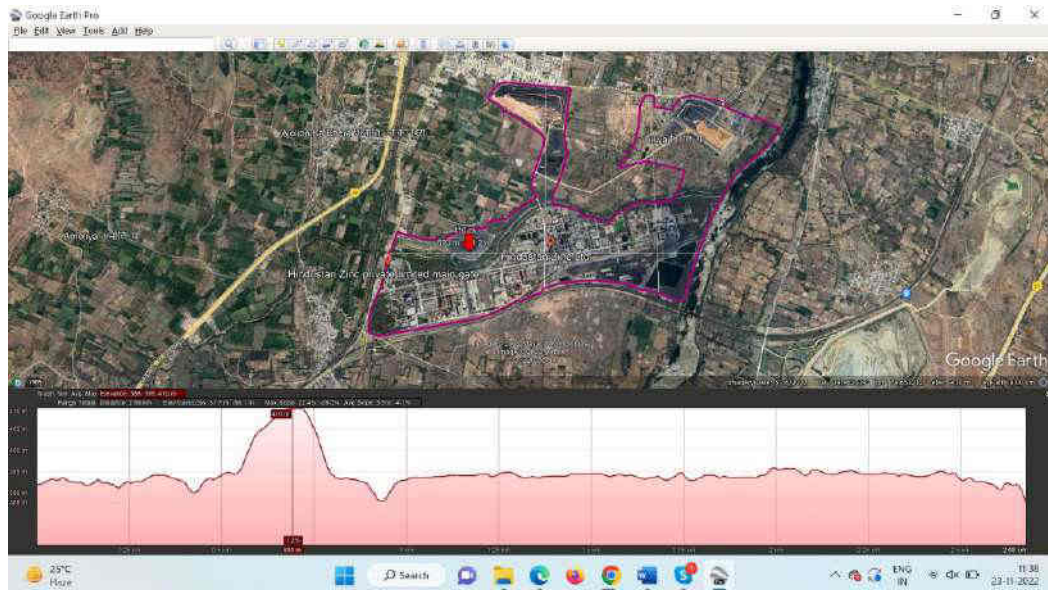
### Topography

The district is characterized by undulating topography. The western, southern and northern parts are generally plain area. Hills are scattered in Chhoti Sadri, Bari Sadri and Pratapgarh tehsils. Hill ranges towards east of Chittorgarh town runs north-south with intervening valleys parallel to each other. Chittorgarh and Pratapgarh tehsils are partly hilly and partly plain. The district has the regional slope from south to north. The height varies from 317m to 637m, Pemakhera, Kanarkhera hill is the highest, having height of 637m.

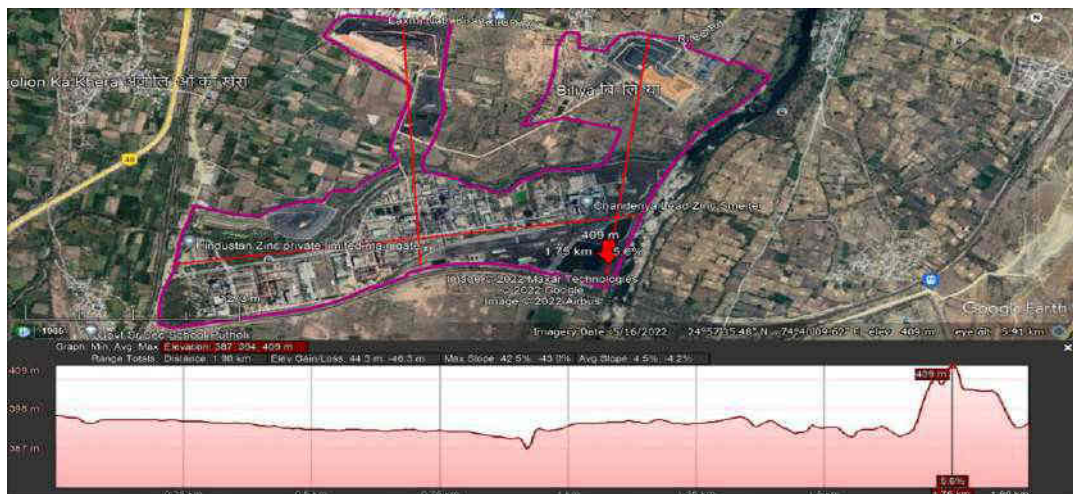
As per the DEM (figure no. 3.2C) that the elevation varies from 380 m to 610 m in the whole study area. And the core zone is in the range of 390-400m.

Elevation profile of the core zone (based on google earth imagery) has been shown below as Figure no. 3.5A:

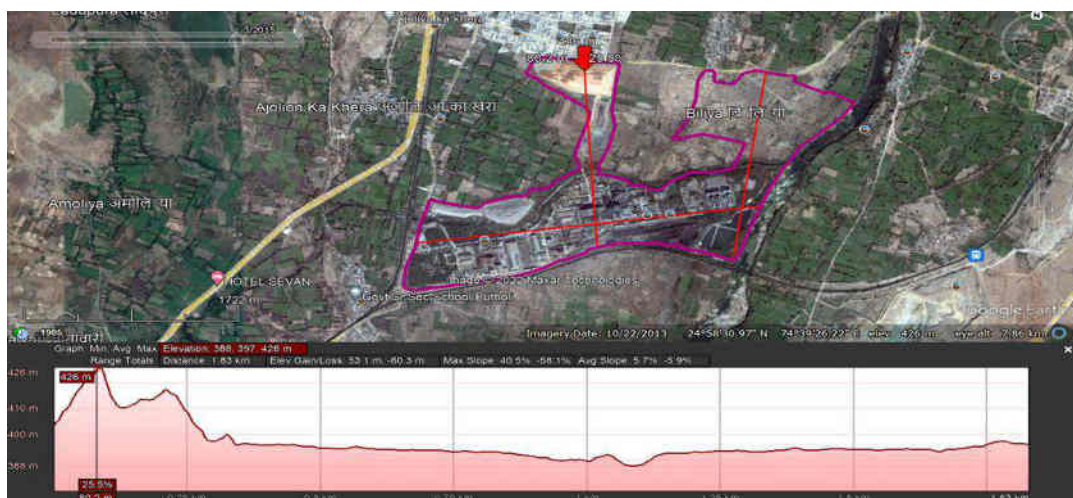




Elevation Profile of Core zone (West to East)



Elevation Profile of Core zone (North to South 1)



Elevation Profile of Core zone (North to South 2)

**Figure 3.5A: Elevation Profile of the Core Zone**



### Drainage Pattern

The drainage system is well developed and drainage density varies from 0.3 to 1 km/sq.km. Chambal is the only perennial river. It enters the district near Gandhi Sagar and flows towards NE for about 50 km and then passes into Kota district. The other main rivers are Banas, Gambhiri, Gujjali, Bamani, Berach, Jakham and Wagon.

The Banas River originates in Udaipur district and enters Chittorgarh through Rashmi tehsil. It passes through Somi, Sankhli, Pahunia, and Unchkia villages.

The Ghabhir River originating in Madhya Pradesh flowing through Nimbahera and Chittorgarh tehsils joins Berach River. It passes through villages of Khor, Myara, Sarthal and Tai.

The local drainage pattern in and around the area is dendritic to sub-parallel in nature with low drainage density.

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

**Table 3.5(B)**

**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.	Putholi Nala	Passing through the plant site	396
2.	Berach River	Adjacent in East	392
3.	Gambhir Nadi	~4.0 km in South direction	405
4.	Nagdi ka Nala	~8.5 km in NNE direction	389
5.	Canal	~8 km in WNW direction	417

Source: SOI Toposheet and Google Earth Imagery

As per Generic ToR point no. 4(x), Drainage map of the 5 km radius of the plant site has been given here as Figure 3.6a.

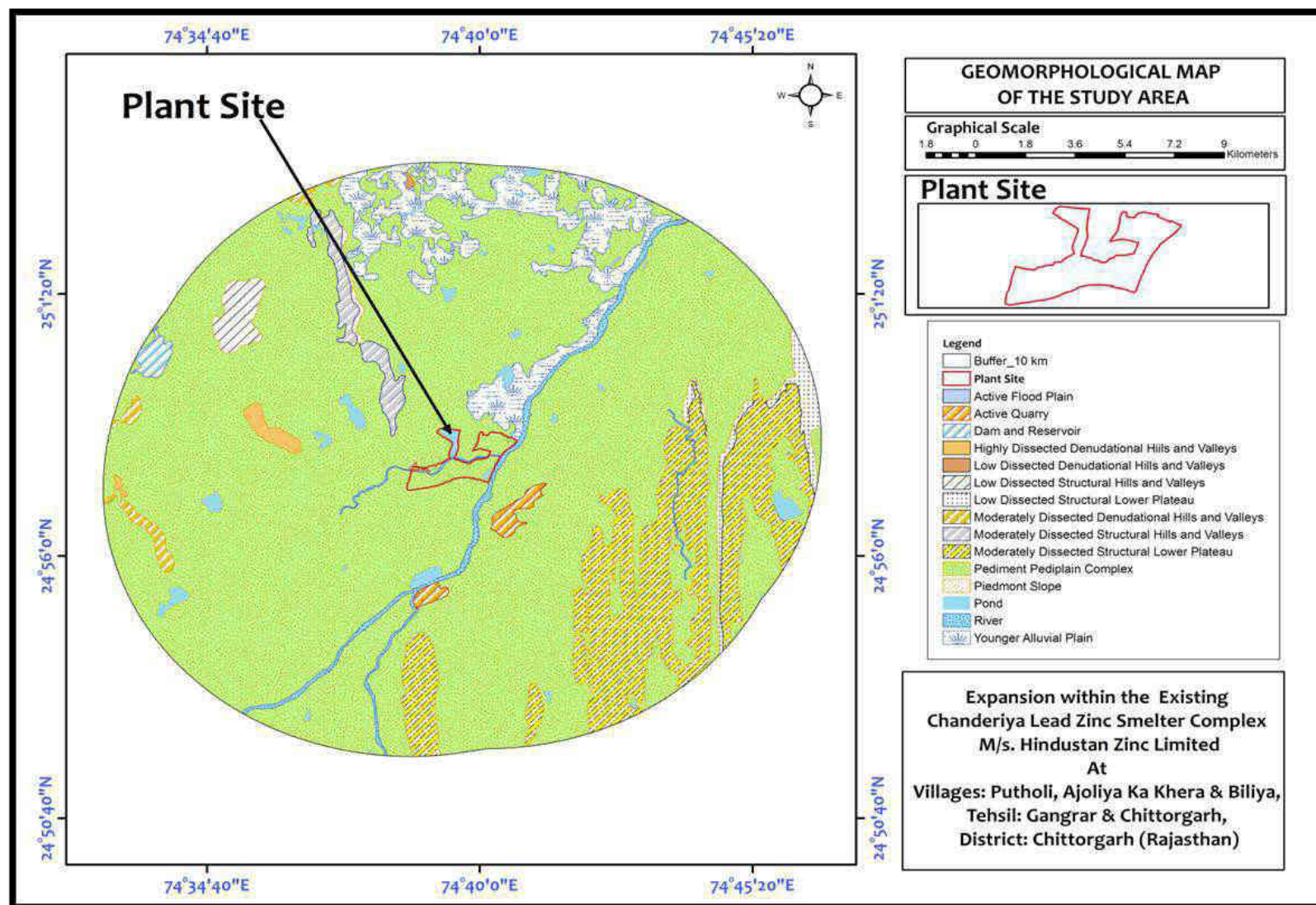


Figure 3.5B: Map showing Geomorphology of 10km study area of Chanderiya Lead Zinc Smelter Complex (Source: Bhukosh)

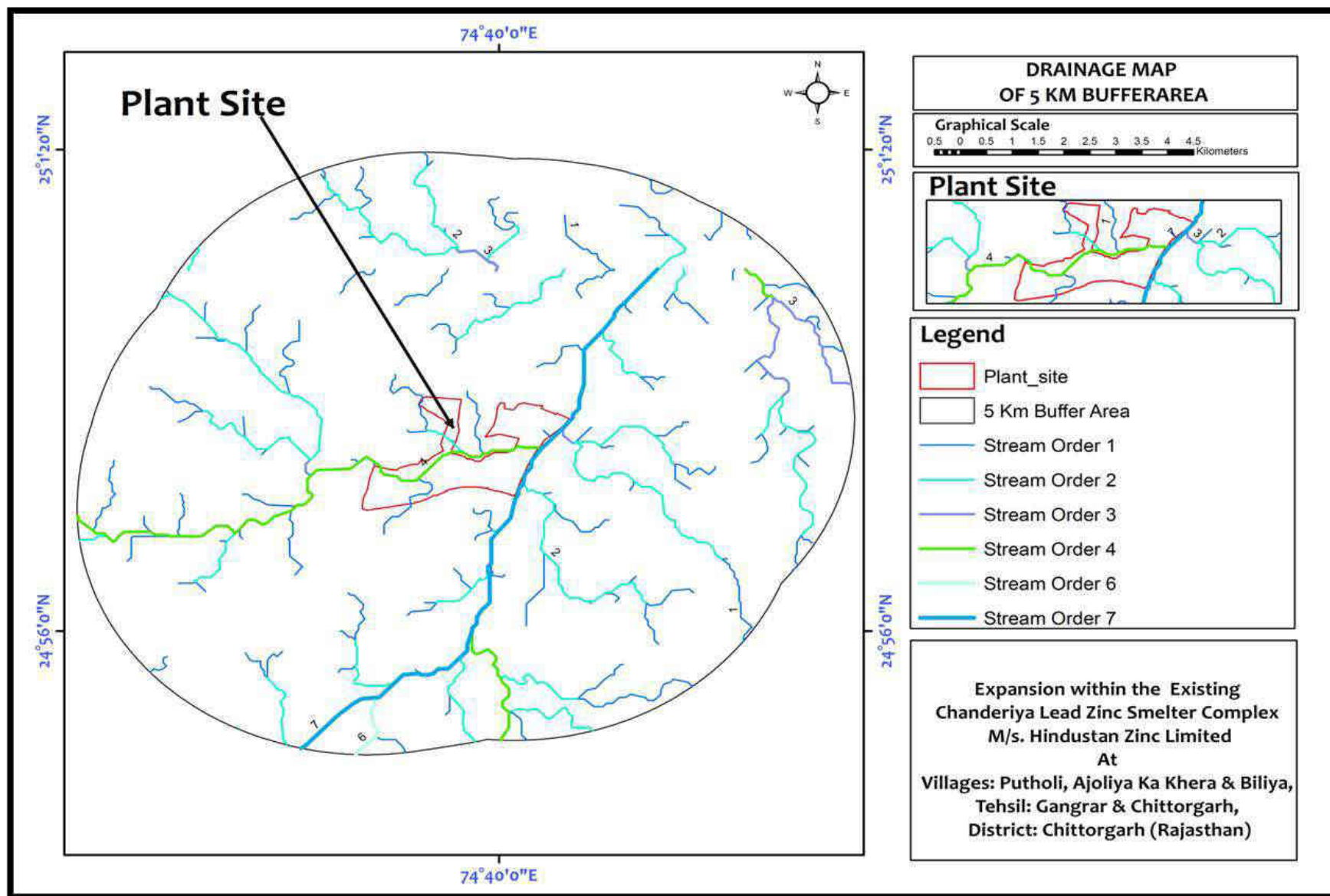


Figure 3.6(a): Drainage Map

### 3.6.4 Geology of the Study Area

#### Regional Geology

The rock formations were first studied and mapped by Hacket C.A. in 1881 and then by Dr. A.M. Heron in 1936. Dr. A.M. Heron classified the limestone formations of the area under Nimbahera limestone belt, equivalent to Semri series of lower Vindhyan. The regional stratigraphic sequence according to Dr. Heron is as follows:

**Table 3.6**  
**Regional Geology**

AGE	GROUP	FORMATIONS
Recent To Sub-Recent		Alluvium & Soil
Pleistocene		Laterite
Upper Cretaceous		Deccan Trap
Vindhyan Super Group	Kaimur Group	Kaimur Sandstone
	KHORIP	SUKET SHALES NIMBAHERA LIMESTONE BARI

The limestone named after its typical place of occurrence is continuously found from Jawad in Madhya Pradesh to Nimbahera in Rajasthan and thereafter in patches in Chittorgarh, Binota, Khori and Sawa.

#### Local Geology

Stratigraphically, the area form part of Berach Granite of Archean age which is Overlain by Semri group (Mesoproterozoic age) which belongs to vindhyan supergroup. The lithostratigraphy consists of Granite, Granitic gneiss of berach granite formation.

### 3.6.5 Climate & Rainfall

The climate of the area is semi-arid except during south west monsoon season. The cold season is from December to February and is followed by summer from March to June. The summer season is from mid of March to middle of July. The monsoon season is from mid of July to mid-September or even less. The rainy days in a year varies from 26 to 30. Post monsoon season extends up to November and thereafter winter season continues up to February.

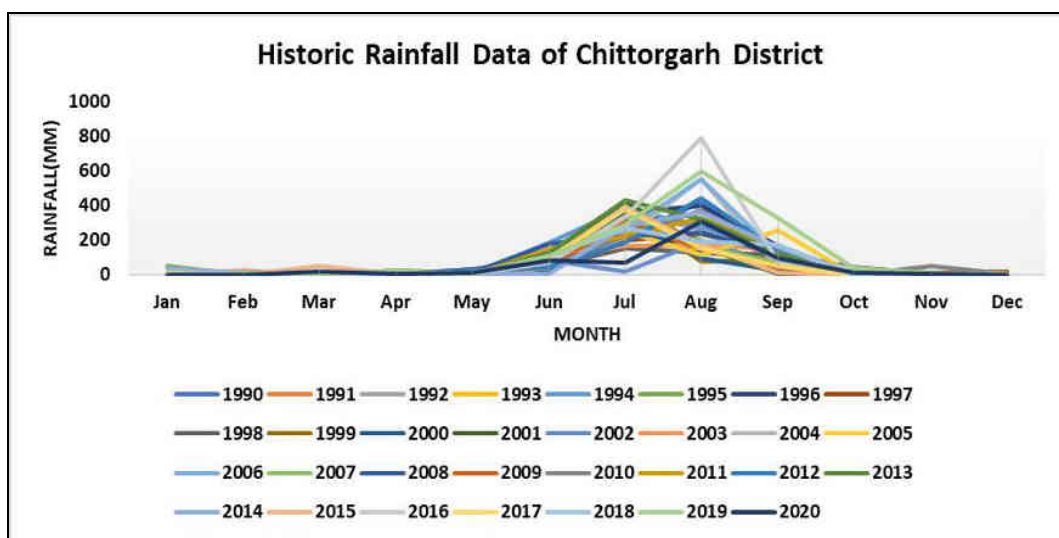
The maximum and minimum temperature during summer season is 48°C and 23°C and during winter season is 28°C and 2°C. The average humidity varies from 18% to 68% and goes up to 90% during rainy season. The predominant wind direction is from South-West to north east.

Source link <https://indiawris.gov.in>

**Table - 3.7**  
**Rainfall Statistics of Chittorgarh District (30 yrs.)**

S.No.	Year	Rainfall (mm)	S.No.	Year	Rainfall (mm)
1.	1991	786.14	17.	2007	658.27
2.	1992	794.32	18.	2008	793.67
3.	1993	676.91	19.	2009	567.68
4.	1994	1016.47	20.	2010	826.58
5.	1995	684.57	21.	2011	858.85
6.	1996	977.86	22.	2012	828.75
7.	1997	721.58	23.	2013	1019.98
8.	1998	486.35	24.	2014	862.93
9.	1999	696.92	25.	2015	740.2
10.	2000	484.41	26.	2016	1315.53
11.	2001	745.22	27.	2017	704.54
12.	2002	353.01	28.	2018	743.99
13.	2003	620.3	29.	2019	1407.03
14.	2004	881.16	30.	2020	599.76
15.	2005	666.54		Average	786.52
16.	2006	1076.19			

(Source: India Meteorological Department)



**Figure 3.6 (b): Historic rainfall data of past 30 years from Chittorgarh District. (Source WRIS)**  
Details regarding flood hazard is given in chapter -7 of this EIA/EMP report.

### Conclusion

The annual average rainfall in the region is around 786.52 mm (average of last 30 years rainfall data from 1991-2020) varying from minimum 353.01 mm in 2002 to maximum 1407.03mm in 2019. Annual average rainfall of last 10 year is 908.15 mm.

### 3.6.6 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 project site is done through annual records data obtained from India Meteorological Department (IMD) (1982-2019). 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.

### Interpretation

The nearest IMD station to the project site is located in Chittorgarh (which is ~8.5 km in SSW direction from the plant site). Based on the previous IMD data [Climatological Normals (1981-2010)], the pre-dominant wind direction (seasonal as well as annual) was considered. As per the data, pre-dominant wind direction throughout post-monsoon season and annual was observed from north east & south west, respectively, according to which, the locations for ambient air quality monitoring were selected. Seasonal wind rose prepared based on secondary meteorological data obtained for Chittorgarh is given in Figure - 3.7 (a).

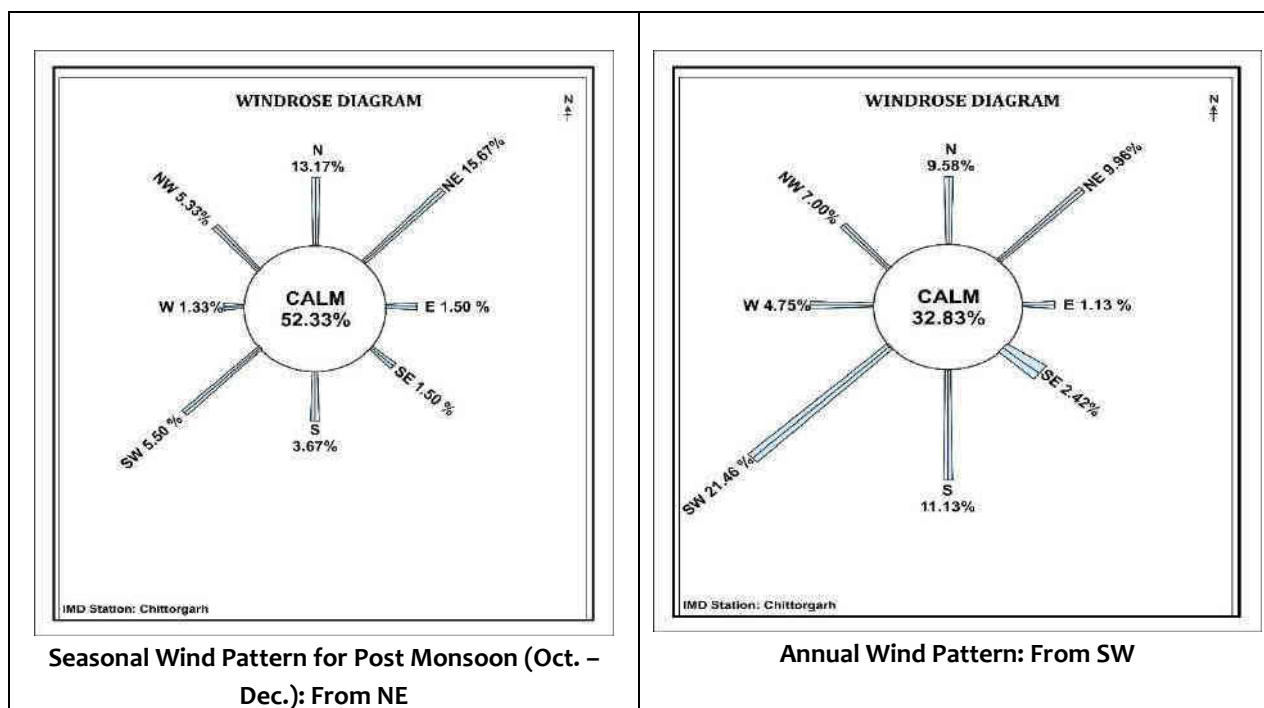


Figure 3.7 (a): Wind Rose Diagram for Chittorgarh–post monsoon Season:  
As per Climatological Normals (1981-2010)

### 3.6.7 Micro-Meteorology at Site

Meteorological station was set-up at site to record surface meteorological parameter during post monsoon season (Oct. to Dec., 2020).

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 proposed expansion project.

It was observed that the dominant overall wind pattern for the study period was from North-East (NE) direction. Wind Rose Diagram showing the wind pattern during the study period is shown in Figure - 3.7 (b).

Solar radiation varies from 4.05 Wh/m<sup>2</sup> to 889.37 Wh/m<sup>2</sup> during study period from Oct., 2020 to Dec., 2020. The same has been incorporated from <https://power.larc.nasa.gov/data-access-viewer/>.

Summary of the micro-meteorology at site is given in Table - 3.8. Detailed Hourly Meteorological Data has been enclosed as **Annexure - 8** with this EIA / EMP Report

**Table - 3.8(A)**

#### **Micro-Meteorology at Site**

**Study Period: Post Monsoon Season (Oct. to Dec., 2020)**

Month	Temperature (°C)		Relative Humidity (%)		Wind Speed (m / sec.)	
	Max.	Min.	Max.	Min.	Max.	Min.
October, 2020	37.2	14.6	70	49	9.0	0.1
November, 2020	32.9	10.0	66	43	7.2	0.1
December, 2020	28.2	3.5	73	49	6.7	0.1

Source: Meteorological Station at Site

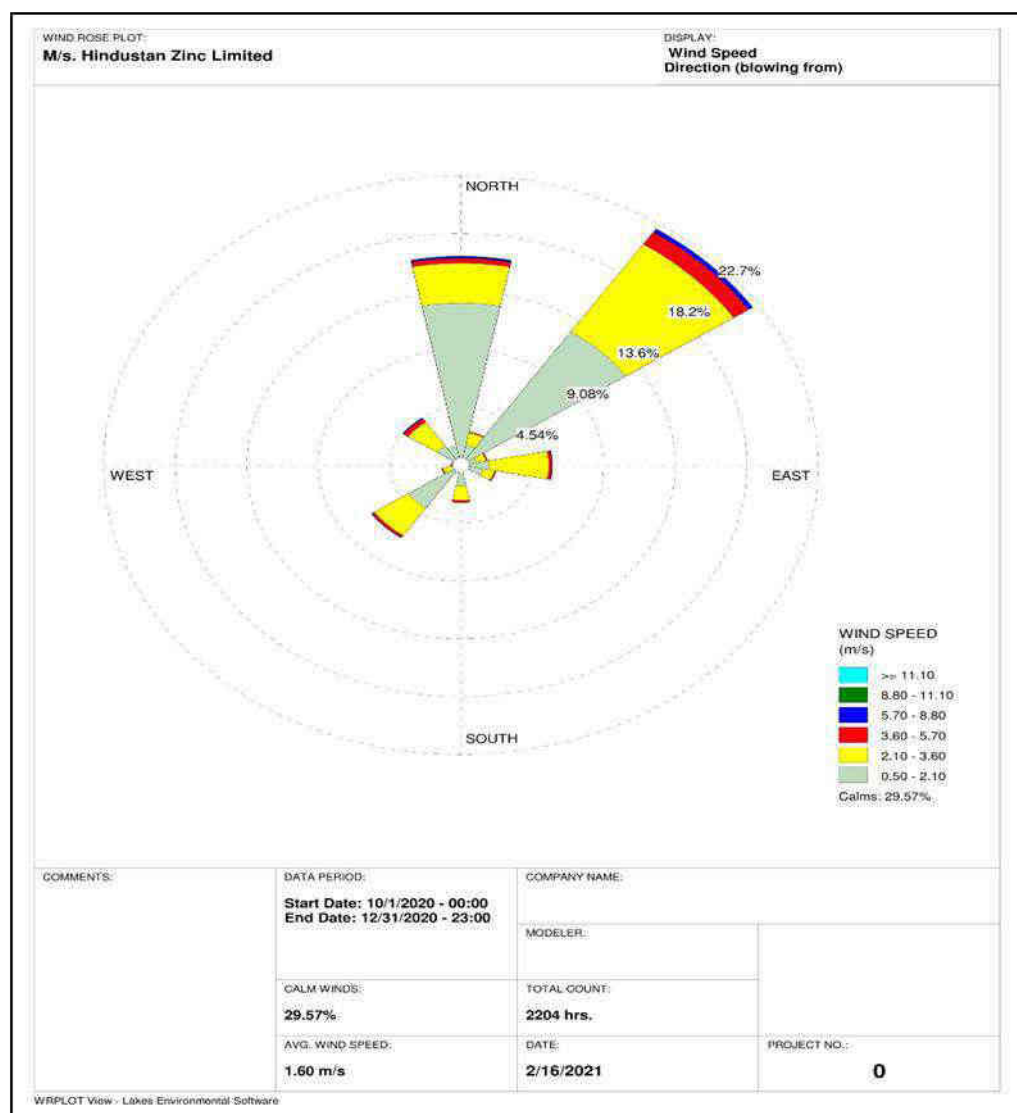


Figure 3.7(b): Wind Rose Diagram for Post Monsoon Season (Oct. to Dec. 2020)

### 3.6.8 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 varies also in the course of a day. It is lowest at night and increases during the day.

Mixing heights based on IMD publication, "Atlas of Hourly Mixing Height and Assimilative Capacity of Atmosphere in India", has been considered for Industrial Source Complex model 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., Post monsoon season and it varies from 70 – 1865 meters.

**Table – 3.8 (B)**  
**Mixing Height (Post-monsoon season)**

Time (Hours)	Mixing Height (m)
07:00	70
08:00	125
09:00	390
10:00	700
11:00	960
12:00	1325
13:00	1615
14:00	1755
15:00	1865
16:00	1835
17:00	1715
18:00	980
19:00	595

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

### 3.6.9 Ambient Air Environment

Ambient air quality monitoring has been carried out within the 10 km study area of the Expansion in existing CLZS Complex 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 proposed 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.

#### **Methodology**

The Ambient air quality monitoring was done for the expansion project during post-monsoon season (Oct., to Dec., 2020) within 10 km radius study area as per the Standard Terms of Reference (ToR) issued for the Metallurgical Industries (Ferrous and nonferrous) and for additional One Month Study as per TOR Letter.

The samples were collected for the following air quality determinants:

- ☞ Sulphur Dioxide (SO<sub>2</sub>)
- ☞ Nitrogen Dioxide (NO<sub>2</sub>)
- ☞ Particulate Matter (PM<sub>10</sub> and PM<sub>2.5</sub>)
- ☞ Carbon Monoxide (CO)
- ☞ Benzo(a)pyrene (BaP)
- ☞ Ammonia (NH<sub>3</sub>),
- ☞ Ozone (O<sub>3</sub>),

- ☞ Benzene (C<sub>6</sub>H<sub>6</sub>),
- ☞ Arsenic (As),
- ☞ Lead (Pb),
- ☞ Nickel (Ni)
- ☞ Zinc (Zn)

The sources of air pollution in the region are dust rising from vehicular traffic, emission from Pyro Plant, Ausmelt Plant, Hydro, DG sets & other industries, Habitation, domestic fuel burning, agricultural activities, etc.

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

The methodology adopted for ambient air quality monitoring is given below in Table - 3.9.

**Table - 3.9**  
**Details of Test Procedures**

S.No.	Parameters*	Test Method Specification against which tests are performed	Range of testing	Limit of detection	Equipment used for monitoring	
					Equipment required for Sampling	Equipment required for Analysis
1.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182, (P-2), 2001 Reaffirmed 2017	4 µg/m <sup>3</sup> to 1050 µg/m <sup>3</sup>	4 µg/m <sup>3</sup>	Respirable dust sampler/Low flow Pump	UV spectrophotometer
2.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182, (P-6), 2006 Reaffirmed 2017	6 µg/m <sup>3</sup> to 750 µg/m <sup>3</sup>	6 µg/m <sup>3</sup>	Respirable dust sampler/Low flow Pump	UV spectrophotometer
3.	Particulate Matter (PM <sub>10</sub> )	IS: 5182, (P-23), 2006 Reaffirmed 2017	10 µg/m <sup>3</sup> to 1000 µg/m <sup>3</sup>	10 µg/m <sup>3</sup>	Respirable dust sampler,	Desiccators, high accuracy weighing balance
4.	Particulate Matter (PM <sub>2.5</sub> )	IS: 5182, P-24 :2019	10 µg/m <sup>3</sup> to 500 µg/m <sup>3</sup>	10 µg/m <sup>3</sup>	Fine Particulate sampler	Desiccators, high accuracy weighing balance
5.	Carbon Monoxide (CO)	IS: 5182, (P-10), 1999 Reaffirmed 2019	0.5 mg/m <sup>3</sup> to 50 mg/m <sup>3</sup>	0.5 mg/m <sup>3</sup>	Sampling in Tedlar Bag with low flow pump	Gas chromatography with detector (FID)
6.	Benzene	IS:5182, (P-11):2006 Reaffirmed 2017	0.5 µg/m <sup>3</sup> to 100 µg/m <sup>3</sup>	0.5 µg/m <sup>3</sup>	Sampling in Charcoal tube with low flow pump,	Gas chromatography with detector (FID)
7.	Benzo (a) pyrene (BaP) particulate Phase Only	IS:5182, (P-12):2004 Reaffirmed 2014	0.5 ng/m <sup>3</sup> to 2000 ng/m <sup>3</sup>	0.5 ng/m <sup>3</sup>	Sampling in Charcoal tube with low flow pump,	Gas chromatography with detector (FID)
	Arsenic	IS:5182 (Part-22)	0.5 ng/m <sup>3</sup>	0.5	Respirable	Atomic absorption



S.No.	Parameters*	Test Method Specification against which tests are performed	Range of testing	Limit of detection	Equipment used for monitoring	
					Equipment required for Sampling	Equipment required for Analysis
8.		2004 Reaffirmed 2014/CPCB Guidelines	to 100 ng/m <sup>3</sup>	ng/m <sup>3</sup>	dust sampler with EPM filter paper	spectroscopy
9.	Nickel	IS:5182 (Part-22) 1979/2004 Reaffirmed 2014/CPCB Guidelines	1 ng/m <sup>3</sup> to 100 ng/m <sup>3</sup>	1 ng/m <sup>3</sup>	Respirable dust sampler with EPM filter paper	Atomic absorption spectroscopy
10.	Lead	IS:5182 (Part-22) 2004 Reaffirmed 2014	0.02 µg/m <sup>3</sup> to 50 µg/m <sup>3</sup>	0.02 µg/m <sup>3</sup>	Respirable dust sampler with EPM filter paper	Atomic absorption spectroscopy
11.	Ozone	IS:5182 (Part-9) 1974 Reaffirmed 2014	1.0 µg/m <sup>3</sup> to 200 µg/m <sup>3</sup>	1.0 µg/m <sup>3</sup>	Respirable dust sampler/Low flow Pump	UV spectrophotometer
12.	Ammonia	Method of Air Sampling & Analysis (3 <sup>rd</sup> Edition – 1988)	1 µg/m <sup>3</sup> to 400 µg/m <sup>3</sup>	1 µg/m <sup>3</sup>	Respirable dust sampler/Low flow Pump	UV spectrophotometer
13.	Zinc	JME/STOP/03 Issue date-04.12: 2020	0.5 ng/m <sup>3</sup> to 100 µg/m <sup>3</sup>	0.5 µg/m <sup>3</sup>	Respirable dust sampler with EPM filter paper	Atomic absorption spectroscopy

Protocol Used: CPCB Guidelines/IS-5182

#### Monitoring Schedule

The sampling was done continuously for 24 hours for PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>2</sub>, CO, Pb, and Ni with a frequency of twice a week for three months (26 observations for one location) & rest of the parameters viz. O<sub>3</sub>, NH<sub>3</sub>, C<sub>6</sub>H<sub>6</sub>, BaP, As & Zn monitored once in the study period at 9 locations.

#### Monitoring Locations

Monitoring locations were selected for AAQ Monitoring keeping in view the 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 - 3.7(b)} that the dominant wind direction during the study period was from North -East (NE).

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 - 3.10 & shown in Figure - 3.8.

**Table - 3.10**  
**Locations of Ambient Air Quality Monitoring Stations**

S. No.	Monitoring Location	Approx. Distance & Direction from Project Site		Selection criteria for Project Site
		Aerial Distance	Direction	
1.	Plant Site	-	-	<ul style="list-style-type: none"> <li>• Core Zone</li> </ul>
2.	Ghosundi	7.0 km	NE	<ul style="list-style-type: none"> <li>• Upwind of pre-dominant direction</li> <li>• Near NH 76</li> </ul>
3.	Putholi	0.5 km	SW	<ul style="list-style-type: none"> <li>• Downwind of pre-dominant direction</li> <li>• Habitation in buffer zone</li> <li>• Near NW Railway line</li> </ul>
4.	Chanderiya	2.5 km	SW	<ul style="list-style-type: none"> <li>• Downwind of pre-dominant direction</li> <li>• Habitation in buffer zone</li> <li>• Near existing industry</li> </ul>
5.	Ajoliya ka Khera	1.0 km	West	<ul style="list-style-type: none"> <li>• Near NH 79</li> <li>• Near PF &amp; RF</li> <li>• Habitation in buffer zone</li> </ul>
6.	Biliya	Adjacent	North	<ul style="list-style-type: none"> <li>• Adjacent to plant site</li> <li>• Habitation in Buffer Zone</li> </ul>
7.	Mungava Ka Khera	1.0 km	South	<ul style="list-style-type: none"> <li>• Habitation in buffer zone</li> </ul>
8.	Chogawadi	5.0 km	North	<ul style="list-style-type: none"> <li>• Habitation in buffer zone</li> </ul>
9.	Chittorgarh (Zinc Nagar)	7.0 km	SSW	<ul style="list-style-type: none"> <li>• Near Chittorgarh Fort RF</li> <li>• Mostly Populated area</li> </ul>

Source: SOI Toposheet & field survey

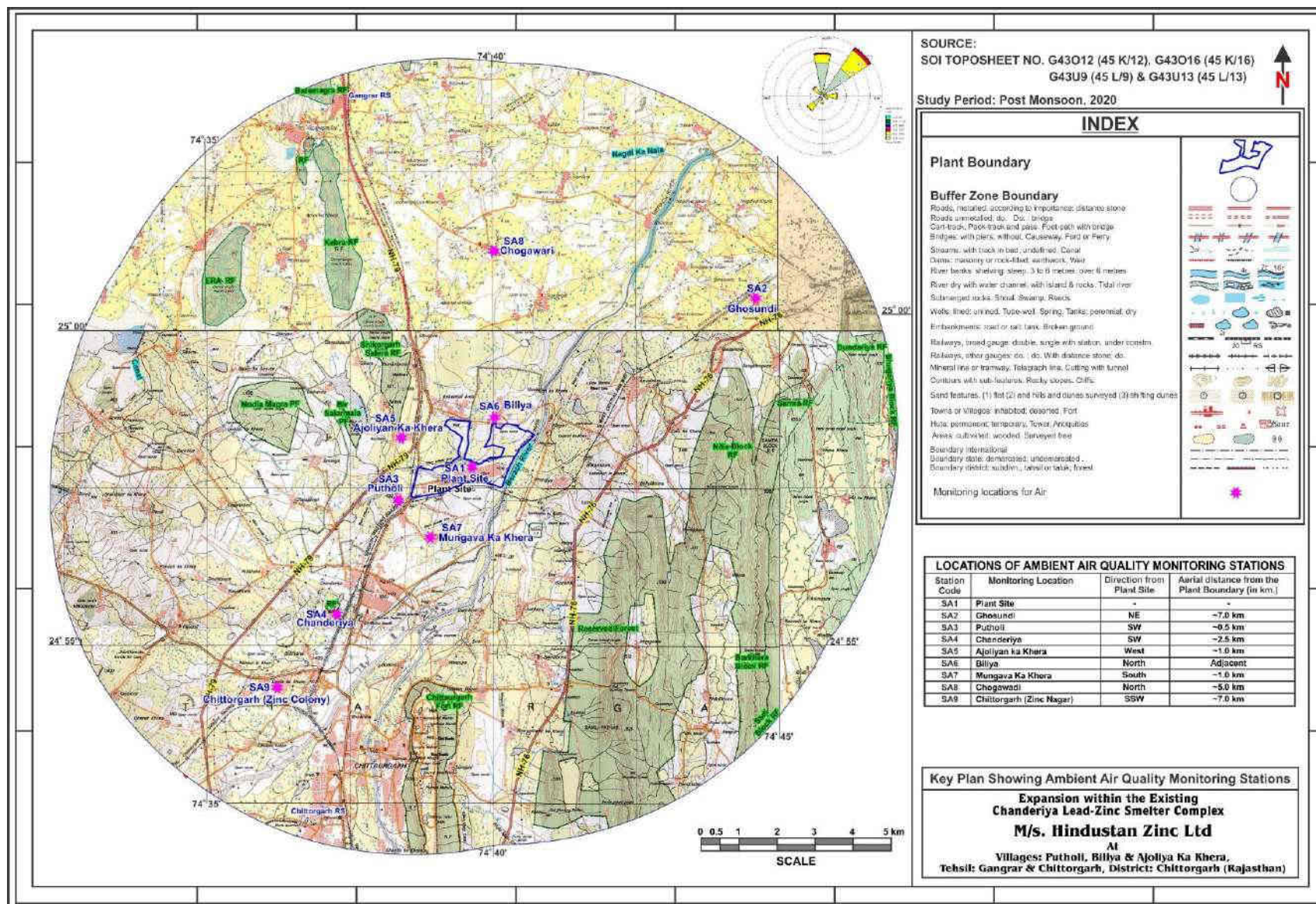


Figure 3.8(a): Key Plan showing Ambient Air Quality Monitoring Locations

### Ambient Air Quality Monitoring

Table - 3.11 (A & B) 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 –9a** along with this EIA/EMP Report.

**Table - 3.11 (A)**  
**Ambient Air Quality Monitoring Results**  
**Study Period: Post Monsoon Season (Oct. to Dec., 2020)**

S. No.	Sampling Location	Parameters													
		PM <sub>2.5</sub> (µg/m <sup>3</sup> )		PM <sub>10</sub> (µg/m <sup>3</sup> )		NO <sub>2</sub> (µg/m <sup>3</sup> )		SO <sub>2</sub> (µg/m <sup>3</sup> )		CO (mg/m <sup>3</sup> )		Pb (µg/m <sup>3</sup> )		Ni (ng/m <sup>3</sup> )	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1.	Plant Site	55.4	40.7	92.4	76.2	38.6	24.1	19.7	11.2	1.13	0.74	0.59	0.26	14.3	6.6
2.	Village- Ghosundi	38.6	27.6	78.3	58.2	25.6	15.7	14.0	6.3	0.69	BDL	0.08	BDL	BDL	
3.	Putholi	47.2	35.0	89.2	72.4	31.5	19.6	16.7	9.2	0.99	0.67	0.12	BDL	5.4	1.9
4.	Village- Chanderiya	48.2	36.8	87.3	71.8	32.0	20.3	17.6	9.9	0.89	0.63	0.41	0.17	9.6	4.1
5.	Ajaliyan ka Khera	41.3	31.2	82.5	63.9	27.8	14.3	14.2	6.8	0.78	0.59	0.31	0.12	6.6	2.6
6.	Village- Biliya	45.1	34.1	83.7	66.5	28.9	18.2	14.8	7.7	0.84	0.56	0.23	0.06	4.3	BDL
7.	Mungava ka khera	37.9	27.6	76.9	61.2	24.1	14.5	14.1	7.1	0.79	BDL	BDL		BDL	
8.	Village- Chogawadi	36.9	26.1	73.7	60.8	22.2	13.8	12.3	5.8	BDL	BDL	BDL		BDL	
9.	Chittorgarh (Zinc Nagar)	37.2	26.8	71.2	59.6	24.4	16.3	13.6	5.9	0.66	BDL	BDL		3.5	BDL
<b>Detection Limit</b>										<b>0.5</b>		<b>0.02</b>		<b>1</b>	
NAAQS*		<b>60</b>		<b>100</b>		<b>80</b>		<b>80</b>		<b>4</b>		<b>1</b>		<b>20</b>	

**Remark** -BDL - Below Detectable Limit, DL - Detection Level & Detection limit for CO - 0.5 mg/ m<sup>3</sup>

**Source:** Ambient Air Quality Monitoring

\*NAAQS - National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009

As per Std. ToR issued by MOEF&CC, New Delhi remaining 6 AAQ parameters (viz. O<sub>3</sub>, NH<sub>3</sub>, Benzene, B(a)P, Arsenic as per NAAQS, 2009 and Zn) were also monitored once and were found far below the prescribed standards. Monitoring results are given as under:

**TABLE - 3.11 (B)**  
**Ambient Air Quality Monitoring Results**  
**Study Period: Post Monsoon Season (Oct. to Dec., 2020)**

S. No.	Sampling Location	Parameters					
		O <sub>3</sub> (µg/m <sup>3</sup> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	C <sub>6</sub> H <sub>6</sub> (µg/m <sup>3</sup> )	BaP-Particulate phase only (ng/m <sup>3</sup> )	As (ng/m <sup>3</sup> )	Zn (µg/m <sup>3</sup> )
1.	Plant Site	29.4	15.6	0.78	0.84	BDL	8.6
2.	Village- Ghosundi	9.8	5.6	BDL	BDL	BDL	BDL



S. No.	Sampling Location	Parameters					
		O <sub>3</sub> (µg/m <sup>3</sup> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	C <sub>6</sub> H <sub>6</sub> (µg/m <sup>3</sup> )	BaP-Particulate phase only (ng/m <sup>3</sup> )	As (ng/m <sup>3</sup> )	Zn (µg/m <sup>3</sup> )
3.	Putholi	26.5	12.4	BDL	BDL	BDL	0.93
4.	Village- Chanderiya	23.6	13.4	0.59	BDL	BDL	5.4
5.	Ajaliyan ka Khera	26.7	10.7	BDL	BDL	BDL	6.2
6.	Village- Biliya	17.9	7.2	BDL	BDL	BDL	1.1
7.	Mungava ka khera	11.1	6.8	BDL	BDL	BDL	BDL
8.	Village- Chogawadi	10.3	4.6	BDL	BDL	BDL	BDL
9.	Chittorgarh (Zinc Nagar)	12.3	8.9	BDL	BDL	BDL	2.3
	<b>Detection Limit</b>	<b>1.0</b>	<b>1.0</b>	<b>0.5</b>	<b>0.5</b>	<b>0.5</b>	<b>0.5</b>
	<b>NAAQS*</b>	<b>180</b>	<b>400</b>	<b>5</b>	<b>1</b>	<b>6</b>	<b>-</b>

NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009

**Remark** - Detection limits for Ozone - 1.0 (µg/m<sup>3</sup>), Lead – 0.02 (µg/m<sup>3</sup>), ammonia – 1.0 (µg/m<sup>3</sup>), Benzene – 0.5 (µg/m<sup>3</sup>), Arsenic – 0.5 (ng/m<sup>3</sup>), Nickel – 1.0 (ng/m<sup>3</sup>), BaP – 0.5 (ng/m<sup>3</sup>), Zinc – 0.5(µg/m<sup>3</sup>).

**Source:** Ambient Air Quality Monitoring Results from JM EnviroLab Pvt. Ltd

#### Interpretation & Conclusion

Ambient Air Quality Monitoring reveals that the concentrations of PM<sub>2.5</sub> and PM<sub>10</sub> for all the 9 AAQM stations were in range of 26.1 to 55.4 µg/m<sup>3</sup> and 58.2 to 92.4 µg/m<sup>3</sup> respectively and were found to be within the prescribed limits.

As far as the gaseous pollutants SO<sub>2</sub> and NO<sub>2</sub> are concerned, the prescribed CPCB limit of 80 µg/m<sup>3</sup> has never surpassed at any station. The concentrations of SO<sub>2</sub> and NO<sub>2</sub> were found to be in range of 5.8 to 19.7 µg/m<sup>3</sup> and 13.8 to 38.6 µg/m<sup>3</sup> respectively. The concentration of CO was found to be in range of BDL to 1.13 mg/m<sup>3</sup>. The concentration of Pb was found to be in range of BDL to 0.59 µg/m<sup>3</sup>. The concentration of Ni was found to be in range of BDL to 14.3 ng/m<sup>3</sup>.

The prime contributors for the air pollutants within the 10 km study area include human activities such as construction and vehicular movement. The maximum concentration of air pollutants was found in plant site which may be due to plant operation.

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 proper 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 Final EIA/EMP report.

As per Project specific ToR point no. 1 vide letter no. F.No. J-11011/279/2006-IA.II(I) dated 27th September, 2021, i.e “One-month Ambient Air Quality (AAQ) data shall be collected additionally at locations near old stations and new location selected / corrected based on wind rose”.

Additional one month baseline study was conducted in October, 2021.



**Table-3.11 (c)**  
**Air Quality Monitoring Stations selected For (Oct., 2021)**  
**No. of Monitoring Stations: 13**

S. No.	Monitoring stations	Approx. Distance & Direction from Project Site		Selection criteria for Project Site
		Aerial Distance	Direction	
1.	Plant Site	-		• Core Zone
2.	Ghosundi	~7.0 km	NNE	• Upwind of pre-dominant direction • Near NH 76
3.	Putholi (Near PHC)	~0.5 km	SW	• Downwind of pre-dominant direction • Habitation in buffer zone • Near NW Railway line
4.	Chanderiya	~2.5 km	SW	• Downwind of pre-dominant direction • Habitation in buffer zone • Near existing industry
5.	Ajoliya ka Khera	~1.0 km	WNW	• Near NH 79 • Near PF & RF • Habitation in buffer zone
6.	Village- Biliya	Adjacent	NNE	• Adjacent to plant site • Habitation in Buffer Zone
7.	Mungava Ka Khera	~1.0 km	SSW	• Habitation in Buffer Zone
8.	Chogawadi	~5.0 km	North	• Habitation in Buffer Zone
9.	Zinc Nagar	~7.0 km	SW	• Mostly Populated area
10.	Near Nagari Village (RIICO Road)	~0.8 km	NE	• Nearest Highway around the Hindustan Zinc Colony • Local Traffic
11.	Manpura (Near Chittorgarh RF)	~5.7 km	South	• Near Stone Crusher
12.	Hokampura	~2.5 km	East	• Near NH 79 • Habitation in Buffer Zone
13.	Chittorgarh	~8.0 km	SSW	• NH and SH at the center of the city

Source: SOI Toposheet & field survey

All 24 observations of pollutants for each location are detailed in Additional Ambient Air Quality Monitoring Tables enclosed as **Annexure – gb**.

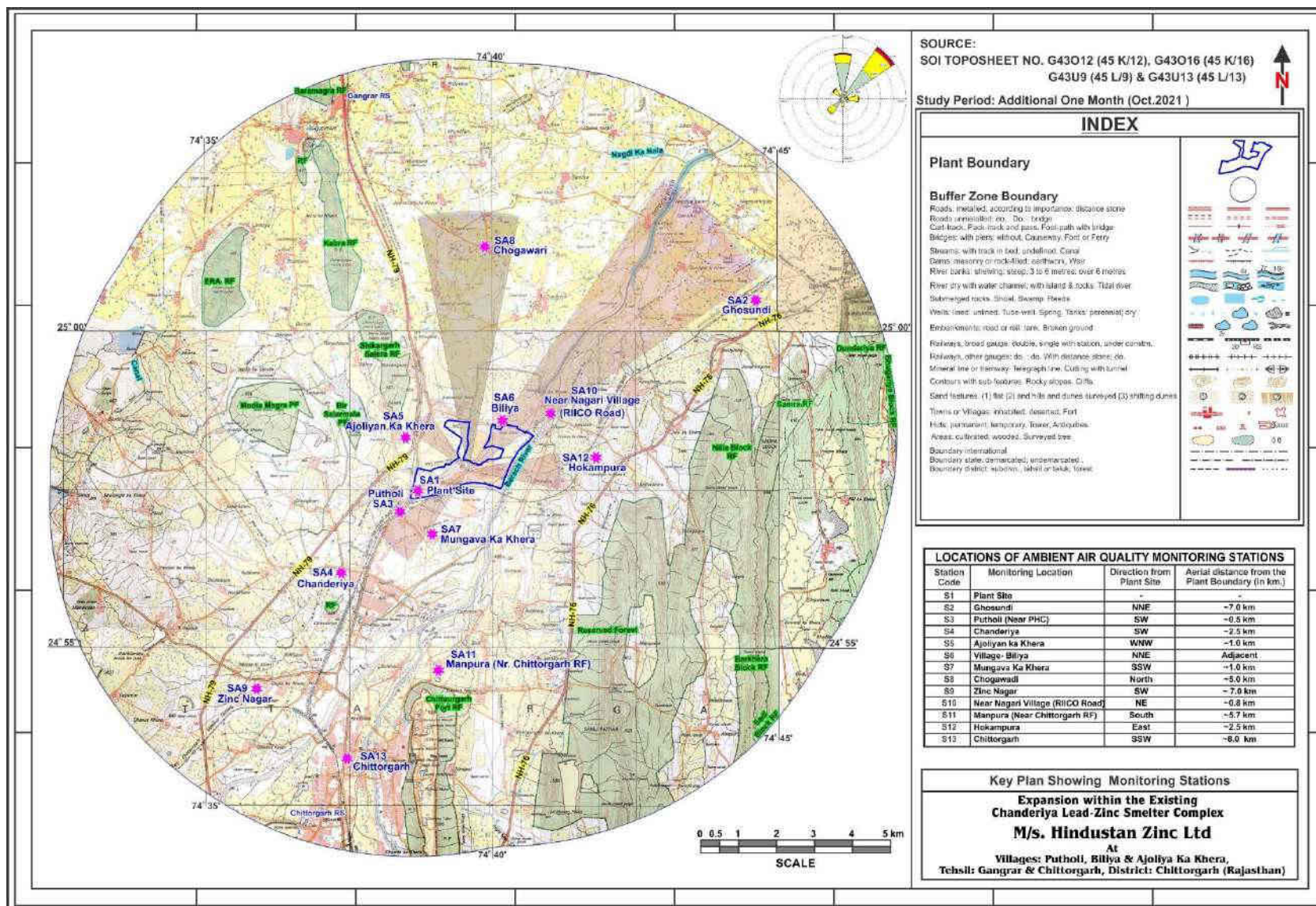


Figure 3.8(b): Key Plan showing Additional Ambient Air Quality Monitoring Location

**Table - 3.11 (D)**  
**Additional Ambient Air Quality Monitoring Results**  
**Study Period: (October, 2021)**

Sampling Location	Parameters													
	PM <sub>2.5</sub> (µg/m <sup>3</sup> )		PM <sub>10</sub> (µg/m <sup>3</sup> )		Nitrogen Dioxide (µg/m <sup>3</sup> )		Sulphur Dioxide (µg/m <sup>3</sup> )		Carbon Monoxide (mg/m <sup>3</sup> )		Lead (µg/m <sup>3</sup> )		Nickel (ng/m <sup>3</sup> )	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Plant Site	53.2	41.3	90.9	77.3	36.9	23.0	20.1	10.9	1.08	0.67	0.57	0.23	12.7	6.5
Village- Chanderiya	47.9	35.6	86.8	72.0	30.2	19.8	18.0	9.2	0.90	0.64	0.43	0.19	9.0	3.2
Ajaliyan ka Khera	42.3	32.2	83.6	60.8	28.0	15.0	15.0	6.6	0.77	0.58	0.26	0.11	6.0	2.3
Village- Biliya	44.0	35.0	84.1	64.7	27.8	18.0	14.6	7.5	0.81	0.54	0.22	0.04	4.0	BDL
Mungava ka khera	38.6	28.9	78.0	60.6	25.3	14.0	14.8	6.8	0.76	BDL	BDL		BDL	
Putholi	48.7	34.4	88.7	70.5	32.0	19.0	17.1	9.4	1.02	0.65	0.11	BDL	5.6	2.0
Village- Chogawadi	37.6	28.7	75.2	61.3	24.3	14.2	12.3	6.0	BDL		BDL		BDL	
Village- Ghosundi	40.0	30.2	80.3	60.2	23.6	16.1	14.2	6.6	BDL		0.07	BDL	BDL	
Chittorgarh (Zinc Nagar)	36.8	26.3	70.8	57.1	23.9	15.8	13.3	5.6	0.68	BDL	BDL		3.3	BDL
Vill. Hokampur	40.0	31.2	82.1	64.5	26.7	14.0	16.8	8.0	0.88	0.53	BDL		2.0	BDL
Manpura	35.6	25.4	68.9	55.4	19.8	12.3	11.2	5.5	BDL		BDL		BDL	
GusaiKhera	41.2	33.8	84.0	63.1	26.9	16.0	15.9	7.4	0.80	BDL	BDL		1.8	BDL
Chittorgarh	53.9	38.7	91.5	79.2	36.0	23.4	22.1	8.9	1.15	0.71	0.47	0.18	7.8	2.0
Detection Limit									0.50		0.02		1.0	
NAAQS*	60		100		80		80		4		1		20	

**Table - 3.11 (E)**  
**Additional Ambient Air Quality Monitoring Results**  
**Study Period: (October, 2021)**

Sampling Location	Parameters					
	Ozone (µg/m <sup>3</sup> )	Ammonia (µg/m <sup>3</sup> )	Benzene (µg/m <sup>3</sup> )	Benzo(a)pyrene (BaP)-Particulate phase only (ng/m <sup>3</sup> )	Arsenic (ng/m <sup>3</sup> )	Zinc (µg/m <sup>3</sup> )
Plant Site	26.8	14.2	0.73	0.81	BDL	8.0
Village- Chanderiya	24.9	13.1	0.51	BDL	BDL	5.9
Ajaliyan ka Khera	28.0	11.2	BDL	BDL	BDL	6.0
Village- Biliya	18.2	7.4	BDL	BDL	BDL	0.6
Mungava ka khera	12.0	6.4	BDL	BDL	BDL	BDL
Putholi	24.7	13.0	BDL	BDL	BDL	1.11

Sampling Location	Parameters					
	Ozone ( $\mu\text{g}/\text{m}^3$ )	Ammonia ( $\mu\text{g}/\text{m}^3$ )	Benzene ( $\mu\text{g}/\text{m}^3$ )	Benzo(a)pyrene (BaP)-Particulate phase only ( $\text{ng}/\text{m}^3$ )	Arsenic ( $\text{ng}/\text{m}^3$ )	Zinc ( $\mu\text{g}/\text{m}^3$ )
Village- Chogawadi	11.2	4.7	BDL	BDL	BDL	BDL
Village- Ghosundi	9.4	5.2	BDL	BDL	BDL	BDL
Chittorgarh (Zinc Nagar)	12.0	8.6	BDL	BDL	BDL	2.4
Vill. Hokampur	10.2	6.7	BDL	BDL	BDL	BDL
Manpura	4.1	3.8	BDL	BDL	BDL	BDL
GusaiKhera	8.0	4.6	BDL	BDL	BDL	BDL
Chittorgarh	22.6	10.2	BDL	BDL	BDL	6.5
Detection Limit	1.0	1.0	1.0	0.50	0.50	0.50
NAAQS*	180	400	5	1	6	-

\*NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009

**Source:** Ambient Air Quality Monitoring Results from JM EnviroLab Pvt. Ltd

### Interpretation & Conclusion

Additional 1 Month Baseline Study (Oct., 2021) for AAQ monitoring has been carried out at 13 stations in the study area on Project Specific TOR point 1. The concentration of  $\text{PM}_{2.5}$  ranges between 25.4 to 53.9  $\mu\text{g}/\text{m}^3$ ,  $\text{PM}_{10}$  ranges between 55.4 to 91.5  $\mu\text{g}/\text{m}^3$ ,  $\text{SO}_2$  ranges between 5.5 to 22.1  $\mu\text{g}/\text{m}^3$  and  $\text{NO}_2$  ranges between 12.3 to 36.9  $\mu\text{g}/\text{m}^3$ . CO concentration was observed as BDL to 1.15  $\text{mg}/\text{m}^3$ . The concentration of Pb was found to be in range of BDL to 0.57  $\mu\text{g}/\text{m}^3$ . The concentration of Ni was found to be in range of BDL to 12.7  $\text{ng}/\text{m}^3$ .

#### 3.6.10 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 traffic on road, human activities in villages and agricultural fields.

#### Sampling Schedule

Noise level monitoring was carried out at 8 locations during the day and night once in the study period.

#### Sampling Locations

Locations / stations selected for noise level monitoring are given in Table - 3.12.

Table - 3.12

Locations of Noise Monitoring Stations

S. No.	Monitoring Location	Approx. Distance & Direction from Plant Site	
		Aerial Distance	Direction
1.	Plant Site- SW Boundary near Railway track	Core zone	-
2.	Plant Site - NE boundary	Core zone	-
3.	NH- 79 near Putholi Village	~1.2 km	West
4.	Ajoliya ka Khera	~1.0 km	West
5.	Chanderiya RS	~2.5 km	SSW
6.	Mungava ka Khera	~1.0 km	South
7.	NH-76 near Hokampura	~3.0 km	East
8.	Near Chittorgarh Fort RF	~6.0 km	South

**Source:** Ambient Noise Level Monitoring



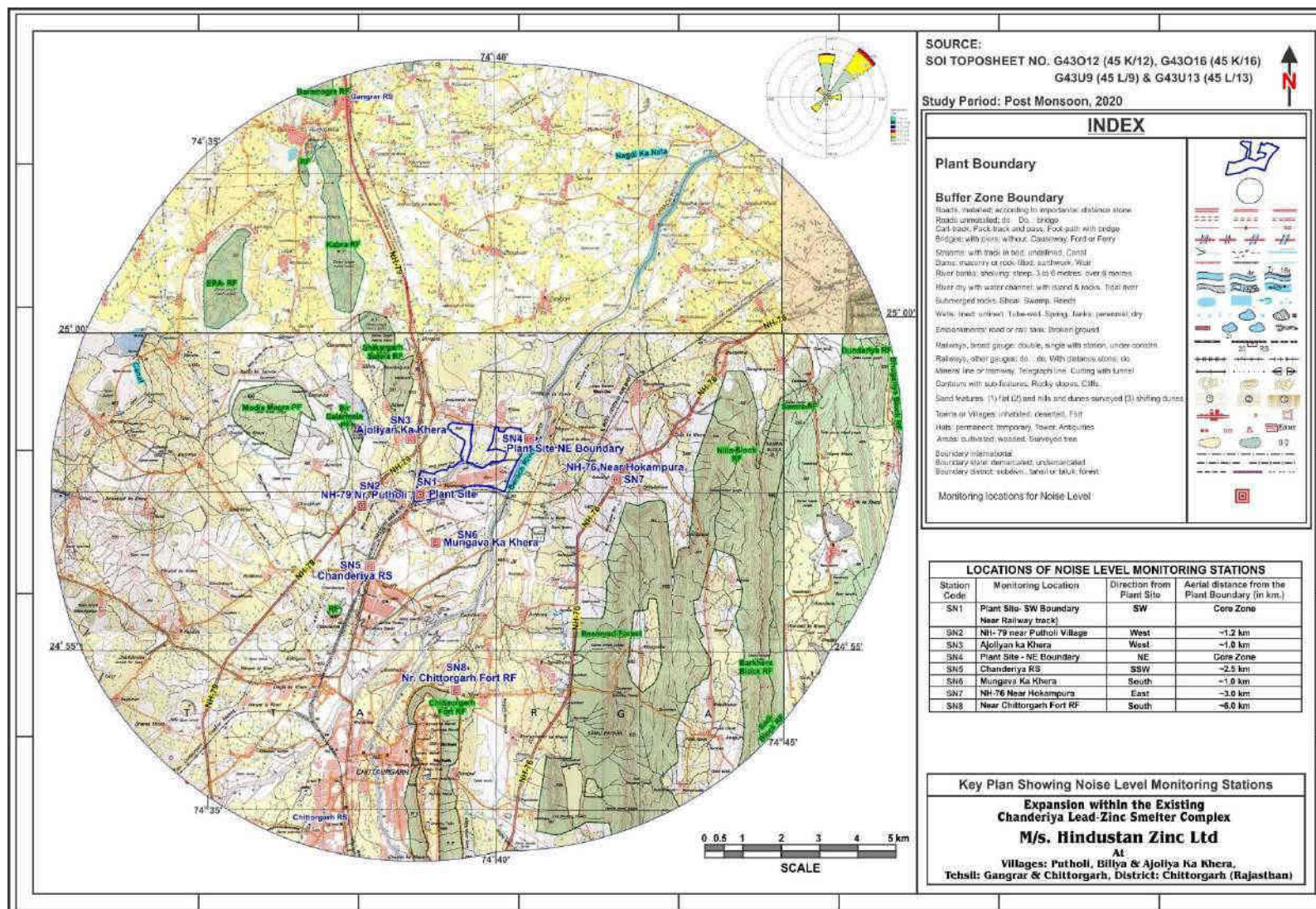


Figure 3.9: Key Plan showing Ambient Noise Level Monitoring Stations

### Ambient Noise Level Monitoring Results

Ambient noise levels monitored at different locations (as mentioned in Table - 3.12) during the study period are given in Table - 3.13.

**Table - 3.13**  
**Ambient Noise Level Monitoring Results**  
**Study Period: Post Monsoon Season (Oct. – Dec. 2020)**

S. No.	Monitoring Locations	Noise Level Leq. dB (A)		CPCB Standards Limits in Leq. dB (A)	
		Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 6:00 am)	Day Time (06.00 am– 10.00 pm)	Night Time (10.00 pm– 6.00 am)
1.	Plant Site (SW Boundary, Near Railway Track)	68.9	62.3	75	70
2.	Plant Site (NE Boundary)	67.2	60.5		
3.	Putholi	54.1	44.2	55	45
4.	Ajoliya ka khera	54.0	43.5		
5.	Chanderiya RS	53.4	44.3	65	55
6.	Mungava ka khera	53.1	43.7	55	45
7.	Hokampura	53.9	43.8		
8.	Near Chittorgarh Fort RF	53.6	43.3		

Source: Ambient Noise Level Monitoring

### Interpretation and Conclusion:

- Ambient noise levels were measured at 08 locations in and around the plant site during the day and night time.
- Within the 10 km radius of study area the noise levels at the sampling locations are under the prescribed limits as given by the CPCB.
- Noise level varies from 53.1 to 68.9 Leq dB (A) during day time and from 43.3 to 62.3 Leq dB (A) during night time.
- The highest value of noise level as monitored in day as well as night time were observed at plant site (SW boundary, near railway track) due to more vehicle transportation and other plant activities. The minimum noise levels were observed at Village Mungava ka khera during day time and near Chittorgarh fort RF at the night time as there is less habitation and there is no other major source of noise pollution near that area.
- ⊖ The noise is mainly caused due to the plant operation and within the complex as well as nearby anthropogenic activities such as industries, vehicular movement, habitation, etc.

During construction activities, a minor temporary increase in noise levels near to the plant site will be seen which will be temporary and details are given in Chapter 4

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

### 3.6.11 Water Environment

#### (A) Type of sampling

Grab sampling has been done as single sample collected at a specific spot and at a site over a short period of time, grab samples are taken at a single selected location, depth and time.

#### (B) Sampling method

Sample were collected manually from various type of sampling location by method described below-

Drinking Water / Ground water: samples have been collected from tanks water as well as borewell water in the study area.

#### 3.6.11.1 Surface Water Quality

##### Sampling Schedule

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

##### Sampling Locations

Details of surface water sampling locations and their distance and directions are given in Table - 3.14 & shown in Figure - 3.10.

Surface water analysis results are given in Table - 3.15.

**Table -3.14**  
**Location of Surface Water Sampling**  
**Study Period: Post Monsoon Season (Oct. – Dec. 2020)**

S. No.	Sampling Location	Approx. aerial distance from Plant Site	Direction	Status of water body
1.	Putholi Nallah near western boundary of the plant (Upstream) *	-	-	Seasonal
2.	Putholi Nallah near Eastern boundary of the plant (Downstream)*	-	-	
3.	Gambhir River near Manpura	~4.5 Km	South	Perennial
4.	Berach River Near Mungava Ka Khera (Upstream)*	~1.5 Km	South	Perennial
5.	Berach River Near Nagri (downstream)*	~1.0 Km	NNE	

Source: SOI Toposheet and Field Survey

Note: The CLZS complex is a “Zero Liquid Discharge Unit”. However, the surface water samples were collected from upstream and downstream of Putholi Nallah (as the same is passing through the plant site) and Berach River (as after passing through the plant site, the Putholi Nalla joins the Berach River) to assess the impact of the existing project on the surface water quality of these water bodies.

**Table: 3.15**  
**Surface Water Quality Results**  
**Study Period: Post Monsoon Season (Oct. – Dec. 2020)**

S. No.	Parameters	Unit	Putholi Nallah (Downstream)	Putholi Nallah (Upstream)	Gambhir River (Near Manpura)	Berach River (Upstream)	Berach River (Downstream)
1.	pH (at 25°C)	--	7.58	7.52	7.64	7.76	7.63
2.	Colour	Hazen Unit	20.0	20.0	BDL (DL 5.0)	5.0	5.0
3.	Turbidity	NTU	9.0	8.0	14.0	10.0	13.0
4.	Odour	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5.	Total Hardness as CaCO <sub>3</sub>	mg/l	330.0	336.8	170.0	290.0	302.00
6.	Calcium as Ca	mg/l	84.2	87.5	30.1	64.1	60.12
7.	Alkalinity as CaCO <sub>3</sub>	mg/l	228.85	223.14	154.2	278.6	271.32
8.	Chloride as Cl	mg/l	128.12	136.87	79.9	154.9	163.4
9.	Magnesium as Mg	mg/l	29.16	28.79	23.09	31.59	36.94
10.	Total Dissolved Solids	mg/l	629.0	616.00	371.0	619.0	627.0
11.	Sulphate as SO <sub>4</sub>	mg/l	132.4	121.65	56.3	78.64	83.4
12.	Fluoride as F	mg/l	0.93	0.96	0.84	1.32	1.26
13.	Nitrate as NO <sub>3</sub>	mg/l	1.03	1.54	3.06	6.87	5.05
14.	Iron as Fe	mg/l	0.06	0.03	0.09	0.26	0.21
15.	Boron	mg/l	0.56	BDL (DL-0.50)	0.78	0.68	0.62
16.	Total Suspended Solid	mg/l	6.5	6.0	8.7	11.4	12.0
17.	Biochemical oxygen demand	mg/l	7.0	6.1	12.0	16.0	16.0
18.	Chemical oxygen demand	mg/l	26.9	26.9	43.0	56.0	59.0
19.	Sodium as Na	mg/l	62.1	57.2	54.3	88.7	92.1
20.	Potassium as K	mg/l	7.6	7.8	7.8	7.5	7.9
21.	Conductivity	µS/cm	982.00	971.0	608.00	953.00	978.00
22.	Dissolve Oxygen	mg/l	5.9	6.0	7.4	7.1	7.0

BDL - Below Detectable Limit, DL - Detection Level

Note: Apart from the above, various parameters viz. Colour (DL 5.0 Hazen Unit), Residual free Chlorine (DL 0.2 Hazen Unit), Cyanide as CN (DL 0.02 mg/l), Aluminum as Al (DL 0.03 mg/l), Boron (DL 0.20 mg/l), Phenolic Compounds (DL 0.001 mg/l), Anionic Detergents as MBAS (DL 0.02 mg/l), Hexa Chromium as Cr<sup>+6</sup> (DL 0.03 mg/l), Copper as Cu (DL 0.02 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), Selenium as Se (DL 0.002 mg/l), Arsenic as As (DL 0.002 mg/l), Mercury as Hg (DL 0.001 mg/l), Nickel (DL 0.005 mg/l), were analyzed in the water samples but the same were not detected.

Source: Surface Water Analysis Report



### Observations & Interpretation:

The above-mentioned chemical analysis of surface water samples reveals that there is a variation in a chemical composition of water samples from the nearby water bodies. The pH of the water bodies ranges from 7.52 to 7.76 indicating slightly alkaline in nature. The water bodies are rich in Calcium, potassium, magnesium and bicarbonates. The colour and turbidity were of permissible range and odour was found agreeable at all the locations.

Total hardness (170.0 to 336.8 mg/l), Total dissolved solids (371.0 to 629.0 mg/l), Alkalinity (154.2 to 278.6 mg/l) and conductivity (608 to 982.0  $\mu$ S/cm). The COD (26.9 to 59.0 mg/l) and BOD (6.1 to 16.0 mg/l). The nutrients were also found low viz. sulphate (56.3 to 132.4 mg/l), nitrate (1.03 to 6.87 mg/l), calcium (30.1 to 87.5 mg/l), magnesium (23.09 to 36.94 mg/l). The Dissolved oxygen (5.9 to 7.4 mg/l) indicated that the water bodies are safe for aquatic biodiversity. The CPCB has classified the inland surface water into five categories A to E on the basis of their designated best use and desired class.

### Conclusion:

Thus, it can be inferred from the above data that water quality of all the sampling stations seems to be clean. Also, the physical quality and chemical quality is good and safe for aquatic biodiversity.

### 3.6.11.2 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 - 3.16 & shown in Figure - 3.10.

**Table - 3.16**  
**Locations of Ground Water**  
**Study Period: Post Monsoon Season (Oct. – Dec. 2020)**

S. No.	Sampling Location	Approx. aerial distance from Plant Site	Direction	Utilization
1.	Plant Site (Drinking water)	-	-	Drinking water
2.	Putholi	~0.5 Km	SW	Domestic and agricultural activities
3.	Nagari	~0.5 Km	NE	Domestic and agricultural activities
4.	Village- Biliya	Adjacent	North	Domestic and agricultural activities
5.	Chittorgarh (Zinc Nagar)	~7.0 Km	SW	Domestic and agricultural activities
6.	Semalpura	~6.0 Km	SSE	Domestic and agricultural activities
7.	Khuntiya	~7.5 Km	NE	Domestic and agricultural activities
8.	Ajoliya Ka Khera	~1.0 Km	West	Domestic and agricultural activities
Source: SOI Toposheet and Field Survey				



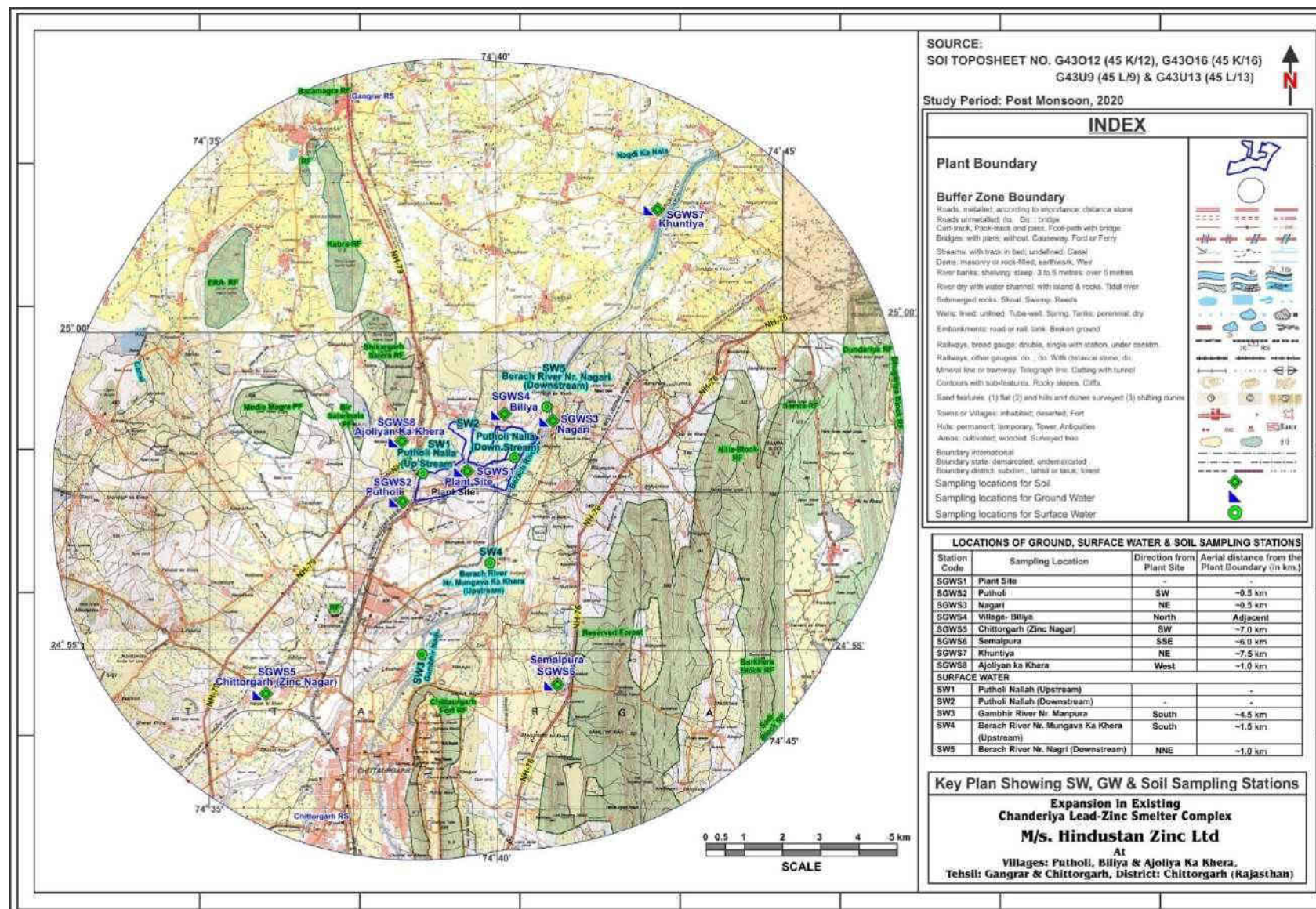


Figure 3.10: Key Plan Showing Surface Water, Ground Water and Soil Monitoring Location

**Table - 3.17**  
**Ground Water Quality Results**  
**Study Period: Post Monsoon Season (Oct. – Dec. 2020)**

S. No.	Parameters	Unit	Plant Site	Village-Putholi	Village-Nagari	Village-Biliya	Chittorgarh (Zinc Nagar)	Village-Semalpura	Village-Khuntiya	Ajoliya Ka Khera	Specification as per IS 10500-2012	
											Requirement Acceptable Limit	Permissible Limit in the Absence of Alternate Source
1.	pH (at 25°C)	-	7.34	7.79	8.02	7.49	7.61	7.75	7.92	8.02	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 <sub>3</sub>	mg/l	250.00	545.00	1005.00	970.0	320.0	420.0	895.0	730.0	200	600
5.	Calcium as Ca	mg/l	42.08	142.30	276.50	248.4	97.4	130.2	210.4	176.4	75	200
6.	Alkalinity as CaCO <sub>3</sub>	mg/l	169.15	368.15	666.65	293.5	203.9	288.5	402.9	417.9	200	600
7.	Chloride as Cl	mg/l	140.44	186.32	501.46	289.90	137.97	142.90	394.2	320.29	250	1000
8.	Magnesium as Mg	mg/l	35.24	46.16	76.58	85.11	18.71	23.12	89.92	70.47	30	100
9.	Total Dissolved Solids	mg/l	468.0	926.0	1923.0	1487.0	498.0	646.0	1336.0	1219.0	500	2000
10.	Sulphate as SO <sub>4</sub>	mg/l	34.5	184.5	301.3	485.40	59.70	88.20	233.04	231.08	200	400
11.	Fluoride as F	mg/l	0.81	1.19	1.09	1.06	1.23	0.98	0.97	1.06	1.0	1.5
12.	Nitrate as NO <sub>3</sub> -N	mg/l	12.43	15.96	19.64	14.32	11.03	12.36	12.4	8.75	45	No Relaxation
13.	Iron as Fe	mg/l	0.11	0.16	0.18	0.19	0.13	0.14	0.17	0.15	1.0	No Relaxation
14.	Zinc as Zn	mg/l	0.62	0.23	0.46	0.23	BDL(0.0005)	0.05	0.23	0.15	5	15
15.	Manganese as Mn	mg/l	BDL(DLo.10)	BDL(DLo.10)	0.06	0.06	BDL(DLo.10)	BDL(DLo.10)	BDL(DLo.10)	BDL(DLo.10)	0.1	0.3
16.	Sodium as Na	mg/l	54.2	89.6	202.3	62.3	32.1	36.5	69.3	89.9	--	--
17.	Potassium as K	mg/l	5.1	5.8	27.8	6.7	4.1	5.1	13.4	20.1	--	--
18.	Conductivity	µS/cm	754.00	1342.00	2530.00	2064.00	791.00	993.00	1881.00	1766.00	--	--

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 (DL 0.02 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  $PO_4$  (DL 0.02 mg/l), Nickel (DL 0.005 mg/l), Total Suspended Solids (DL 1.0 mg/l) were analyzed in the water samples but the same were not detected.

### **Interpretation & Conclusion**

The physico-chemical quality of groundwater was compared with drinking water standard (IS: 10500-2012). The pH of the water samples ranged from 7.34 to 8.02 indicating alkaline in nature; and maximum pH was recorded at Village Nagari and Ajoliya ka khera. 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 Hardness (250.00 to 1005.00 mg/l), Alkalinity (169.15 to 666.65 mg/l), and Total Dissolved Solids (468.00 to 1923.00 mg/l) however, maximum hardness, total dissolved solid and alkalinity were found in the sample of villages Nagari. The concentration of chloride was found to be (137.97 to 501.46 mg/l) and sulphate was (34.50 to 485.40 mg/l), Nitrate (8.75 to 19.64 mg/l), Calcium (42.08 to 276.50 mg/l), Magnesium (18.71 to 89.92 mg/l). The value of Zinc in the ground water is found to be BDL to 0.62mg/l, the conductivity is observed to be minimum i.e., 754.00 $\mu$ S/cm at plant site and maximum i.e., 2530.00 $\mu$ S/cm at village Nagari. 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 Nagari, Village Biliya, Village Khuntiya and Village Ajoliya ka khera where Total Hardness, Calcium and Alkalinity are out of the prescribed limit.

### **3.6.12 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 Expansion within existing CLZS Complex, 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.

#### **Sampling Locations**

Representative 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 physico-chemical parameters. Details of Location of soil sampling stations along with the direction are given in Table - 3.18(A) and Figure: 3.10 and soil analysis results are given in Table - 3.18(B).

**Table - 3.18(A)**  
**Locations of Soil Sampling**

**Study Period: Post Monsoon Season (Oct. – Dec. 2020)**

S. No.	Sampling Location	Approx. aerial distance from Plant Site	Direction
1.	Plant Site (Drinking water)	-	-
2.	Putholi	~0.5 Km	SW
3.	Nagari	~0.5 Km	NE
4.	Village- Biliya	Adjacent	North
5.	Chittorgarh (Zinc Nagar)	~7.0 Km	SW
6.	Semalpura	~6.0 Km	SSE
7.	Khuntiya	~7.5 Km	NE
8.	Ajoliya Ka Khera	~1.0 Km	West
Source: SOI Toposheet and Field Survey			

Table - 3.18 (B) Soil Quality Analysis Results - Study Period –Post Monsoon Season (Oct. to Dec., 2020)

S. No.	Parameters	Unit	Sampling Locations							
			Plant Site	Putholi	Nagari	Village- Biliya	Village- Semalpura	Chittorgarh (Zinc Nagar)	Village- Khuntiya	Ajoliya Ka Khera
1.	pH (at 25°C) (1:2.5 soil water sus.)	-	7.35	7.86	7.82	7.42	7.69	7.92	7.45	7.76
2.	Conductivity (1:2 soil water sus)	mS/cm	0.44	0.39	0.53	0.37	0.47	0.49	0.41	0.42
3.	Soil Texture	-	Sandy Clay Loam	Loam clay	Silt Clay Loam	Loam clay	Sandy Clay Loam	Silty Loam	Silty Loam	Silty Loam
4.	Colour	-	Brownish	Reddish Brown	Brown	Brown	Brown	Blackish brown	Blackish brown	Blackish brown
5.	Water holding capacity	%	41.61	37.16	40.44	34.32	35.48	42.70	39.79	40.37
6.	Bulk density	gm/cc	1.37	1.39	1.35	1.40	1.33	1.30	1.34	1.32
7.	Soluble Chloride	mg/kg	77.13	66.86	114.60	81.24	104.03	96.40	114.20	110.19
8.	Exchangeable Calcium	mg/kg	2356.3	1956.8	3096.5	1692.5	2303.7	2686.2	2411.0	2231.6
9.	Exchangeable Sodium	mg/kg	114.7	131.3	165.2	121.3	98.3	101.4	108.1	96.5
10.	Available Potassium	kg/hect	327.21	186.61	205.51	189.37	265.89	311.30	329.86	286.99
11.	Organic matter	%	1.29	1.23	0.99	1.41	1.16	1.38	0.84	1.38
12.	Exchangeable Magnesium as Mg	mg/kg	400.47	418.86	362.95	499.32	394.05	488.37	401.92	367.83
13.	Available Nitrogen as N	kg/hect	277.33	196.81	239.60	213.16	208.08	350.14	218.54	241.71
14.	Available Phosphorus	kg/hect	48.73	43.07	41.93	51.60	39.74	58.64	42.91	50.05
15.	Total Zinc as Zn	mg/kg	45.28	39.09	39.43	38.47	38.59	38.21	31.31	30.89
16.	Total Manganese as Mn	mg/kg	342.25	329.67	312.08	267.05	240.73	344.12	253.33	302.58
17.	Total Chromium as Cr	mg/kg	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)
18.	Total Lead as Pb	mg/kg	18.58	21.00	19.93	20.24	20.70	20.00	16.94	24.13
19.	Total Cadmium as Cd	mg/kg	BDL(DL 5.0)	BDL(DL 5.0)	BDL(DL 5.0)	BDL(DL 5.0)	BDL(DL 5.0)	BDL(DL 5.0)	BDL(DL 5.0)	BDL(DL 5.0)
20.	Total Copper as Cu	mg/kg	39.80	19.88	22.17	25.48	22.37	34.72	21.81	37.55
21.	Organic Carbon	%	0.75	0.71	0.57	0.82	0.67	0.80	0.49	0.80
22.	SAR Value	-	0.58	0.70	0.75	0.67	0.50	0.47	0.54	0.50
23.	Particle Size	Sand	%	72	74	4	69	76	22	21
24.	Distribution (%)	Silt	%	6	5	67	8	4	75	77
25.		Clay	%	22	21	29	23	20	3	2
26.	Porosity	%	49.8	45.2	48.7	42.6	43.7	50.9	47.9	48.6
27.	Salinity	ppt	0.21	0.19	0.25	0.18	0.23	0.24	0.20	0.20

Source: Soil Quality Analysis Report



**Table - 3.19**  
**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

### **Observation & Interpretation**

The pH in all the soil samples varies from 7.35 to 7.92 which show that the soil is slightly Alkaline to moderately alkaline in nature which is an optimal range for the various principle crops such as wheat, mustard, Bajra, guar; pulses such as Gram, Moong, chaula and commercial crops such as Methi, onion, chillies, etc. (District census Handbook, Chittorgarh, 2011).

The soil samples majorly exhibit different colour of soil viz. Brownish, Brown, Blackish brown, Reddish Brown & the textures of the soil samples majorly was Silty Loam, Loam Clay, Silt Clay Loam & Sandy clay Loam. The samples have rich content of organic matter comprising of 0.84 % to 1.41 % for the plant growth.

Examined essential nutrients required for an ideal plant growth are Nitrogen, Phosphorus, Potassium, Magnesium, Sulfur and calcium. All the essential nutrients were observed to be Nitrogen

(196.81 to 350.14 kg/ha), Phosphorous (39.74 to 58.64 kg/ha), Potassium (186.61 to 329.86 kg/ha), Magnesium (362.95 to 499.32 mg/kg), Calcium (1692.5 to 3096.5 mg/kg). As observed the Nitrogen content in the soil sampled was observed to be present in the better to sufficient quantity, where the values for phosphorus and potassium indicate the medium to better range. Optimum calcium values in the soil sample have resulted in alkaline nature of the soil within the area which makes it suitable for the plant to grow well in both the seasons.

The SAR value was observed with maximum value of 0.75 at Village Nagari to minimum value of 0.47 at Chittorgarh (Zinc Nagar), which indicates the soil samples do not have any presence of Sodicty which can affect the plant growth and indicates the suitability of water used for irrigation purpose in the area.

From the results, it can be concluded that the quality of the soil within the study area varies from medium to good range and contains sufficient macro and micro nutrients which are vital for the healthy plant.

### 3.6.13 Biological Environment

#### Introduction

Biological environment includes the Habitat (Place where the organism lives) and natural surroundings of all species (living organism species) of the particular area. 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 under taking 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 and to study the floral and faunal diversity of the study area within the 10 km radius of the project site. Some of the information was gathered from the local habitants. All the collected data were classified to interpret the impact of pollution on the flora and fauna of that region. Survey of the wild plants as well as cultivated crop plants was made and all the available information was recorded. Night survey was also conducted with the help of spotlight to record nocturnal animals, birds and reptiles. Secondary data on flora and fauna, cropping patterns etc. were also collected from available literatures, internet, forest department and revenue department.

List of flora observed in the study area as well as core zone and buffer zone are as mentioned in the list given below:

**Table - 3.20**  
**Inventory of floral diversity in Core & Buffer zone of Plant site**  
**Based on Actual Sighting, based on inputs from locals and Perused from Secondary Data**  
**Habit: Tree (T), Shrub (S), Herb (H), Grass (G), Climber (C), Bush (B) and Hydrophytes (H)**

S. No.	Scientific name	Local name/ English Name	Family	Habit	Core	Buffer	IUCN conservation status as on 11 <sup>th</sup> Nov. 2021
<b>Tree Species</b>							
1.	<i>Acacia catechu</i>	Black Cutch	Fabaceae	T	+	-	LC
2.	<i>Acacia leucocephala</i>	Ronj	Fabaceae	T	-	-	NA
3.	<i>Acacia nilotica</i>	Babool	Fabaceae	T	+	+	LC
4.	<i>Aegle marmelos</i>	Bael	Rutaceae	T	+	+	NT
5.	<i>Ailanthus excelsa</i>	Ardu	Leguminosae	T	-	+	NA
6.	<i>Albizia amara</i>	Krishna Siris	Mimosaceae	T	-	-	LC
7.	<i>Albizia lebbeck</i>	Siris	Mimosaceae	T	-	+	LC
8.	<i>Anogeissus latifolia</i>	Axlewood	Combretaceae	T	-	+	NA
9.	<i>Anogeissus pendula</i>	Dhok	Combretaceae	T	+	+	NA
10.	<i>Azadirachta indica</i>	Neem	Meliaceae	T	+	-	LC
11.	<i>Bauhinia variegata</i>	Kachnar	Fabaceae	T	-	+	LC
12.	<i>Boswellia serrata</i>	Salar	Burseraceae	T	-	+	NA
13.	<i>Bridelia retusa</i>	Kaljhada	Euphorbiaceae	T	-	+	LC
14.	<i>Bridelia superba</i>	Harinhara	Euphorbiaceae	T	-	+	NA
15.	<i>Butea monosperma</i>	Chheela	Fabaceae	T	-	-	LC
16.	<i>Cassia fistula</i>	Amaltas	Fabaceae	T	+	+	LC
17.	<i>Cassia siamea</i>	Seemia/Kassod	Fabaceae	T	+	-	LC
18.	<i>Celastrus paniculatus</i>	Black Oil Plant	Celastraceae	T	+	+	LC
19.	<i>Commiphora wightii</i>	Guggul	Burseraceae	T	-	+	CR
20.	<i>Cordia dichotoma</i>	Lasoda	Boraginaceae	T	+	+	LC
21.	<i>Dalbergia sissoo</i>	Shisham	Fabaceae	T	+	-	LC
22.	<i>Delonix regia</i>	Gulmohar	Fabaceae	T	+	+	LC
23.	<i>Dendrocalamus strictus</i>	Solid Bamboo	Poaceae	T	+	+	NA
24.	<i>Dichrostachys cinerea</i>	Durangi Babool	Leguminosae	T	-	+	LC
25.	<i>Diospyros cordifolia</i>	Dheki	Ebenaceae	T	+	+	NA
26.	<i>Diospyros melanoxylon</i>	Tendu	Ebenaceae	T	+	-	NA
27.	<i>Emblia officinalis</i>	Awala	Euphorbiaceae	T	+	+	LC
28.	<i>Emilia lajerium</i>	Kirankuri	Compositae	T	-	+	NA
29.	<i>Erythrina indica</i>	Indian Coral Tree	Papilionaceae	T	-	-	LC
30.	<i>Eucalyptus globulus</i>	Safeda	Myrtaceae	T	-	+	LC
31.	<i>Ficus bengalensis</i>	Bargad	Moraceae	T	+	+	NA
32.	<i>Ficus religiosa</i>	Peepal	Moraceae	T	+	-	NA
33.	<i>Grevillea robusta</i>	Silky oak	Proteaceae	T	+	+	LC
34.	<i>Hardwickia binata</i>	Anjan	Fabaceae	T	-	+	LC
35.	<i>Holoptelea integrifolia</i>	Papri, Churel	Utreaceae	T	-	+	NA
36.	<i>Leucaena leucocephala</i>	Su- babool	Fabaceae	T	+	+	NA
37.	<i>Madhuca indica</i>	Mahua	Sapotaceae	T	-	+	NA
38.	<i>Mangifera indica</i>	Aam	Anacardiaceae	T	+	+	DD
39.	<i>Mimusops elengi</i>	Baula	Sapotaceae	T	+	-	NA
40.	<i>Mitragyna parvifolia</i>	Kadam	Rubiaceae	T	-	+	NA
41.	<i>Moringa oleifera</i>	Senjana	Moringaceae	T	+	+	LC

S. No.	Scientific name	Local name/ English Name	Family	Habit	Core	Buffer	IUCN conservation status as on 11 <sup>th</sup> Nov. 2021
42.	<i>Morus alba</i>	Shahtoot	Moraceae	T	-	+	LC
43.	<i>Opuntia dillenii</i>	Prickly Pear	Cactaceae	T	+	-	LC
44.	<i>Peltophorum ferrugineum</i>	Radha Chura	Fabaceae	T	+	-	NA
45.	<i>Phoenix sylvestris</i>	Khajoor	Arecaceae	T	+	+	NA
46.	<i>Phyllanthus emblica</i>	Indian Amla	Phyllanthaceae	T	+	+	LC
47.	<i>Pithecellobium dulce</i>	Jungal jalebi	Leguminosae	T	-	+	LC
48.	<i>Polyalthia longifolia</i>	Ashok	Annonaceae	T	+	+	NA
49.	<i>Pongamia pinnata</i>	Karanj	Fabaceae	T	+	-	LC
50.	<i>Prosopis cineraria</i>	Khejri	Fabaceae	T	+	+	NA
51.	<i>Prosopis juliflora</i>	Vilayati-Babool	Fabaceae	T	+	-	NA
52.	<i>Psidium guajava</i>	Amrud	Myrtaceae	T	+	-	LC
53.	<i>Salvadora oleoides</i>	Jal	Salvadoraceae	T	-	+	DD
54.	<i>Salvadora persica</i>	Arak	Salvadoraceae	T	-	+	LC
55.	<i>Sapindus laurifolius</i>	Soapnuts	Sapindaceae	T	-	-	NA
56.	<i>Samanea saman</i>	Gulabi Siris	Fabaceae	T	+	-	LC
57.	<i>Sterculia urens</i>	Katila	Sterculiaceae	T	-	+	NA
58.	<i>Syzygium cumini</i>	Jamun	Myrtaceae	T	+	+	NA
59.	<i>Tamarindus indica</i>	Imli	Fabaceae	T	+	-	LC
60.	<i>Tecomella undulata</i>	Rohida	Bignoniaceae	T	-	+	EN
61.	<i>Tectona grandis</i>	Sagon	Verbenaceae	T	+	-	NA
62.	<i>Terminalia arjuna</i>	Arjuna	Combretaceae	T	+	+	NA
63.	<i>Terminalia catappa</i>	Almond tree	Combretaceae	T	-	-	LC
64.	<i>Thespesia populnea</i>	Portia Tree	Malvaceae	T	+	-	LC
<b>Shrubs</b>							
1.	<i>Abutilon indicum</i>	India Abuition	Malvaceae	S	-	+	NA
2.	<i>Agave wightii</i>	Ram bans	Agavaceae	S	-	+	NA
3.	<i>Annona squamosa</i>	Sitafal	Annonaceae	S	+	+	LC
4.	<i>Barleria prionitis</i>	Bajradanti	Acanthaceae	S	-	+	LC
5.	<i>Calotropis gigantea</i>	Aakra	Asclepiadaceae	S	+	+	NA
6.	<i>Calotropis procera</i>	Aak	Asclepiadaceae	S	+		NA
7.	<i>Capparis deciduas</i>	Kair	Capparaceae	S	+	+	NA
8.	<i>Capparis sepiaria</i>	Wild Kair	Capparaceae	S	-	+	LC
9.	<i>Carissa carandus</i>	Karonda	Apocynaceae	S	-	+	NA
10.	<i>Carissaspinarum</i>	Karonda	Apocynaceae	S	-	+	NA
11.	<i>Citrus lemon</i>	Lemon	Rutaceae	S	+	+	NA
12.	<i>Citrus sinensis</i>	Lemon	Rutaceae	S	+	+	NA
13.	<i>Datura metel</i>	Datura	Solanaceae	S	+	+	NA
14.	<i>Euphorbia neriifolia</i>	Thor	Euphorbiaceae	S	+	+	LC
15.	<i>Grewia tenax</i>	Phalsa	Malvaceae	S	-	+	LC
16.	<i>Ipomea cornea</i>	Besharam	Convolvulaceae	S	-	+	NA
17.	<i>Jatropha curcas</i>	Ratanjyot	Euphorbiaceae	S	+	+	LC
18.	<i>Lantana camara</i>	Raimuniya	Verbeniaceae	S	-	+	NA
19.	<i>Lepidagathis Cristata</i>	Unt Knatala	Acanthaceae	S	-	+	NA
20.	<i>Nerium oleander</i>	Kaner	Apocynaceae	S	+	+	LC
21.	<i>Opuntia elatior</i>	Naag-phani	Cactaceae	S	-	+	NA
22.	<i>Parkinsonia aculeata</i>	Ram babool	Fabaceae	S	+	+	LC

S. No.	Scientific name	Local name/ English Name	Family	Habit	Core	Buffer	IUCN conservation status as on 11 <sup>th</sup> Nov. 2021
23.	<i>Pedaliu murex</i>	Bara Gokhru	Pedaliaceae	S	-	+	NA
24.	<i>Plumeria alba</i>	Champa	Apocynaceae	S	+	+	NA
25.	<i>Prosopis juliflora</i>	Vilayati Babul	Mimosaceae	S	+	+	NA
26.	<i>Ricinus communis</i>	Arandi	Euphorbiaceae	S	+	+	NA
27.	<i>Ziziphus mauritiana</i>	Ber	Rhamnaceae	S	+	+	LC
28.	<i>Ziziphus nummularia</i>	Chotaber	Rhamnaceae	S	+	+	NA
29.	<i>Ziziphus xylopyrus</i>	Jungle ber	Rhamnaceae	S	+	+	NA
<b>Herbs and Creepers</b>							
1.	<i>Acalypha indica</i>	Muktajhuri	Euphorbiaceae	H	-	+	NA
2.	<i>Achyranthes aspera</i>	Latjira	Amaranthaceae	H	-	+	NA
3.	<i>Aerva tomentosa</i>	Bui	Amaranthaceae	H	-	+	NA
4.	<i>Aloe Vera</i>	Guar Bhata	Liliaceae	H	+	+	VU
5.	<i>Amaranthus spinosus</i>	Janglichaulai	Amaranthaceae	H	-	+	NA
6.	<i>Argemone mexicana</i>	Pili Kantili	Papaveraceae	H	-	+	NA
7.	<i>Beta vulgaris</i>	Palak	Chenopodiaceae	H	-	+	LC
8.	<i>Boerhavia diffusa</i>	Punarnava	Nyctaginaceae	H	-	+	NA
9.	<i>Borreria ocymoides</i>	Purple- Leaf Button Weed	Rubiaceae	H	-	+	NA
10.	<i>Cannabis sativa</i>	Bhaang.	Cannabaceae	H	-	+	NA
11.	<i>Celosia argentea</i>	Survali	Amaranthaceae	H	-	+	LC
12.	<i>Chenopodium album</i>	Bathua.	Chenopodiaceae	H	-	+	NA
13.	<i>Citrullus colocynthis</i>	Chitraa	Cucurbitaceae	H	-	+	NA
14.	<i>Cleome gynandra</i>	Jakhiya	Cleomaceae	H	-	+	NA
15.	<i>Commelina forskolii</i>	Kankus	Commelinaceae	H	-	+	NA
16.	<i>Croton bonplandianum</i>	Ban Tulsi	Euphorbiaceae	H	+	+	NA
17.	<i>Cucumis melo</i>	Kachari	Cucurbitaceae	H	-	+	NA
18.	<i>Dichrostachys cinerea</i>	Sickle bush	Fabaceae	H	-	+	NA
19.	<i>Digera muricata</i>	Latmahuria	Amaranthaceae	H	-	+	NA
20.	<i>Echinops echinatus</i>	Unthkanta	Asteraceae	H	-	+	NA
21.	<i>Eclipta alba</i>	Bhringraj	Asteraceae	H	-	+	LC
22.	<i>Euphorbia hirta</i>	Asthma Weed	Euphorbiaceae	H	-	+	NA
23.	<i>Euphorbia spiralis</i>	Spurge	Euphorbiaceae	H	-	+	LC
24.	<i>Gisekia pharnaceoides</i>	Baloo-ka-Saag	Aizoaceae	H	-	+	NA
25.	<i>Helianthus annuus</i>	Sunflower	Asteraceae	H	-	+	LC
26.	<i>Indigofera cordifolia</i>	Gokhru	Leguminosae	H	-	+	NA
27.	<i>Melochia corchorifolia</i>	Tikiokra	Sterculiaceae	H	-	+	LC
28.	<i>Mollugo pentaphylla</i>	Jharasi	Molluginaceae	H	-	+	NA
29.	<i>Momordica charantiia</i>	Karela	Cucurbitaceae	C	-	+	NA
30.	<i>Mukia maderaspatana</i>	Bilari	Cucurbitaceae	H	-	+	NA
31.	<i>Oldenlandia corymbosa</i>	Damanpaper	Rubiaceae	H	-	+	LC
32.	<i>Parthenium hysterophorus</i>	Congress grass	Asteraceae	H	-	+	NA
33.	<i>Polycarpaea corymbosa</i>	Oldman'S Cap	Caryophyllaceae	H	-	+	NA
34.	<i>Polygala erioptera</i>	Gulpankhi	Polygalaceae	H	-	+	NA
35.	<i>Setaria verticillata</i>	Laptuna	Poaceae	H	-	+	NA
36.	<i>Sida rhombifolia</i>	Khareti	Malvaceae	H	-	+	NA
37.	<i>Solanum virginianum</i>	Kantakari	Solanaceae	H	-	+	NA



S. No.	Scientific name	Local name/ English Name	Family	Habit	Core	Buffer	IUCN conservation status as on 11 <sup>th</sup> Nov. 2021
38.	<i>Sonchus oleraceus</i>	Dudhi	Asteraceae	H	-	+	NA
39.	<i>Striga asiatica</i>	Asiatic witch weed	Scrophulariaceae	H	-	+	NA
40.	<i>Tagetes minuta</i>	Marigold	Asteraceae	H	-	+	NA
41.	<i>Tecoma gaudichaudi</i>	Yellow Bell	Bignoniaceae	H	-	+	NA
42.	<i>Tephrosia purpurea</i>	Sarphonk	Fabaceae	H	+	+	LC
43.	<i>Tephrosia villosa</i>	Sarapunkha	Fabaceae	H	-	+	LC
44.	<i>Thevetia peruviana</i>	Peeli Kaner	Apocynaceae	H	+	+	LC
45.	<i>Tridax procumbens</i>		Asteraceae	H	-	+	VU
<b>Grass</b>							
1.	<i>Alysicarpus monilifer</i>	Jhuhighas	Leguminosae	G	-	+	NA
2.	<i>Aristida adscensionis</i>	Bristle grass	Poaceae	G	+	+	NA
3.	<i>Cynodon dactylon</i>	Doob	Poaceae	G	+	+	NA
4.	<i>Dactyloctenium aegyptium</i>	Makra	Poaceae	G	+	+	NA
5.	<i>Dichanthium annulatum</i>	Sheda Grass	Poaceae	G	-	+	NA
6.	<i>Digitaria bicornis</i>	Asian crab grass	Poaceae	G	-	+	NA
7.	<i>Eragrostis japonica</i>	Panghas	Poaceae	G	-	+	LC
8.	<i>Eragrostis minor</i>	Small stink grass	Poaceae	G	-	+	NA
9.	<i>Eragrostis unioides</i>	Chinese Love Grass	Poaceae	G	-	+	LC
10.	<i>Heteropogon contortus</i>	Sukhala	Poaceae	G	-	+	NA
11.	<i>Saccharum spontaneum</i>	Kaans	Poaceae	G	+	+	LC

Source: Primary site survey and secondary data from previous EIA/EMP report of CLZS Complex

(+) Shows: Presence of the species and (-) Shows: Absence of the species

LC: Least Concern, NA: Not Assessed, NT: Near Threatened, VU: Vulnerable, DD: Data Deficient, EN: Endangered

### Analysis of Flora

During our field survey, none of the species of flora recorded in any threaten status (Rare, Endangered and Threatened) in the study area.

Table -3.21

### Inventory of Faunal Diversity in The Core & Buffer Zone of plant Site

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 as on 11 <sup>th</sup> Nov. 2021
<b>Mammals</b>						
1.	<i>Axis axis</i>	Chital	Sch-III	-	+	LC
2.	<i>Bandicota bengalensis</i>	Bandicoot	Sch-V	-	+	LC
3.	<i>Bandicota indica</i>	Bandicoot	Sch-V	-	+	LC
4.	<i>Bosephalus tragocamelus</i>	Nilgai	Sch-III	-	+	LC
5.	<i>Canis aureus</i>	Jackal	Sch-II (Part-1)	-	+	NA
6.	<i>Cervus unicolor</i>	Sambar	Sch-III	-	+	VU
7.	<i>Felis chaus</i>	Jungle Cat	Sch-II (Part-1)	-	+	LC
8.	<i>Funambulu pennantii</i>	Five-striped Palm	Sch-IV	-	+	LC

S. No.	Scientific name	Common name/ English Name	Conservation status according to IWPA-1972	Core	Buffer	IUCN conservation status as on 11 <sup>th</sup> Nov. 2021
		Squirrel				
9.	<i>Hyaena hyaena</i>	Hyaena	Sch-III	-	+	NT
10.	<i>Hystrix indica</i>	Indian Porcupine	Sch-IV	-	+	LC
11.	<i>Lepus nigricollis</i>	Indian Hare	Sch-IV	-	+	LC
12.	<i>Macaca radiata</i>	Bonnet Macaque	Sch-II (Part-1)	-	+	VU
13.	<i>Mus booduga</i>	Little Indian Field Mouse	Sch-IV	+	+	LC
14.	<b><i>Panthera pardus</i></b>	<b>Baghera</b>	<b>Sch-I</b>	-	+	<b>VU</b>
15.	<i>Paradoxurus hermaphroditus</i>	Common Palm Civet	Sch-II (Part-1)	-	+	LC
16.	<b><i>Prionailurus rubiginosus</i></b>	<b>Rusty Spotted Cat</b>	<b>Sch-I</b>	-	+	<b>NT</b>
17.	<i>Presbytis entellus</i>	Langur	Sch-II	-	+	VU
18.	<i>Pteropus giganteus</i>	Indian Flying Fox	Sch-IV	-	+	LC
19.	<i>Rattus rattus</i>	House Rat	Sch-IV	-	+	LC
20.	<i>Rhesus macaca</i>	Monkey	Sch-II	-	+	NA
21.	<i>Semnopithecus entellus</i>	Bangal Hanuman Langur	Sch-II	-	+	LC
22.	<i>Suncus murinus</i>	Grey Musk Shrew	Sch. V	-	+	LC
23.	<i>Sus scrofa</i>	Wild pig	Sch-III	-	+	LC
24.	<i>Vulpes bengalensis</i>	Indian fox	Sch-II (Part-1)	-	+	LC
<b>Reptiles and Amphibians</b>						
1.	<i>Bangarus caeruleus</i>	Common Indian Krait	Sch-IV	-	+	NA
2.	<i>Boa constricta</i>	Common boa	Sch. IV	-	+	NA
3.	<i>Boiga trigonata</i>	Cat snake	Sch-IV	+	+	LC
4.	<b><i>Varanus bengalensis</i></b>	<b>Bengal Monitor lizard</b>	<b>Sch. I</b>	-	+	<b>NT</b>
5.	<i>Calotes versicolor</i>	Common garden lizard	Sch-IV	-	+	NA
6.	<i>Chameleon zeylanicus</i>	Indian chameleon	Sch-IV	-	+	LC
7.	<i>Duttaphrynus melanostictus</i>	Common Indian toad	Sch-IV	-	+	LC
8.	<i>Eryx johnii</i>	Red Sand Boa	Sch. IV	-	+	NT
9.	<i>Hemidactylus flaviviridis</i>	House Gecko/ Chhipkali	Sch. V	-	+	NA
10.	<i>Hemidactylus maculatus</i>	Rock Gecko	Sch. V	+	+	LC
11.	<i>Hoplobatrachustigerinus</i>	Indian Bull Frog	Sch-IV	+	+	LC
12.	<i>Mabuya carinata</i>	Brahminy skink	Sch. IV	+	+	LC
13.	<i>Melanochelys trijuga</i>	Indian black turtle	Sch. IV	-	+	LC
14.	<i>Naja naja</i>	Common Indian cobra	Sch. II	-	+	DD
15.	<i>Ptyas mucosa</i>	Indian Rat Snake	Sch. II	-	+	NA
16.	<i>Rana hexadactyla</i>	Rana hexadactyla	Sch-IV	-	+	NA
17.	<i>Rana limnocharis</i>	Indian cricket Frog	Sch. IV	-	+	LC
18.	<i>Rana tigrina</i>	Rana tigrina	Sch-IV	+	+	LC
19.	<i>Vipera Russellii</i>	Russels viper	Sch-II (part-II)	+	+	LC
<b>Birds</b>						
1.	<i>Accipiter badius</i>	Shikra	Sch. IV	+	+	LC
2.	<i>Acridotheres fuscus</i>	Jungle Myna	Sch. IV	-	+	LC
3.	<i>Acridotheres tristis</i>	Common myna	Sch-IV	+	+	LC
4.	<i>Alcedo atthis</i>	Common Kingfisher	Sch-IV	-	+	NA
5.	<i>Amaurornis phoenicurus</i>	White breasted water hen	Sch. IV	-	+	LC
6.	<i>Anas poecilorhyncha</i>	Indian Spot billed duck	Sch. IV	-	+	LC
7.	<i>Anas acuta</i> Sp.	Common Teal	Sch-IV	-	+	LC
8.	<i>Anhinga melanogaster</i>	Darter	Sch-IV	-	+	NT
9.	<i>Ardeo lagrayii</i>	Pond Heron	Sch-IV	-	+	LC
10.	<i>Athena noctua</i>	Little Owllet	Sch. IV	-	+	NA
11.	<i>Bubo bubo</i>	Indian great horned Owl	Sch-IV	-	+	LC

S. No.	Scientific name	Common name/ English Name	Conservation status according to IWPA-1972	Core	Buffer	IUCN conservation status as on 11 <sup>th</sup> Nov. 2021
12.	<i>Bubulcus ibis</i>	Cattle Egret	Sch-IV	-	+	LC
13.	<i>Caprimulgus asiaticus</i>	Indian Night jar	Sch-IV	-	+	LC
14.	<i>Centropus sinensis</i>	Greater Coucal	Sch. IV	-	+	LC
15.	<i>Ceryle rudis</i>	Pied kingfisher	Sch. IV	-	+	LC
16.	<i>Cinnyris asiaticus</i>	Purple Sunbird	Sch. IV	-	+	LC
17.	<i>Columba livia</i>	Blue Rock Pigeon	Sch-IV	+	+	LC
18.	<i>Copsychus saularis</i>	Oriental magpie robin	Sch. IV	+	+	LC
19.	<i>Coracias benghalensis</i>	Indian Roller	Sch-IV	-	+	LC
20.	<i>Corvus machrorhynchos</i>	Jungle crow	Sch-IV	-	+	LC
21.	<i>Corvus splendens</i>	House crow	Sch-V	-	+	LC
22.	<i>Coryllis vaeralis</i>	Lorikeet	Sch-IV	-	+	NA
23.	<i>Dicrurus macrocerus</i>	Black Drongo	Sch-IV	+	+	LC
24.	<i>Egretta garzetta</i>	Little Egret	Sch-IV	-	+	LC
25.	<i>Elanus axillaris</i>	Black shoulder kite	Sch. IV	+	+	LC
26.	<i>Eremopterix griseus</i>	Ashy crowned sparrow lark	Sch. IV	+	+	LC
27.	<b>Falco jugger</b>	<b>Laggar Falcon</b>	<b>Sch. I</b>	<b>+</b>	<b>+</b>	<b>NT</b>
28.	<i>Francolinu spondicerianus</i>	Grey francolinus	Sch. IV	-	+	LC
29.	<i>Galerida cristata</i>	Common crested lark	Sch. IV	+	+	LC
30.	<i>Gracupica contra</i>	Pied myna	Sch. IV	-	+	LC
31.	<b>Gyps bengalensis</b>	<b>White-rumped Vulture</b>	<b>Sch. I</b>	<b>-</b>	<b>+</b>	<b>CR</b>
32.	<i>Halcyon smyrnensis</i>	White-throated Kingfisher	Sch. IV	-	+	LC
33.	<i>Halia sturindus</i>	Brahminy kite	Sch-IV	-	+	LC
34.	<i>Himantopus himantopus</i>	Black Winged Stilt	Sch. IV	-	+	LC
35.	<i>Hirundo rustica</i>	Barn swallow	Sch. IV	-	+	LC
36.	<i>Lanius cristatus</i>	Brown Shrike	Sch. IV	+	+	LC
37.	<i>Megalaima merulinus</i>	Indian Cuckoo	Sch-IV	-	+	LC
38.	<i>Merops orientalis</i>	Small Green Bee Eater	Sch. IV	+	+	LC
39.	<i>Microcarbo niger</i>	Little Cormorant	Sch. IV	-	+	LC
40.	<i>Microfus affinis</i>	House swift	Sch-IV	-	+	NA
41.	<i>Micropterus brachyurus</i>	Rufous Woodpecker	Sch- IV	-	+	NA
42.	<i>Oriolus oriolus</i>	Indian Oriole	Sch-IV	-	+	LC
43.	<i>Orthotomus sutorius</i>	Common tailor bird	Sch. IV	-	+	LC
44.	<b>Pavo cristatus</b>	<b>Indian Peafowl</b>	<b>Sch. I</b>	<b>-</b>	<b>+</b>	<b>LC</b>
45.	<i>Passer domesticus</i>	House Sparrow	Sch-IV	-	+	LC
46.	<i>Plegadis falcinellus</i>	Glossy ibis	Sch. IV	-	+	LC
47.	<i>Ploceus philippinus</i>	Weaver bird	Sch-IV	+	+	LC
48.	<i>Prinia socialis</i>	Ashy prinia	Sch. IV	-	+	LC
49.	<i>Pseudibis papillosa</i>	Black ibis	Sch. IV	-	+	LC
50.	<i>Psittacula krameri</i>	Rose ringed parakeet	Sch- IV	-	+	LC
51.	<i>Pycnonotus cafer</i>	Red vented bulbul	Sch-IV	-	+	LC
52.	<i>Pycnonotus jocosus</i>	Red whiskered bulbul	Sch. IV	-	+	LC
53.	<i>Pycnonotus leucotis</i>	White eared bulbul	Sch. IV	-	+	LC
54.	<i>Saxicola maurus</i>	Common stone chat	Sch. IV	+	+	NA
55.	<i>Saxicoloides fulicata</i>	Indian Robin	Sch. IV	+	+	LC
56.	<i>Spilopelia senegalensis</i>	Laughing Dove	Sch. IV	+	+	LC
57.	<i>Streptopali decaocto</i>	Eurasian collared dove	Sch. IV	+	+	NA
58.	<i>Streptopelia chinensis</i>	Spotted dove	Sch. IV	-	+	NA
59.	<i>Sturnia pagodarum</i>	Brahminy Starling	Sch. IV	+	+	LC
60.	<i>Tachybaptus ruficollis</i>	Little grebe	Sch. IV	-	+	LC

S. No.	Scientific name	Common name/ English Name	Conservation status according to IWPA-1972	Core	Buffer	IUCN conservation status as on 11 <sup>th</sup> Nov. 2021
61.	<i>Temenuchus pagodarum</i>	Brahmny Myna	Sch-IV	-	+	NA
62.	<i>Threskiornis melanocephalus</i>	Oriental White ibis	Sch. IV	-	+	NT
63.	<i>Turdoi descaudata</i>	Common babbler	Sch. IV	+	+	LC
64.	<i>Turdoides striatus</i>	Jungle babbler	Sch. IV	+	+	NA
65.	<i>Upupa epops</i>	Hoopoe	Sch. IV	-	+	LC
66.	<i>Vanellus indicus</i>	Red- wattled Lapwing	Sch. IV	+	+	LC
<b>Butterfly and Anthopods</b>						
1.	<i>Aethriamanta brevipennis</i>	Scarlet Marsh Hawk dragonfly	Not Listed	-	+	LC
2.	<i>Apis cerana indica</i>	Indian Honey bee	Not Listed	-	+	NA
3.	<i>Apis dorsata</i>	Giant Honey bee	Not Listed	-	+	NA
4.	<i>Brachythemis contaminata</i>	Ditch Jewel dragonfly	Not Listed	+	+	LC
5.	<i>Bradinopy gageminata</i>	Granite ghost dragonfly	Not Listed	-	+	LC
6.	<i>Catopsilia pomona</i>	Common emigrant butterfly	Not Listed	+	+	NA
7.	<i>Chilades parrhasius</i>	Small cupid butterfly	Not Listed	+	+	NA
8.	<i>Colotis eucharis</i>	Plain Orange Tip butterfly	Not Listed	-	+	NA
9.	<i>Danaus chrysippus</i>	Plain tiger butterfly	Not Listed	+	+	LC
10.	<i>Diplacode strivialis</i>	Ground skimmer dragonfly	Not Listed	+	+	NA
11.	<i>Euploea core</i>	Common crow	Not Listed	-	+	LC
12.	<i>Eurema hebe</i>	Common grass yellow	Not Listed	-	+	NA
13.	<i>Hyperaspis connectens</i>	Red lady bug	Not Listed	+	+	NA
14.	<i>Ixias marianne</i>	White Orange Tip butterfly	Not Listed	-	+	NA
15.	<i>Junonia orithya</i>	Blue pansy butterfly	Not Listed	-	+	LC
16.	<i>Junonia almana</i>	Peacock pansy	Sch-IV	+	+	LC
17.	<i>Korscheltellus lupulina</i>	Common Swift Moth	Not Listed	-	+	NA
18.	<i>Leptosia nina</i>	Psyche	Not Listed	+	+	NA
19.	<i>Neptishylas Moore</i>	Common sailor	Not Listed	-	+	NA
20.	<i>Pantala flavescens</i>	Globe skimmer dragonfly	Not Listed	-	+	NA
21.	<i>Papilio demoleus</i>	Lime butterfly	Not Listed	-	+	LC
22.	<i>Papilio polytes</i>	Common Mormon butterfly	Not Listed	-	+	NA
23.	<i>Parantica aglea</i>	Glassy tiger	Not Listed	-	+	NA
24.	<i>Rhyothemis variegata</i>	Common picture wing dragonfly	Not Listed	-	+	LC
25.	<i>Scolopendrid centipedes</i>	Kan Khajura	Not Listed	-	+	NA
26.	<i>Stegodyphus sp.</i>	Social Spider	Not Listed	+	+	NA
27.	<i>Sternocer casternicornis</i>	Ditch Jewel Beetle	Not Listed	-	+	NA
28.	<i>Tarucus nara</i>	Nara butterfly	Not Listed	-	+	NA
29.	<i>Trithemis aurora</i>	Crimson Marsh glider dragonfly	Not Listed	-	+	LC
30.	<i>Urodacus manicatus</i>	Black Rock Scorpion	Not Listed	+	+	NA

LC: Least Concern, NA: Not available, NT: Near Threatened, VU: Vulnerable, DD: Data Deficient

### 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.

- No National Parks, Wildlife Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animal; exist within 10 km radius of the plant site. Letter from DCF, Wildlife, Chittorgarh vide letter no. No.F()Survey/DCF/WL/2021-22/2709 dated 26.04.2022 regarding no National Park & Sanctuary falling within 10 km radius study area of plant site, has been enclosed herewith this EIA/EMP Report as **Annexure 10 C.**
- 17 Reserve 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 of 64 trees, 29 shrubs, 45 herbs and Creepers, 11 species of grass and no 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. 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, 24 species of mammals, 20 species of reptiles & amphibians and 30 species of Butterfly and Arthropods were recorded from the study area. Among avifauna, 66 species of Birds were recorded in the study area. No National Park, Sanctuary, Biosphere Reserve, Migratory Corridor of wild animals exists within 10 km radius study area.
- List of flora and fauna existing within the study area has been authenticated by DFO, Chittorgarh vide letter No. F()survey/DFC/2022-23/5600 dated 18.08.2022; further amended regarding List of Fauna vide letter No. F()survey/DFC/2022-23/7233 dated 19.10.2022. The same has been enclosed herewith with this EIA/EMP report as **Annexure 10 A & 10 B,** respectively.
- As per the authenticated list, total 6 schedule I species i.e., *Panthera pardus* (Leopard), *Prionailurus rubiginosus* (Rusty Spotted Cat), *Gyps bengalensis* (White-rumped Vulture), *Falco jugger* (Laggar Falcon), *Pavo cristatus* (Indian Peafowl), *Varanus bengalensis* (Bengal Monitor lizard) found within the study area during survey.
- Wildlife conservation plan for the above species along with *Hystrix indica* (Indian Crested Porcupine) & *Semnopithecus entellus* (Bangal Hanuman Langur) has been prepared and submitted to DCF, Chittorgarh for authentication from CWW, Chittorgarh vide letter no. HZL/CLZS/43/2022-23 dated 10.11.2022. The Copy of the same is enclosed herewith with this EIA/EMP report as **Annexure 10 D.**
- There will be no significant impact of proposed expansion project on flora & fauna as proper mitigative measures like development of greenbelt, installation of APCE etc. will be taken by the company.

### 3.7 SOCIO-ECONOMIC STUDY

An essential part of environmental study which 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 feature of aesthetic significance such as temples, historical monuments etc. at the baseline level.

Socio-economic study of an area provides a good opportunity to assess the socio-economic conditions of an area. This study may possibly facilitate a change in living and social standards of the area around the project. It can undoubtedly be said that this plant will provide some direct and indirect employment and facilitate in improving the infrastructural facilities and standards of living of the area.

### **Objectives of the Study**

The Following objectives are plan to access from this socio-economic study:

- ✎ To conduct socio-economic assessment study in Project Area
- ✎ To know the current socio-economic situation in the region to cover the sub sectors of education, health, sanitation, water and food security and know about occupation structure
- ✎ To recommend practical strategic interventions in the sector
- ✎ To help in providing better living standards
- ✎ To provide employment opportunities

### **Methodology**

Following methodology is undertaken to conduct this socio-economic study:

#### **✎ Collection of Data**

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

JMEPL conducted the socio-economic baseline survey using a survey team of Field Assistants and a Supervisor apprising them about the study 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**

Field observations along with social research were presented in tabular, graphical and diagrammatic form suiting collected inputs for comprehensive understanding. These datasets are further interpreted and analyzed with the help of ancillary data in order to highlight major concerns/issues being borne by individuals in these villages. Also, when collected inputs are correlated with the ongoing qualitative parameters, one can perceive them and then can derive an action plan to meet the current need and find its solution. These tabulated data were interpreted and analysed with the help of various qualitative techniques and ideographic approaches.

### **Study Area**

A detailed socio-economic survey was conducted in the buffer zone (10 km radius of the Expansion within the existing Chanderiya Lead Zinc Smelter Complex at villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan) in order to determine the impact of the proposed expansion on nature and inhabitant. To get an overview of the villager's views and preferences about this expansion activity, different demographic parameters and social aspects such as 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**

#### **Study Area Details**

The CLZS Complex is located near Villages Putholi, Ajoliya Ka Khera & Biliya, tehsil Gangrar & Chittorgarh, district Chittorgarh in the state of Rajasthan.

The study area (buffer zone) was categorized on the basis of the distance of the villages from project 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. The 10 km study area falls in Udaipur district.

#### **Socio Economic Profile of the Region**

The study area comprise of 75 villages and 1 city (Chittorgarh) of the study area that covers a total area of 365.81 square kilometers giving approximately 72325 people residence. Following table entails brief information about demography structure at state level, district level and study area.

**Table - 3.22**  
**Demographic Profile of Rajasthan State, Chittorgarh District & Study Area**

S.No.	Particular	Rajasthan State	Chittorgarh District	Study Area
1.	Area (in sq. km.)	342,239	7,882	365.81
2.	No. of Households	12651423	2,69,332	72325
3.	Population	68548437	15,44,338	343256
4.	Male	35550997	783,171	176121
5.	Female	32997440	61,167	167135
6.	Scheduled Tribes	9238534	41629	16309
7.	Scheduled Castes	12221593	360709	49056
8.	Literacy (%)	66.11	74.13	63.3
9.	Sex Ratio (Females per 1000 Males)	928	950	949

Source: Census of India, 2011

#### **Demography Structure**

##### **Zone wise population of study area**

Census data suggests that the study area is composed of 51% of male population while 49% of female population. Following table entails information about basic demographic structure of villages/town lying in study area (buffer zone) as primary, secondary and outer zone.

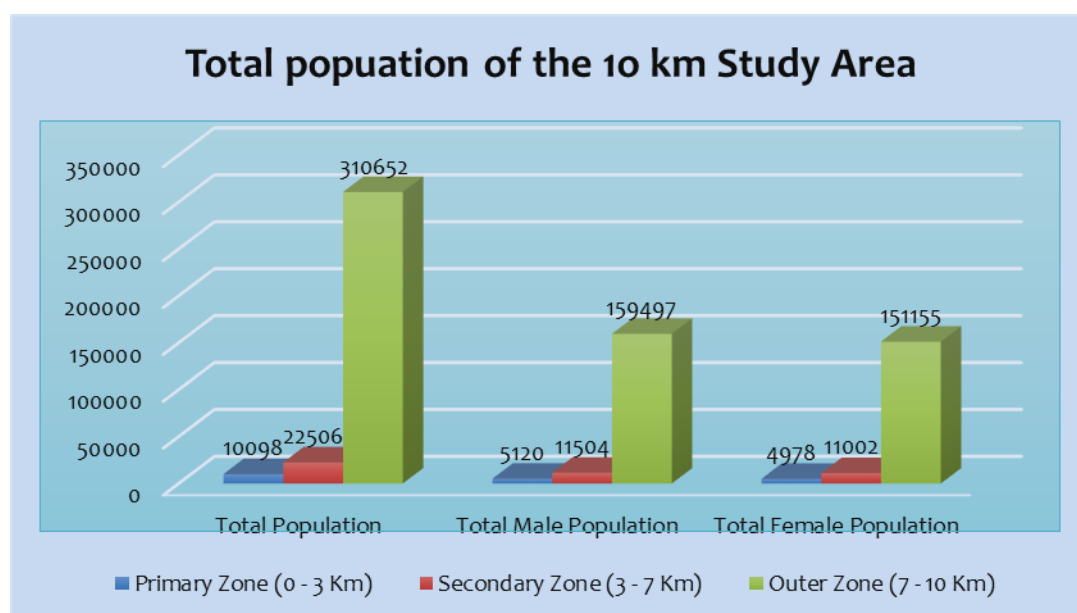
**Table - 3.23**  
**Summary of Demographic Profile of Study Area**

Study Area Zone	No. of villages / towns	No. of households	Total Population	SC Population	ST Population	Total Literate Population	Workers			Non-Worker
							Main	Marginal	Total	
0 - 3 km	9	2180	10098	1779	689	5112	4519	1265	5784	4314
3 - 7 km	30	4810	22506	5718	3171	10712	11047	857	11904	10087
7 - 10 km	37	65335	310652	41559	12449	218672	101869	15054	116923	193519
<b>Total</b>	<b>76</b>	<b>72325</b>	<b>343256</b>	<b>49056</b>	<b>16309</b>	<b>234496</b>	<b>117435</b>	<b>17176</b>	<b>134611</b>	<b>207920</b>

Source: Census of India, 2011

Above table highlights that 09 villages/towns comes under primary zone (0 – 3 km radius from plant site) with as much as 2180 houses resides with a total population of over 10098 people.

Secondary and outer zone both comprise of 30 village and 36 villages and 1 city (Chittorgarh) holding a total population of 22506 and 310652 respectively. Since secondary and outer zone comprise mostly of flowing streams and clustered ponds, most of these settlements are inhabited in and along these natural features.



**Figure - 3.11: Population of the study area**

## SEX RATIO

Sex ratio determine the Human Development Index (HDI) of an area thereby understanding the status of women in that region.

The sex ratio in the study area is 949 females per 1000 males (higher than state's average i.e. 928) with secondary zone having 956, following with primary zone as 972 and then outer zone as 947. This variation suggests that possible reason behind this variation is due to presence of service facility in each of these zones.

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.

S. No.	Buffer Zone	Sex Ratio of Study area Female/ 1000 Male
1	Primary Zone (0-3 km)	972
2	Secondary zone (3-7 km)	956
3	Outer Zone (7-10 km)	947
4	Overall Study Area (0-10 km)	949

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 labors) fertility rate is high causing higher proportion of men and women.

#### 8.3 Vulnerable Group

While developing an action plan, it is very important to identify the population that falls under the marginalized and vulnerable groups and special attention should be given towards these groups while making action plans. In the observed villages schedule caste (SC) population is ~14% and Schedule Tribe population ~5% in study area. ~81% population observed as other.

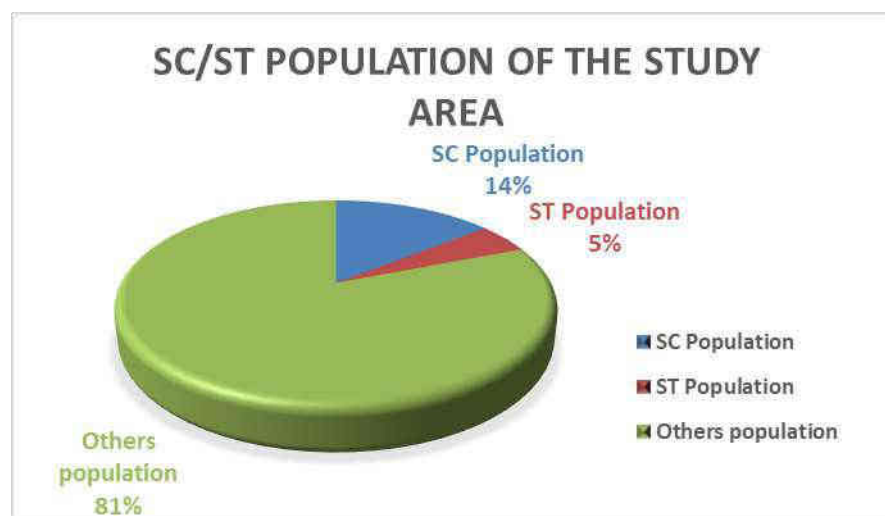


Figure 3.12: SC / ST Population within 10 Km Study Area

#### 8.4 Literacy Rate

Literacy Rate is the percentage of people in a country with the ability to read and write. The analysis of the literacy levels is done in the study area. The 10 km radius study area demonstrates a literacy rate of 63.3 % as per census data. The male literacy rate in the study area works out to be 77.0 % whereas the female literacy rate, which is an important indicator for social change, is observed to be 49.0 % in the study area as per the survey data. This indicates that there is an urgent need to focus in sociological aspect in the region and enhance further development.

In the present study, the total literacy rate observed to be less moderate in the study area and this is the area of concern and to be improved.

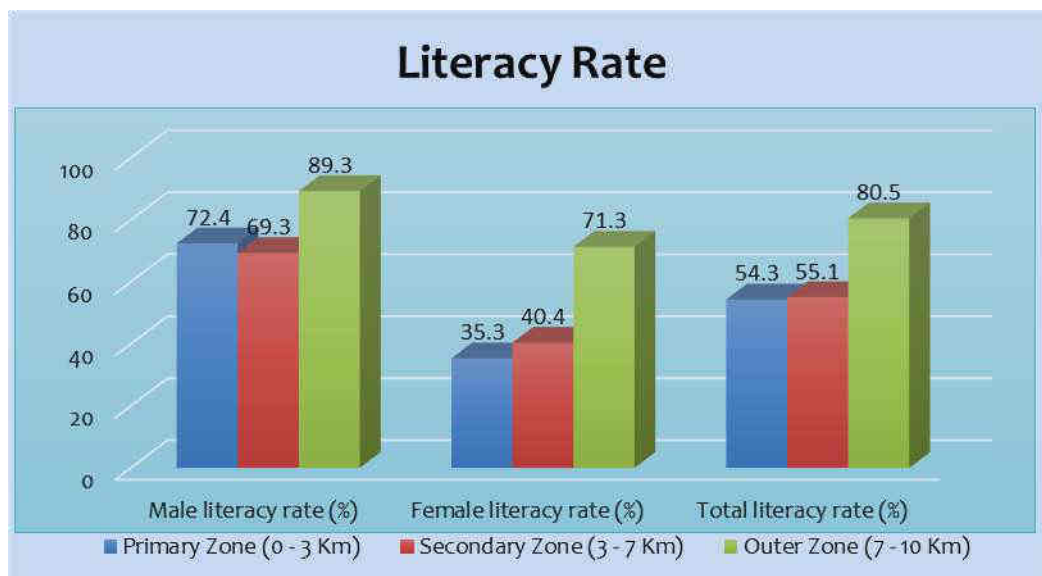


Figure 3.13: Literacy Rate within 10 km Study Area

### Economic Structure

The total marginal workers in the study area are 17176 (5%), total main workers are 117435 (34%) and total non-working population is 207920 (61%). As per the surveyed villages analysis most of them are non-working population. A major portion of working age people is not ideal worker because of limited sectors in which they are engaged with less training and non-awareness of latest sectors in which maybe they can do better than other traditional work.

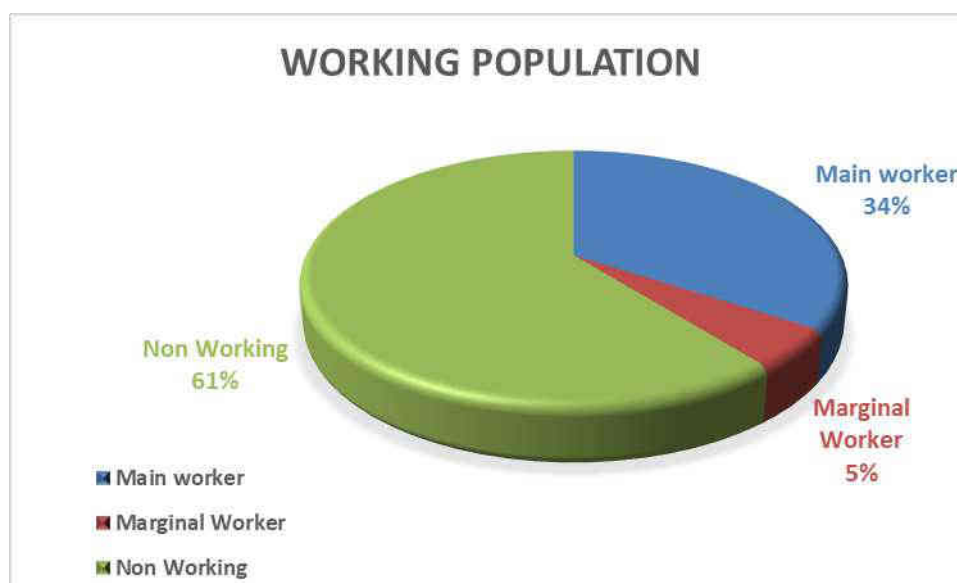


Figure 3.14: Working Population of the Study Area



### 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:

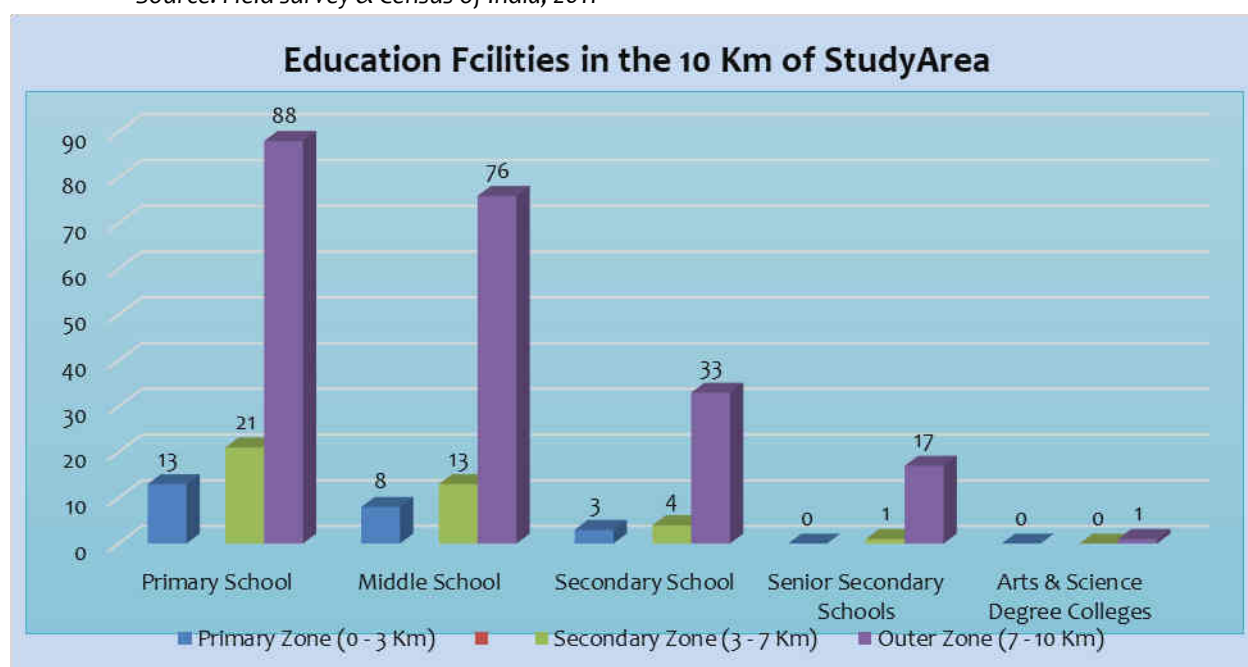
### Education Facilities

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 122 primary schools, 97 middle schools, 40 secondary schools and 18 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 second day school. But for higher studies, there is a need of more institutes or colleges providing higher level education.

**Table - 3.24**  
**Education Facilities in the Villages**

Particular	Primary School	Middle School	Secondary School	Senior Secondary School	Arts and Science Degree College
No. of Educational Facilities	122	97	40	18	1

Source: Field survey & Census of India, 2011



**Figure 3.15: Educational Facilities (till senior secondary level)**

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.

#### 8) 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 no Community Health Centre, only one Family Health Centre, 1 Primary Health Centre (PHC) and 14 Primary Health Sub Centres (PHSC) along with 5 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 4 veterinary hospitals, 31 Non Govt. medical facilities and 43 Non govt. Medical facilities medicine shop.

In Chittorgarh City many private and government hospitals are there like Pearl Hospital and Research, Sanjivani Hospital, Maa Gayatri Hospital typically 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 - 3.25**  
**Health/Medical Facilities in the Villages**

Type of Facility	Primary Health Centre	Primary Health Sub Centre	Maternity Child Centre	TB Clinic	Dispensary	Veterinary	Mobile Health Clinic	Non Govt medical facilities	Non govt. Medical facilities medicine shop
Number of Facilities	1	14	5	1	0	4	2	31	43

Source: Field Survey

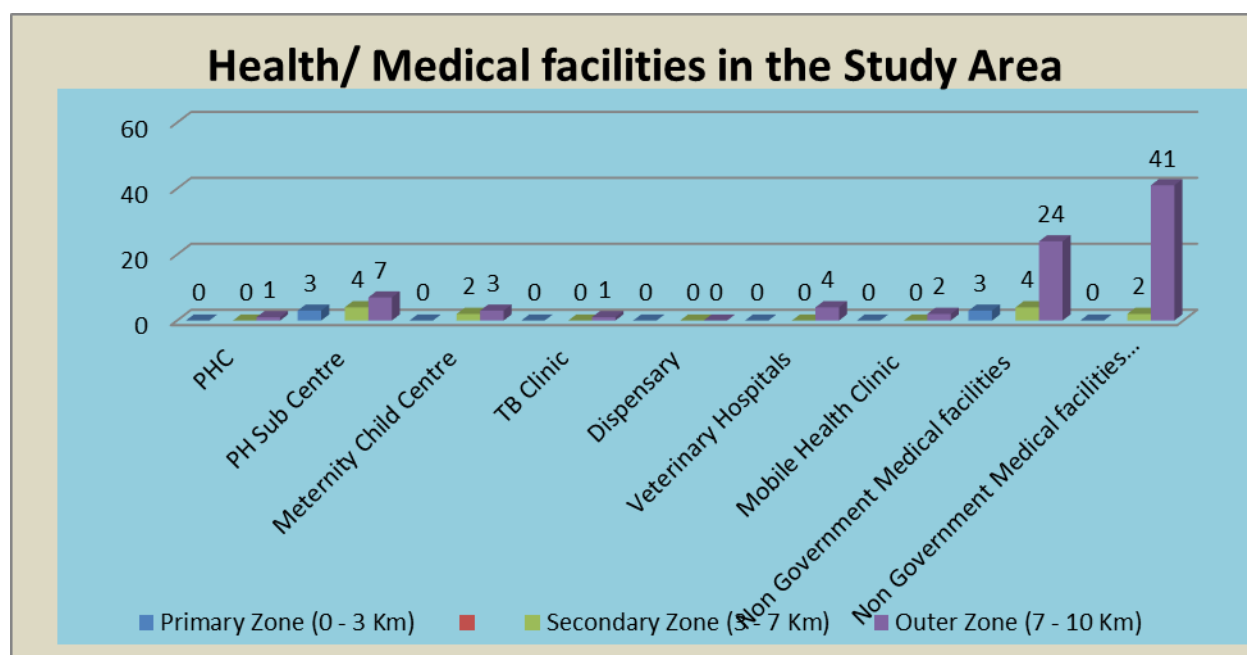


Figure 3.16: Health Facilities in the Villages

#### 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 - 3.26  
Drinking Water Facility

Zones	Tap Water	Covered Well	Hand Pump	River	Tank	Open Drainage
Primary Zone (0 - 3 km)	A	NA	A	NA	A	NA
Secondary Zone (3 - 7 km)	A	NA	A	A	A	A
Tertiary Zone (7 - 10 km)	A	A	A	A	A	NA

Source: Field Survey

#### 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-79~ 0.5 km in West direction, NH- 76~2.5 km in ESE 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 Chittorgarh town/City, Village Putholi, Ajoliya ka khera, & Biliya were observed to be satisfactory.

#### Tourism

Chittorgarh is a city in Rajasthan, northwest India. It's known for the honey-colored, 7th-century Chittorgarh Fort, a vast hilltop complex with the remains of many temples and monuments. The 15th-century, 9-story Vijay Stambh (Tower of Victory) is built from red sandstone and white marble. It offers city views from the top, and it is lit up at night. Nearby is the Rajput-style Fateh Prakash Palace. 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 Infrastructure 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 Centers are also available in the villages.

#### ***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 949 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 122 primary schools, 97 middle schools, 40 secondary schools and 18 senior secondary schools along with one Art and science degree college. The educational status of the area is confined to the senior secondary level thus require higher educational facilities in the area.
  - ✓ **Medical:** In 10 km study area, there is no Dispensary and 1 TB clinic, 1 Primary Health Centre (PHC) and 14 Primary Health Sub Centres (PHSC) along with 5 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 1 veterinary hospitals. The area requires improvement in the existing medical facilities as the area lacks latest medical equipments, staff/ Doctors.

- ✓ *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-79, NH-76. 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.

### 3.8 CONCLUSION

To predict and evaluate the impacts of Expansion within the existing Chanderiya Lead 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 post monsoon season (Oct. to Dec., 2020)

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. The study area does not consist of any Eco sensitive area. Hence it can be concluded that the present baseline environment status of the study area will not be affected by the Expansion in existing Chanderiya Lead Zinc Smelter Complex by Hindustan Zinc Limited will adopt adequate control measures to protect the surrounding environment and will contribute in development of the study areas.





## CHAPTER - 4

### ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

#### 4.1 ENVIRONMENTAL IMPACT STUDY

The anticipated environmental impacts of the Expansion within the existing Chanderiya Lead Zinc Smelter Complex 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, and 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-liftment 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 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 of 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 CLZS Complex 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 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
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 installation of infrastructure	furnace & 1 slab casting line in Hydro-II, Integration of RZO plant, Lead Refinery Unit at Pyro, BPTG, new DG sets and Minor Metal	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	Operation of Pyro, Hydro- & II, Ausmelt, CPP, DG sets and Minor Metal Recovery Unit	Storage, Handling and Transport of products & by products	Abstraction of water	Waste 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			√	√											√	

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 installation of infrastructure	furnace & 1 slab casting line in Hydro-II, Integration of RZO plant, Lead Refinery Unit at Pyro, BPTG, new DG sets and Minor Metal	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	Operation of Pyro, Hydro-I & II, Ausmelt, CPP, DG sets and Minor Metal Recovery Unit	Storage, Handling and Transport of products & by products	Abstraction of water	Waste management	Developmental activities carried out by company	Greenbelt Development
8.	Public Health						√	√	√			√	√		√	√	
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 IMPACT 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
		Water environment (Ground water & Surface Water)
		Land Use
		Soil Environment
		Drainage Pattern
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

##### 8.2 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 Chanderiya Lead Zinc Smelter Complex is 335.89 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 CLZS complex.
- 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 (335.89 ha), 125.02 ha area has already been developed under greenbelt/ plantation. The same will be maintained and enhanced by doing gap plantation to achieve the plantation density @2500/ha.

##### 8.2 Impact Evaluation

Impact Evaluation is given in table below:

**Impact Evaluation for Change in Land Use Pattern**

Impact Element	Evaluation	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:**

- Out of the total plant area (335.89 ha), 37.21% (i.e. 125.02 ha) area has already been developed under greenbelt/ plantation. The same will be maintained and enhanced 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<sub>x</sub> concentration due to Leveling activity and Heavy vehicular movement.

- The main sources of dust emission are the movement of equipment at site, leveling, 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<sub>2</sub>, NO<sub>x</sub>, 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.
- A separate storage area will be demarcated for construction material to confine the dust dispersion.
- 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 CLZS complex are the PM (Pyro: 150mg/Nm<sup>3</sup>, Ausmelt: 50mg/Nm<sup>3</sup>, Hydro: 30 mg/Nm<sup>3</sup>, DG Sets: 75mg/Nm<sup>3</sup>), SO<sub>2</sub> (Pyro & Ausmelt: 2kg/ton of 100% conc. Acid produced; Hydro: 1kg/ton of acid produced; CPP: 600mg/Nm<sup>3</sup>), Acid Mist (Pyro & Ausmelt: 50mg/Nm<sup>3</sup>; Hydro: 30mg/Nm<sup>3</sup>); Lead (Sinter & Ausmelt: 10m/Nm<sup>3</sup>); NO<sub>x</sub> (CPP: 300

mg/Nm<sup>3</sup>, DG Sets: 710mg/Nm<sup>3</sup>), Hg & its compounds (CPP: 0.03mg/Nm<sup>3</sup>); NMHC (DG Sets: 100mg/Nm<sup>3</sup>) & CO (DG Sets: 150mg/Nm<sup>3</sup>).

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
  - 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 Emissions

In plant site, the major emission from stack is Particulate Matter (PM) emissions. In addition, gaseous pollutants (SO<sub>2</sub>, NO<sub>x</sub>, Pb, Acid Mist, Hg and its compounds, NMHC and CO) are also emitted from the stacks and vehicular emissions.

##### Mitigation Measures

- The SO<sub>2</sub> emission from Acid Plant (At Pyro Plant) will be reduced upto 1.5 Kg/ton of Acid production. The same will be achieved by improving the acid plant converter (SO<sub>2</sub> conversion efficiency by using super cesium catalyst in 4th bed). The same will be achieved by December, 2023.
- In Pyro plant, HZL will reduce the PM emission by replacement of existing bag filter bags with upgraded/ PTFE coated bags, which will bring down PM emission from existing 150 mg/Nm<sup>3</sup> to 100 mg/Nm<sup>3</sup>. The same will be achieved by December, 2024.

- 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 SO<sub>2</sub>
- Cansolv technology for Sulphur capture from Ausmelt Lead Furnace.
- Spraying of water is being continuously carried out at the various location viz., Lead concentrated bays, 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
- State-of-The-Art DCDA Acid Plants & Tail Gas Treatment Plant.
- Concentrate shed, Coal yard and Ash handling unit disposal area, concentrate 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 are exist at smelter to control airborne dust due to the vehicles movement. Regular road washing is being done on internal roads;
- Vehicular emissions is maintained as per standard; and
- More than 33% 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 existing DG set, 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 operation of Lead 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<sub>2</sub> and NO<sub>x</sub> will be emitted from the expansion activity and Cumulative Impact Assessment for all the 4 project activity on different environmental parameters due to the proposed expansion project are discussed below. In reference to the Terms of Reference (ToR) issued by MoEFCC, New Delhi vide their letter no. J-11011/279/2006-IA.II (I) dated 27.09.2021 for carrying out the Environmental Impact Assessment (EIA) study for “Expansion within the existing Chanderiya Lead Zinc Smelter Complex at villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan)” by M/s. Hindustan Zinc Limited Prescribing Specific TOR Point no. (iv) Stated that for the Cumulative impact assessment shall be carried out by integrating following units under implementation:

- Activities proposed under the proposed expansion of Chanderiya Lead Zinc Smelter Complex
- Proposed Ammonium Phosphate Fertilizer Complex of 1.02 MTPA (2 x 0.51 MTPA)
- Capacity expansion from 4,20,000 to 5,04,000 TPA in Hydro-I and Hydro-II Zinc Smelter within CLZS Complex
- Fumer Plant within the CLZS Complex as per EC issued vide F.No.J-11011/279/2006-IA.II (I) 5/10/2015

#### 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';
- ✎ Flat 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 Post Monsoon Season (Oct. to Dec, 2020). Hourly Meteorological Data has been enclosed as **Annexure – 8** 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(a)**  
**Stack Emission Details in Proposed CLZS Expansion Project (Including Fumer Plant**  
**& Hydro expansion)**

Stack No.	Stack attached to.	Height from ground level (m)	Diameter (m)	Existing Emission (g/sec)			Exit Velocity m/sec	Exhaust Gas		Emission Proposed g/sec
				PM10	SO2	NOX		Temp (°K)	Volumetric Flow (nm³/sec)	
Pyro Metallurgical Unit										
1	Acid Plant TGT	50	1.6	0.0	12.3 *	NA	10.27	303	17.93	*PROPOSED 15.7 [Acid production]
2	Copper Recovery Dross Milling	30	0.6	0.6	NA	NA	7.77	316	22.58	No change
3	Imperial Smelting Furnace	75	2.24	2.1	NA	NA	14.2	325	43.36	No change
4	Lead Refinery Copper Drossing	34	1.4	0.4	NA	NA	6.32	313	9.43	No change
5	Lead Refinery Plant [Hygiene Gases of Kettle & Rotatory Furnace]	75	2	0.4	NA	NA	7.17	326	22.58	No change
6	Sinter Plant Crusher [Venturi]	75	0.85	0.3	NA	NA	11.4	331	11.5	No change
7	Sinter Plant Dedusting [Crusher Main]	75	2.6	1.6	NA	NA	9.58	356	40.62	No change
8	Sinter Plant Main Exhaust	75	2.6	2.0	NA	NA	11.11	337	50.8	No change
9	Sinter Plant Wet Scrubber [Sinter Venturi]	45	0.85	0.2	NA	NA	10.86	334	5.27	No change
10	Zinc Refinery Plant Flue Gas Stack	60	1.5	0.1	NA	NA	0	401	10.7	No change
11	Zinc Refinery Plant Fume Extraction 1	35	1.5	0.7	NA	NA	12.0	340	34	No change
12	Zinc Refinery Plant Fume Extraction 2	35	1.5	0.7	NA	NA	12.0	340	34	No change
13	Refinery Stack	30	1.2	NA	NA	NA	14.3	NA	NA	No change
14	ISF Condenser Bag Filter Stack	46	3.2	NA	NA	NA	16.3	NA	NA	No change

Stack No.	Stack attached to.	Height from ground level (m)	Diameter (m)	Existing Emission (g/sec)			Exit Velocity m/sec	Exhaust Gas		Emission Proposed g/sec
				PM <sub>10</sub>	SO <sub>2</sub>	NO <sub>x</sub>		Temp (°K)	Volumetric Flow (nm <sup>3</sup> /sec)	
15	Proposed Refinery Stack 1	40	1.2	NA	NA	NA	6.4	120	3.7	Proposed Additional
16	Proposed Refinery Stack 2	40	1.2	NA	NA	NA	6.4	120	3.7	Proposed Additional
17	Proposed Refinery Stack 3	40	1.2	NA	NA	NA	6.4	120	3.7	Proposed Additional
18	Proposed Refinery Stack 4	40	1.2	NA	NA	NA	6.4	120	3.7	Proposed Additional
<b>Ausmelt Unit</b>										
15.	Dust Extraction system [ RMH]	35	1.2	0.38	NA	NA	16.97	311`	18.46	NO change
16.	Lead Smelter Building [ Hygiene & Ventilation]	30	1.1	0.38	NA	NA	10.71	432	9.18	NO change
17.	So <sub>2</sub> Absorption Tower [ Acid plant-Cansolv]	30	1.2	0.38	3.5	NA	11.25	322	8.23	NO change
18.	Start-up Stack Lead Furnace	52	1.2	NA	NA	NA	3.18	473	2.26	NO change
<b>Hydro Metallurgical Unit I</b>										
1	Pre heater Stack	45	1.1	0.37	NA	NA	8.1	500	10.15	No change
2	Roaster Start up	50	2.5	NA	10.8*	NA	3.87	311	18.19	No change
3	Sulphuric Acid Plant	100	2	39.38	10.8*	NA	11.36	348	30.95	No change
4	Zinc melting furnace bag filter no.1	30	1.3	23.13	NA	NA	17.83	323	14.82	No change
5	Zinc melting furnace bag filter no.2	30	1.3	27.6	NA	NA	17.83	323	13.94	No change
6	Zinc melting furnace bag filter no.3	30	1.3	26.7	NA	NA	17.80	323	13.94	No change
7	Zinc melting furnace bag filter no.4	30	1.3	25.5	NA	NA	11.02	323	13.94	No change
8	Zinc atomizing attached to zinc dust	30	0.5	28.36	NA	NA	14.6	313	2.24	No change
9	Zinc dross milling	30	0.5	27.17	NA	NA	14.13	303	2.06	No change

Stack No.	Stack attached to.	Height from ground level (m)	Diameter (m)	Existing Emission (g/sec)			Exit Velocity m/sec	Exhaust Gas		Emission Proposed g/sec
				PM10	SO2	NOX		Temp (°K)	Volumetric Flow (nm³/sec)	
Hydro Metallurgical Unit II with Fumer										
1.	Pre heater Stack	45	1.1	0.37	NA	NA	8.1	500	0.15	NO change
2.	Roaster Start up	30	1	NA	10.8	NA	21.6	303	18.19	NO change
3.	Sulphuric Acid Plant	100	2.5	NA	10.8	NA	7.21	348	49.5	No change
4.	Zinc melting Induction furnace 1	30	1.2	22.03	NA	NA	8.34	373	8.86	NO change
5.	Zinc atomizing attached to zinc dust	30	0.5	18.04	NA	NA	12.74	348	2.22	NO change
6.	Zinc dross milling	30	0.75	24.7	NA	NA	10.71	323	7.8	NO change
7	Fuming Furnace – Hygiene - Fumer	75	2.7	30	NA	NA	18.4	323	52.77	NO change
8	Off Gases- Fumer	80	2.7	30	40.38	63.57	37.6	323	58.33	NO change
9	Proposed Zinc melting Induction furnace 2	30	1.2	30	NA	NA	8.34	373	8.86	Proposed Additional
CAPTIVE POWER PLANT										
1.	Captive Power Plant Unit I&II (CPP) 154 MW	165	4	33.67	259.72	603.93	18.4	395	230.74	NO change
2.	Captive Power Plant Unit III (CPP) 100 MW	165	2.9	31.34	147.91	634.05	18.88	392	95.98	NO change
3.	Coal crusher (Common for 154 MW and 100 MW CPP)	20	0.8	28.14	NA	NA	16.21	40	3.21	NO change
Minor Metal Complex										
1	Cu dross treatment (Pyro) 1	45	1	NA	NA	NA	12.3	65	9.7	Proposed Additional
2	Cu dross treatment (Pyro) 2	45	1	NA	NA	NA	12.3	65	9.7	Proposed Additional
3	Boiler stack	30	0.7	NA	NA	NA	5.0	NA	NA	Proposed Additional
4	Cobalt Plant	15	0.8	NA	NA	NA	15	50	7.5	Proposed Additional

Stack No.	Stack attached to.	Height from ground level (m)	Diameter (m)	Existing Emission (g/sec)			Exit Velocity m/sec	Exhaust Gas		Emission Proposed g/sec
				PM <sub>10</sub>	SO <sub>2</sub>	NOX		Temp (°K)	Volumetric Flow (nm <sup>3</sup> /sec)	
5	Cadmium Plant	16	0.9	NA	NA	NA	13	70	8.33	Proposed Additional

Table - 4.6(b)

## Details of Stacks in Fertilizer Complex (For Phase I of 0.51 MTPA)

Area	Stack Height	Stack Diameter	Stack Exit Temperature	Flow Rate	Emission Parameters		Control Measures	Control Efficiency
	in M	in M	Deg K	NM <sub>3</sub> /Hr	Parameter	Value		
PAP - Fluorine Scrubber Stack	60	1.80	328	189000	F	≤ 15 mg / NM <sup>3</sup>	2 Venturi + 3 water scrubbing	99.95%
					SPM	≤ 30 mg / NM <sup>3</sup>		
DAP /NPK / NPS Plant Scrubber Stack	50	3.10	341	344000	Ammonia	≤ 25 mg / NM <sup>3</sup>	1 Pre-scrubber venturi followed by another scrubber venturi followed by water scrubber	99.95%
					F	≤ 15 mg / NM <sup>3</sup>		
					SPM	≤ 50 mg / NM <sup>3</sup>		
AlF <sub>3</sub> - Fluorine Scrubber Stack	30	0.55	348	9000	F	≤ 15 mg / NM <sup>3</sup>	2 stage condenser, one stage packed bed sulphuric acid absorption column	99.99%
					SPM	≤ 30 mg / NM <sup>3</sup>		
					F	≤ 15 mg / NM <sup>3</sup>		



PAP Crusher Stack	30	0.80	300	12000	SPM	$\leq 50 \text{ mg} / \text{NM}_3$		
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Source: EIA /EMP Report prepared by EQMS India Pvt. Ltd., Delhi for Proposed Greenfield Ammonium Phosphate Fertilizer Complex –1.02 MTPA (2 x 0.51 Million TPA) at Village: Biliya, Tehsil & District: Chittorgarh of Hindustan Zinc Ltd.

Table - 4.6(c)

Emission Load [Phase I; Phase II &amp; both Phases]

Area	Stack Height	Stack Dia	Stack exit velocity	Stack Exit Temperature	Flow Rate	Emission Parameters		Emission Load (gm/sec)			Control System Efficiency
								phase I	phase II	Phase I and II	
	in M	In M	M/Sec	Deg K	NM <sub>3</sub> /Hr	Parameter	Value				
PAP - Fluorine Scrubber Stack	60	1.8	22.7	328	189000	F	$\leq 15 \text{ mg} / \text{NM}_3$	0.7875	0.7875	1.58	99.95% efficiency
						PM	$\leq 30 \text{ mg} / \text{NM}_3$	1.575	1.575	3.15	
DAP /NPK / NPS Plant Scrubber Stack	50	3.10	14.49	341	344000	Ammonia	$\leq 25 \text{ mg} / \text{NM}_3$	2.388889	2.388889	4.78	To be provided
						F	$\leq 15 \text{ mg} / \text{NM}_3$	1.433333	1.433333	2.87	
						PM	$\leq 50 \text{ mg} / \text{NM}_3$	4.78	4.78	9.56	
AlF <sub>3</sub> - Fluorine Scrubber Stack	30	0.55	12.29	348	9000	F	$\leq 15 \text{ mg} / \text{NM}_3$	0.0375	0.0375	0.08	99.99% efficiency
						PM	$\leq 30 \text{ mg} / \text{NM}_3$	0.075	0.075	0.15	

**Expansion within the existing Chanderiya Lead Zinc Smelter Complex**

At villages: Putholi, Ajoliya Ka Khera &amp; Biliya, Tehsil: Gangrar &amp; Chittorgarh, District: Chittorgarh (Rajasthan)

Chapter - 4 of Final EIA / EMP Report

PAP - Crusher Stack	30	0.80	6.67	300	12000	PM	≤ 50 mg / NM <sub>3</sub>	0.17	0.17	0.33	
---------------------------	----	------	------	-----	-------	----	------------------------------	------	------	------	--

Source: EIA /EMP Report prepared by EQMS India Pvt. Ltd., Delhi for Proposed Greenfield Ammonium Phosphate Fertilizer Complex –1.02 MTPA (2 x 0.51 Million TPA) at Village: Biliya, Tehsil & District: Chittorgarh of Hindustan Zinc Ltd.

**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)****Cumulative 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 <sub>2.5</sub>	µg/m <sup>3</sup>	55.4	2.0	57.4	60
		PM <sub>10</sub>	µg/m <sup>3</sup>	92.4	5.0	97.4	100
		SO <sub>2</sub>	µg/m <sup>3</sup>	19.7	1.0	20.7	80
		NO <sub>x</sub>	µg/m <sup>3</sup>	38.6	2.0	40.6	80
		CO	mg/m <sup>3</sup>	1.13	0.01	1.14	4
2.	Village-Ghosundi	PM <sub>2.5</sub>	µg/m <sup>3</sup>	38.6	0.9	39.5	60
		PM <sub>10</sub>	µg/m <sup>3</sup>	78.3	1.0	79.3	100
		SO <sub>2</sub>	µg/m <sup>3</sup>	14.0	0.8	14.8	80
		NO <sub>x</sub>	µg/m <sup>3</sup>	25.6	1.0	26.6	80
		CO	mg/m <sup>3</sup>	0.69	0.007	0.697	4
3.	Putholi	PM <sub>2.5</sub>	µg/m <sup>3</sup>	47.2	2.0	49.2	60
		PM <sub>10</sub>	µg/m <sup>3</sup>	89.2	6.0	95.2	100
		SO <sub>2</sub>	µg/m <sup>3</sup>	16.7	1.0	17.7	80
		NO <sub>x</sub>	µg/m <sup>3</sup>	38.6	3.0	41.6	80
		CO	mg/m <sup>3</sup>	0.99	0.01	1	4
4.	Village-Chanderiya	PM <sub>2.5</sub>	µg/m <sup>3</sup>	48.2	3.0	51.2	60
		PM <sub>10</sub>	µg/m <sup>3</sup>	87.3	9.0	96.3	100
		SO <sub>2</sub>	µg/m <sup>3</sup>	17.6	2.0	19.6	80

S. No.	AAQ Sampling Station	Parameters	Unit	Baseline (A)	Incremental GLC (B)	Post project Ambient Air Quality (A + B)	NAAQS* Standards
		NOx	µg/m <sup>3</sup>	32.0	6.0	38	80
		CO	mg/m <sup>3</sup>	0.89	0.04	0.93	4
5.	Ajoliya ka Khera	PM <sub>2.5</sub>	µg/m <sup>3</sup>	41.3	1.0	42.3	60
		PM <sub>10</sub>	µg/m <sup>3</sup>	82.5	4.0	86.5	100
		SO <sub>2</sub>	µg/m <sup>3</sup>	14.2	1.0	15.2	80
		NOx	µg/m <sup>3</sup>	27.8	2.0	29.8	80
		CO	mg/m <sup>3</sup>	0.78	0.01	0.79	4
6.	Village- Biliya	PM <sub>2.5</sub>	µg/m <sup>3</sup>	45.1	2.0	47.1	60
		PM <sub>10</sub>	µg/m <sup>3</sup>	83.7	5.0	88.7	100
		SO <sub>2</sub>	µg/m <sup>3</sup>	14.8	1.0	15.8	80
		NOx	µg/m <sup>3</sup>	28.9	2.0	30.9	80
		CO	mg/m <sup>3</sup>	0.84	0.01	0.85	4
7.	Mungava ka khera	PM <sub>2.5</sub>	µg/m <sup>3</sup>	37.9	3.0	40.9	60
		PM <sub>10</sub>	µg/m <sup>3</sup>	76.9	8.0	84.9	100
		SO <sub>2</sub>	µg/m <sup>3</sup>	14.8	1.0	15.8	80
		NOx	µg/m <sup>3</sup>	24.1	3.0	27.1	80
		CO	mg/m <sup>3</sup>	0.79	0.03	0.82	4
8.	Village- Chogawadi	PM <sub>2.5</sub>	µg/m <sup>3</sup>	36.9	0.8	37.7	60
		PM <sub>10</sub>	µg/m <sup>3</sup>	73.7	1.0	74.7	100
		SO <sub>2</sub>	µg/m <sup>3</sup>	12.3	0.8	13.1	80
		NOx	µg/m <sup>3</sup>	22.2	1.0	23.2	80
		CO	mg/m <sup>3</sup>	BDL	0.0	BDL	4
9.	Chittorgarh Zinc Nagar	PM <sub>2.5</sub>	µg/m <sup>3</sup>	37.2	3.0	40.2	60
		PM <sub>10</sub>	µg/m <sup>3</sup>	71.2	9.0	80.2	100
		SO <sub>2</sub>	µg/m <sup>3</sup>	13.6	1.0	14.6	80
		NOx	µg/m <sup>3</sup>	24.4	7.0	31.4	80
		CO	mg/m <sup>3</sup>	0.66	0.04	0.7	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 CLZS for PM<sub>2.5</sub>, PM<sub>10</sub>, SO<sub>2</sub>, NOx 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 baseline result and incremental ground level concentrations have been predicted that maximum value of PM<sub>2.5</sub>(57.4 µg/m<sup>3</sup>), PM<sub>10</sub> (9.7 µg/m<sup>3</sup>), SO<sub>2</sub> (20.7 µg/m<sup>3</sup>), NO (40.6

$\mu\text{g}/\text{m}^3$ ) and CO ( $1.14 \text{ mg}/\text{m}^3$ ) will be at plant site. There will be minor threat to the gaseous pollutants of the ambient air quality; however, concentration of particulate matter is a subject of concern - though not immediate. Proper mitigation plan for dust 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.

#### 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 CLZS 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 upto such extend that emission level comes under prescribed standard. Shutdown of polluting unit to repair / replace of non functioning section of the APCD.

**Table 4.7(B)**

#### Worst Case Scenario for Cumulative Ground Level

Scenarios	Concentration ( $\mu\text{g}/\text{m}^3$ )			
	PM <sub>2.5</sub>	PM <sub>10</sub>	SO <sub>2</sub>	NO <sub>x</sub>
Worst Case Scenario (During abnormal condition) ( $\mu\text{g}/\text{m}^3$ )	696	1485	147	173

In event of any abnormal condition, the predicted concentration of pollutants is as follows:

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:



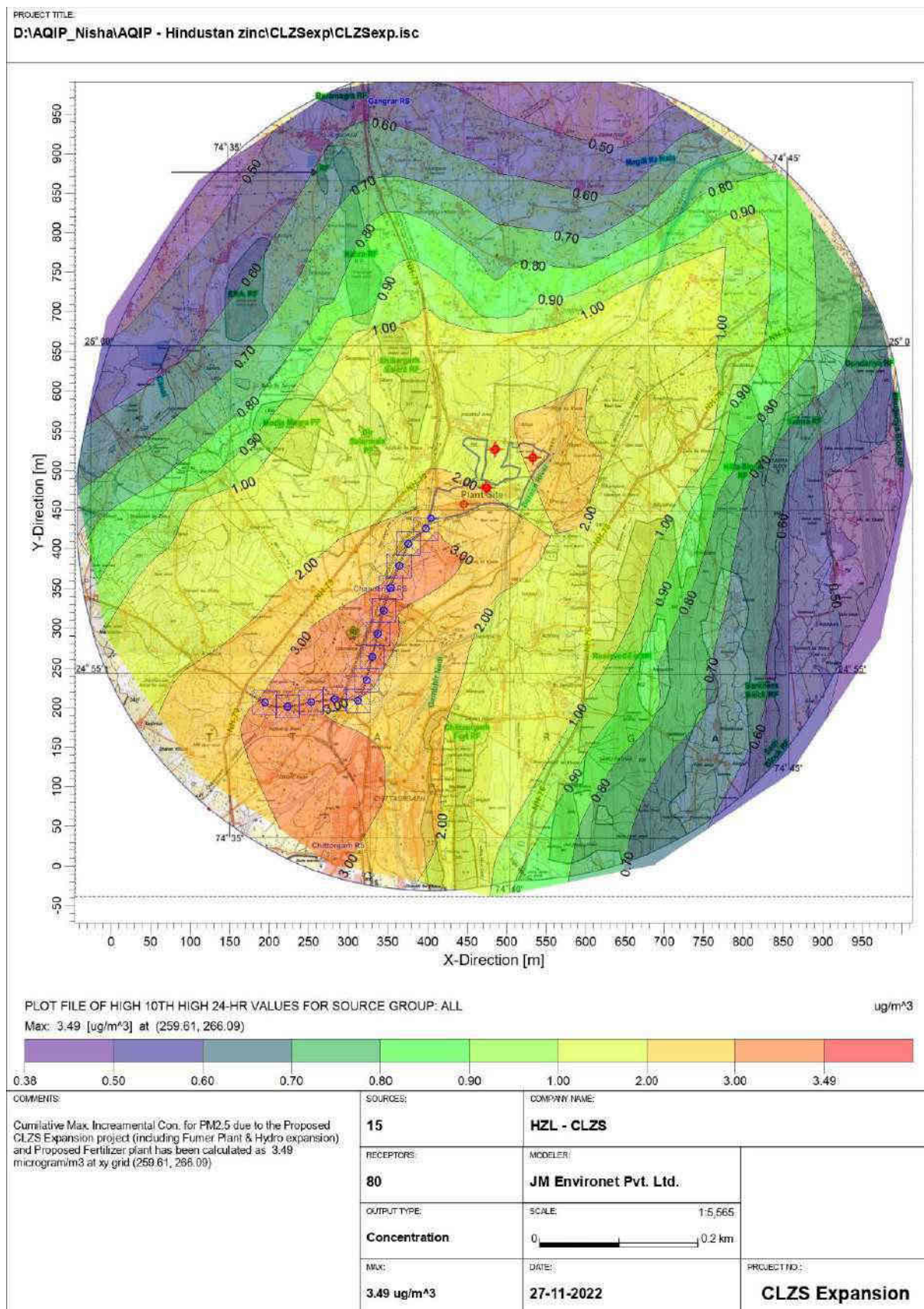
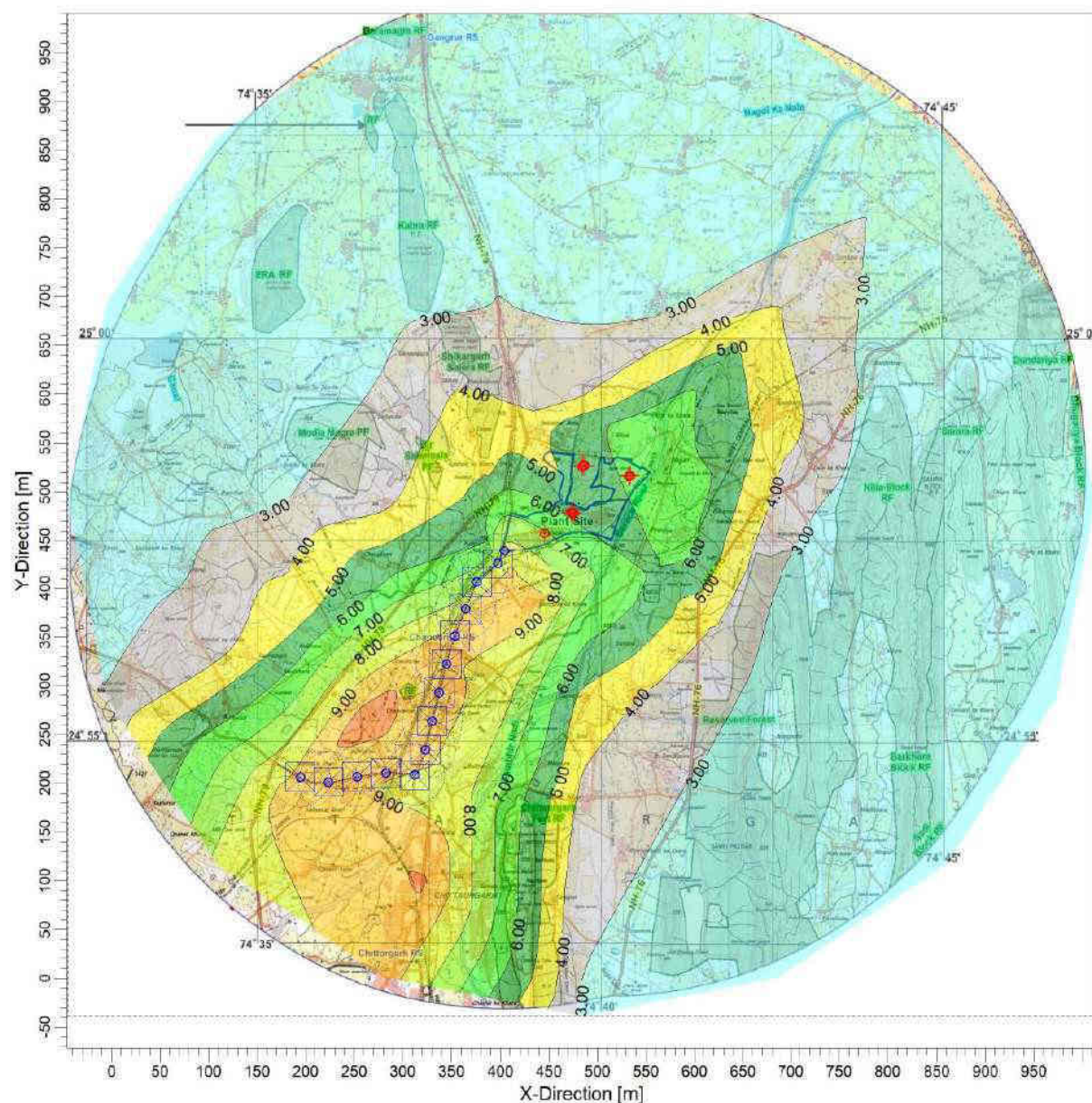


Figure 4.1: Isopleth showing the cumulative incremental GLCs of PM2.5

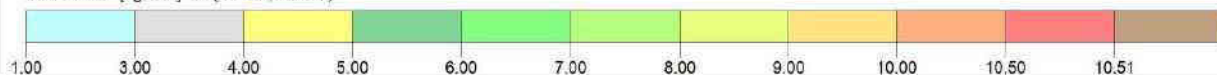


PROJECT TITLE

D:\AQIP\_Nisha\AQIP - Hindustan zinc\CLZSexp\CLZSexp.isc



PLOT FILE OF HIGH 10TH HIGH 24-HR VALUES FOR SOURCE GROUP: ALL

ug/m<sup>3</sup>Max: 10.51 [ug/m<sup>3</sup>] at (259.61, 266.09)

COMMENTS:

Cumulative Max Incremental Con. for PM10 Proposed CLZS Expansion project (including Furner Plant & Hydro expansion) and Proposed Fertilizer plant has been calculated as: 10.51 microgram/m<sup>3</sup> at xy grid (259.61, 266.09)

SOURCES:

15

COMPANY NAME:

HZL - CLZS

RECEPTORS:

80

MODELER:

JM Environet Pvt. Ltd.

OUTPUT TYPE:

Concentration

SCALE:

1:5,565

0

0.2 km

MAX:

10.51 ug/m<sup>3</sup>

DATE:

26-11-2022

PROJECT NO.:

CLZS Expansion

Figure 4.2: Isopleth showing the cumulative incremental GLCs of PM10

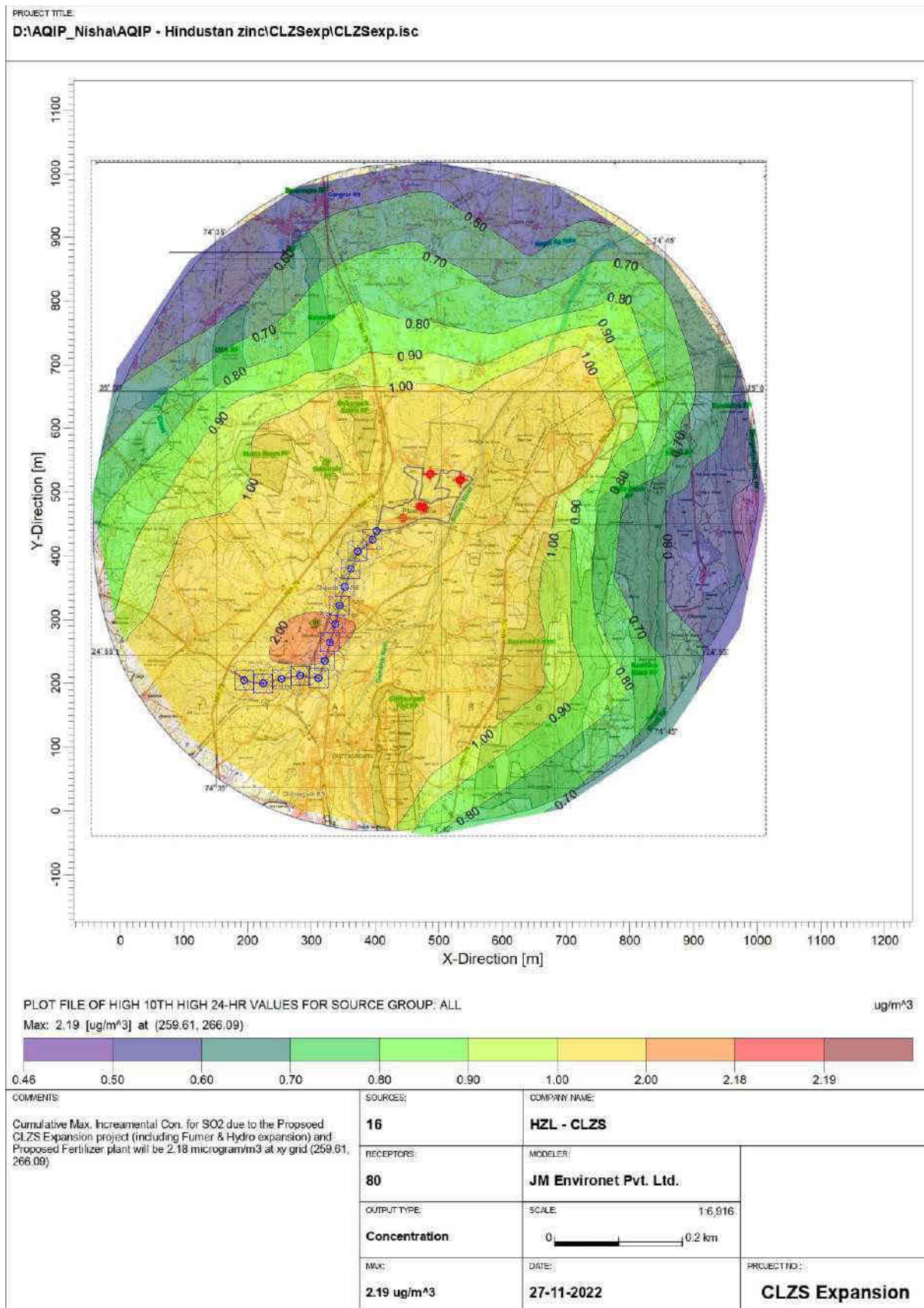
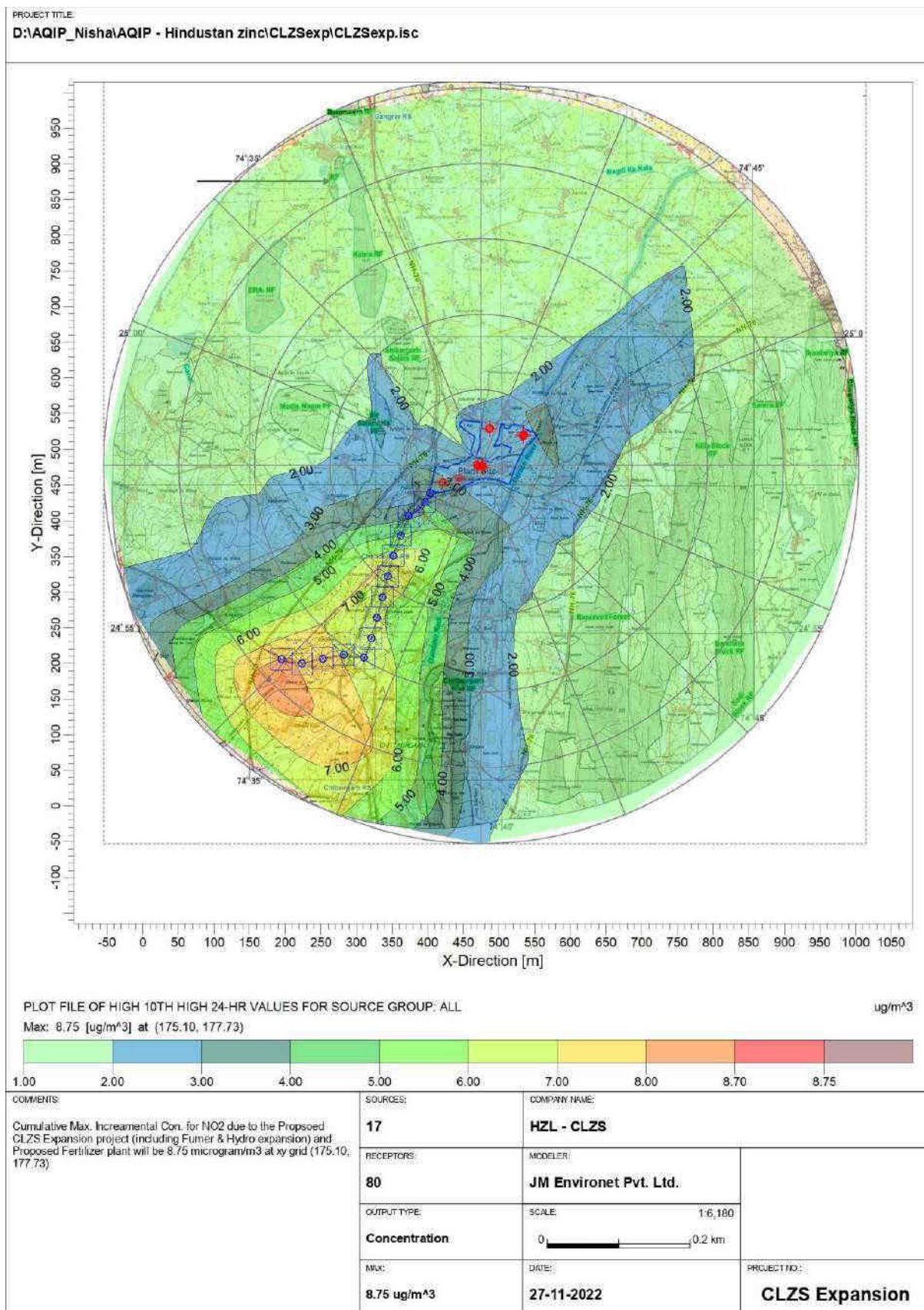


Figure 4.3: Isopleth showing the cumulative incremental GLCs of SO<sub>2</sub>



Figure 4.4: Isopleth showing the cumulative incremental GLCs of NO<sub>x</sub>

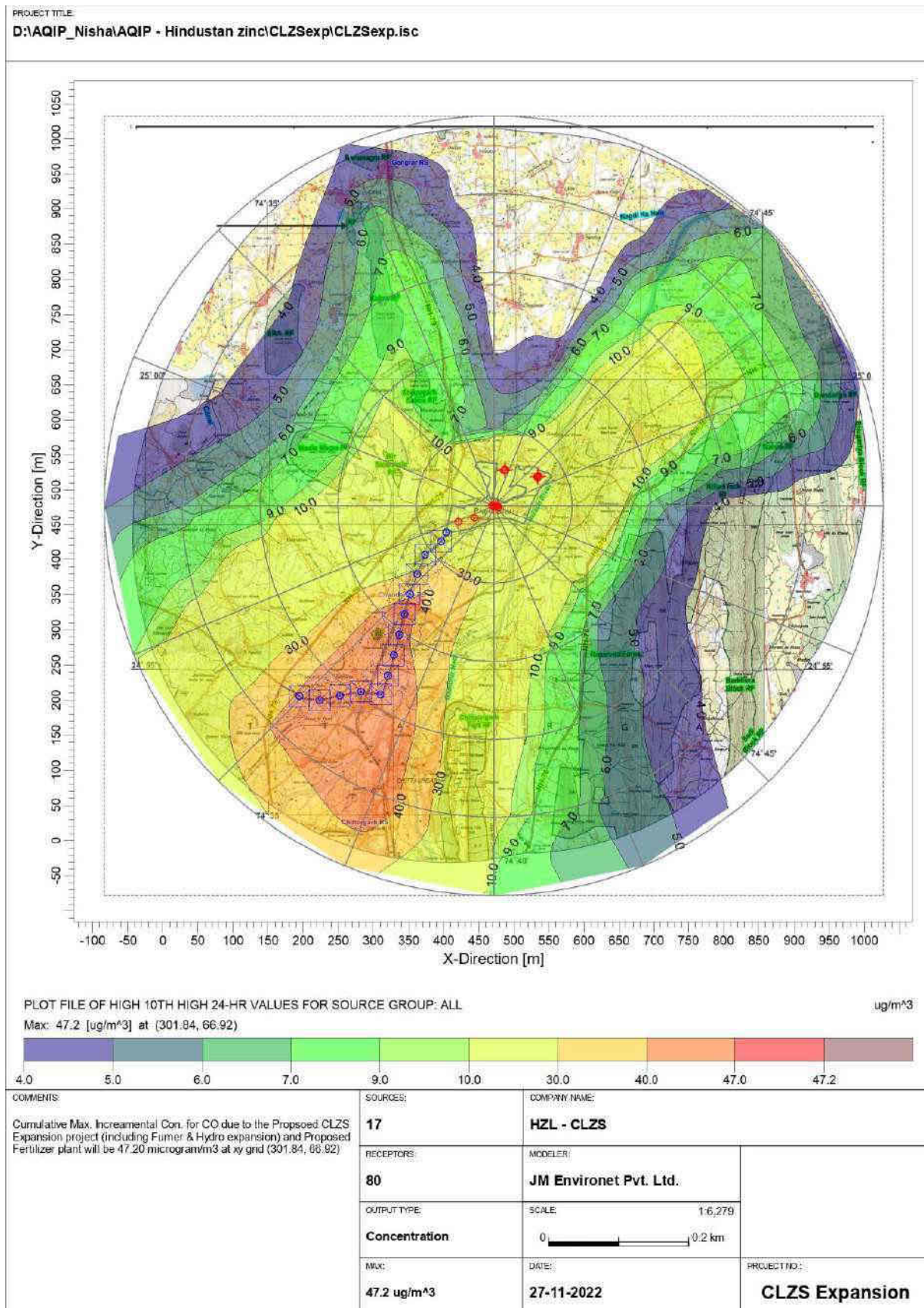


Figure 4.5: Isopleth showing the cumulative incremental GLCs of CO



**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 line source 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 which are given below:

- Dust suppression system have been/ will be maintained to minimize fugitive dust emission in Zinc Lead 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., 335.89 ha of CLZS Complex, 125.02 ha (~37.21%) has been covered under greenbelt and plantation which will help in reducing the emission level.
- Native Plant species have been and will be planted in consultation with local horticulturist

**Table 4.7(c)**



**Pollution control Equipment**

S. No.	Pollution control system	Control equipment	Recovery & Recycle
<b>Raw Material Handling</b>			
i.	Dust suppression in coke yard.	Water spray systems.	Loss of coke fines prevented by moisture addition, which reduces further fines generation as well.
ii.	Dust extraction in coke transfer points.	Pulse jet type bag filters.	Collected dust to fall on conveyor itself.
iii.	Truck washing	Water spray pumps and sump.	Zinc and Lead concentrates sticking to the trucks transporting concentrate from the mines to the smelter complex are washed. The sludge collected at the bottom of the sump is removed periodically and sent to sinter plant.
<b>Sinter Plant</b>			
iv.	Main plant dust extraction system	Fan, bag filter complete with compressor, conveyor etc.	Dry dust collected in bag filter is taken to mixing drum through dust collection bins.
v.	Cooling & mixing drum de-dusting system.	Fan, venturies, moisture separator, HRT, pumps.	Wet dust slurry is added to cooling drum through HRT.
vi.	Return fines bin de-dusting system.	Fan, mini-venturi, moisture eliminator, tank etc.	Dust slurry recycled to cooling drum through HRT.
vii.	Hot gas cleaning system.	Hot gas electrostatic precipitator conveyor.	Collected dry dust is recycled in sinter plant.
viii.	Wet gas cleaning system.	Washing tower, fluorine tower.	Sludge through cooling tower, fluorine removal sediments recycled to Sinter plant through ETP.
ix.	Wet de-dusting system for mixing drum - Crusher Building.	-- do --	-- do --
x.	Pre-Drying Tower	Tower circulation tank pump, Acid coolers.	Partial removal of moisture in the gas.
<b>ISF Plant</b>			
xi.	Charge preparation coke handling de-dusting system.	Fan, Venturi scrubber, moisture separator etc.	Slurry Disposed off to compact clarifier.
xii.	Charge preparation sinter handling de-dusting system.	Bag filter fan, screw conveyor, rotary valve etc.	Dust collected in the bag filter is slurried and transferred to blue powder thickener.

S. No.	Pollution control system	Control equipment	Recovery & Recycle
xiii.	Condenser floor fume/dust extraction system.	Bag filter, fan, screw conveyor, rotary valve etc.	Dust collected in the bag filter is slurried and transferred to blue powder thickener.
xiv	Slagging floor dust extraction system.	Bag filter, Fan, screw conveyor, rotary valve etc.	Dust collected in the bag filter is slurried and transferred to blue powder thickener.
xv	Slag granulating de-dusting system.	Fan, Venturi scrubber moisture separator etc.	The dust is collected in the slurry and transferred to Blue powder thickener.
xvi	Gas Cleaning System	Gas wash tower, thiesen disintegrator, moisture separator, dredge tank etc.	Washed dust from furnace off take gas is collected in the dredge tank. The larger lumps are taken in the skips to sinter plant. Blue powder slurry from the dredge tank is transferred to ETP for recovery of blue powder.
xvii	Briquetting Plant de-dusting	Bag filter, fan, screw conveyor etc.	Dry dust in the bag filter is recycled in the plant itself.
<b>Zinc Refinery</b>			
xviii	Fume extraction and treatment section.	Fan, Bag filter, cooler etc.	Flue gases from the furnace are cooled and cleaned in the bag filter. Collected dust is transferred to sinter plant periodically. Recycled in Sinter plant
<b>Lead Refinery</b>			
xix	Dust/Fume extraction system.	Bag filters	Ventilation dust is sent to RMH for treatment.
xx	MTM section ventilation	Bag filter, fan, screw conveyor, bagging machine etc.	-- do --
xxi	Rotary furnace area ventilation	Bag filter, fan screw conveyor etc.	Ventilation dust is sent to CRP
xxii	Copper dressing fume/dust extraction system	Bag filter, fan, screw conveyor etc.	Recovered dust is recycled in Copper Recovery Plant itself.
<b>Copper Recovery Plant</b>			
xiii	Dust extraction in dross milling	Bag filter, fan, screw conveyor etc.	Recovered dust is shifted to RMH and recycled in Ausmelt
<b>Ausmelt Plant</b>			
xiv	Metal Tapping Floor	Fume extraction system and Bag filters	SO <sub>2</sub> emissions are well below the stipulated limits
<b>SO<sub>2</sub> gas cleaning plant</b>			

S. No.	Pollution control system	Control equipment	Recovery & Recycle
xv	Ausmelt RMH and Feeding Area	An innovative technology called “cansolv” has been installed.	Recovered dust is shifted to RMH and recycled in Ausmelt
<b>Hydro Plants</b>			
xvi	Roaster	Dust suction and Bag filters	Recovered dust is shifted to RMH and recycled in Roaster.
<b>Acid Plant</b>			
xvii	Zinc Melting & Dross Milling and Zinc Atomizing Unit	DCDA based acid plants using cesium-based Vanadium Pentoxide	SO <sub>2</sub> emissions are well below the stipulated limits
xviii	Casting Areas	Bag Filters	Recycled back to Zinc Refinery Furnace

### 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<sub>2</sub> emissions will be absorbed in pyro processing itself.
- Gas wash tower and Thiessen Disintegrator are provided to capture Furnace Gas
- Cansolv technology for Sulphur capture from Ausmelt Lead Furnace.
- All existing Stacks are connected to CPCB & RSPCB Server.
- Automatic shutdown will take place due to non-working of APCE.
- All existing Stacks are connected to CPCB & RSPCB Server.

### DG Sets

- Emissions from DG set are /will be dispersed through the stack;
- Adequate stack height has been maintained for the existing DG set, same will be followed for the proposed DG sets.

### • Accidental Release

- All the stack have 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 ESP 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 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 RZO, Lead Refinery Plant, Minor Metal Recovery units, Induction Furnace & Slab Casting Line, Back Pressure Turbine Generator and new DG Sets.
- Piling work during laying down of foundation for infrastructure

The noise generation during construction phase will be temporary and will be limited to the active construction site within the complex.

#### ∞ Mitigation Measures

- 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.

#### 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 RZO plant at Hydro-II, Lead Refinery unit at Pyro Plant, Back Pressure Turbine Generator at CPP unit and D.G. Set, etc.; and from vehicular movements for transportation of construction material.
- ❖ 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 and Back Pressure Turbine Generator etc. 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 CLZS 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 personal protective equipment 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.
  - Greenbelt along the plant boundary has been developed. The same will enhanced w.r.t area & density.
  - 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. This will be further attenuated by vegetation. The following noise management measures are carried at CLZS
  - Provision for insulating caps and aids at the exit of noise source on the machinery is available
  - The use of damping materials such as thin rubber/ Lead sheet for wrapping the work places like MBF platform, DG set etc.
  - Shock absorbing techniques are adopted to reduce impact;
  - All the noise sources are sealed with covers, partitions are acoustically sealed;
  - 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



- PPE/Ear plugs are provided to all the workers in high noise areas. Safety officer ensures the safety of the workers along with the security
- Cumulative noise exposure of workers never exceed 90 dB (A) for 8-hrs shifts.
- Effective equipment maintenance like periodic lubrication, replacement of gears and de-dusting should be done.
- The plant boundary is thickly with vegetated with species of wide canopy.

#### 4.9 ANTICIPATED IMPACT ON WATER QUALITY AND MITIGATION MEASURES

##### **Construction Phase**

##### **Anticipated Impacts**

- 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 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.
- Domestic Waste water generated due to construction activities is being/will be treated in existing STP (1000 KLD) and treated water is being /will be used in process/Plantation.

##### **Operation Phase**

##### **Anticipated Impacts**

- Total existing water requirement for the project is 38570 KLD. After the expansion project, 500 KLD additional water will be required for the Minor Metal Unit; which will be sourced from RO permeate water from ETP. Therefore, no additional water Fresh water will be required for the proposed expansion project.
- The water is being / will be sourced from Gosunda Dam (Fresh Water) & Proposed STP Chittorgarh/ Udaipur/ other proposed STP's (Recycled Water).
- 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. At present we are treating average 7598m<sup>3</sup> or less effluent per day while we have treatment facility for 12600m<sup>3</sup>/d so increment if any in waste water will be treated in existing system.

- Total wastewater generated from CLZS complex is 7598 KLD (1500 KLD Pyro, 450 KLD Ausmelt, 3296 KLD H-I & 2352 KLD H-II), which is being treated in two existing ETPs (8400 KLD and 4200 KLD, respectively).
  - Domestic Waste water is being / will be generated from the office toilets.
- Hence there will be no significant impact on ground water level & quality.

### ∞ 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 discharge Facility and after expansion it will continue to be a zero-discharge facility.
- Industrial effluent is being / will be treated in two existing ETPs (8400 KLD and 4200 KLD, respectively).
- All the Treated trade effluent is being used for Slag Granulation and Lime slurry preparation and remaining treated trade effluent will be further treated through three stage reverse osmosis (R.O.) plants and R.O. permeate will be recycled/ reused in the process within the premises.
- RO reject is being evaporated in solar evaporation pond and also used for spraying on waste disposal area; and
- Mist evaporators are already installed at site.
- Effluent treatment plant followed with Three stage RO Plant and Multiple Effect Evaporator (MEE/MVR) Plant is already in operation;

- Blow down water from CPP is being/will be treated in neutralization pit and further reused in dust suppression.
- Domestic waste water will be treated in Sewage Treatment Plant and treated water will be used in process/Plantation.
- Storm water management practice will be continued as existing.

#### 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 construction material used resulting in soil deterioration.
- Compaction is a common problem during the construction activity due to the movement of large number of heavy machineries over the soil.
- 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.

##### ⌘ 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.

##### 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
			✓	

### 8 Mitigation Measures

- Efficient Air Pollution Control Equipment (APCE) like Reverse Bag House / Bag House / Bag Filter / ESP is being / will be installed at all major stacks of all the units (Including Pyro & Ausmelt unit, Hydro-I & II, Minor Metal Recovery unit, etc.) to keep the emissions within 50 mg/Nm<sup>3</sup>. Adequate stack height helps to control dust emissions.
- No waste water is being / will be discharged outside the plant premises
- 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 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.

#### 4.11 ANTICIPATED IMPACT ON BIOLOGICAL ENVIRONMENT AND MITIGATION MEASURES

There is no National Park, Sanctuary, Biosphere Reserve, Migratory Corridor of wild animals and Protected Forest exists within 10 km radius study area.

- List of flora and fauna existing within the study area has been authenticated by DFO, Chittorgarh vide letter No. F(survey)/DFC/2022-23/5600 dated 18.08.2022; further amended regarding List of Fauna vide letter No. F(survey)/DFC/2022-23/7233 dated 19.10.2022. The same has been enclosed herewith with this EIA/EMP report as **Annexure 10 A & 10 B**, respectively.
- As per the authenticated list, total 6 schedule I species i.e., *Panthera pardus* (Leopard), *Prionailurus rubiginosus* (Rusty Spotted Cat), *Gyps bengalensis* (White-rumped Vulture), *Falco jugger* (Laggar Falcon), *Pavo cristatus* (Indian Peafowl), *Varanus bengalensis* (Bengal Monitor lizard) found within the study area during survey.

However; 17 Reserve Forest lies within 10 km of the study area which are given as below:

- Dadiya RF (~9.5 km in NNW direction from plant site)
- Baramagra RF (~9.5 km in NNW direction from plant site)

- Shikargarh Salera RF (~1.5 km in NW direction from plant site)
- RF (~7.5 km in NNW direction from plant site)
- Kabra RF (~4.0 km in NW direction from plant site)
- Modia Magra RF (~3.5 km in WNW direction from plant site)
- Era RF (~6.5 km in NW direction from plant site)
- RF (~3.5 km in SSW direction from plant site)
- Bir Salarmala RF (~1.5 km in WNW direction from plant site)
- Nilia Block RF (~4.5 km in East direction from plant site)
- Samra RF (~6.5 km in East direction from plant site)
- Dundaniya RF (~9.0 km in East direction from plant site)
- Bhugariya Block RF (~10 km in East direction from plant site)
- Barkhera Block RF (~8 km in SE direction from plant site)
- Reserved Forest (~4 km in SSE direction from plant site)
- Chittorgarh Fort RF (~5.5 km in South direction from plant site)
- Sadi Block RF (~10 km in SE direction from plant site)

#### 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 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		<b>Negative</b>	Neutral
			√	
Type	<b>Direct</b>	Indirect	Cumulative	
	√			
Extent	Project Area	<b>Local</b>	Zonal	Regional
		√		
Duration	Short – term		<b>Long- term</b>	



		✓	
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 I species i.e. *Panthera pardus* (Leopard), *Prionailurus rubiginosus* (Rusty Spotted Cat), *Gyps bengalensis* (White-rumped Vulture), *Falco jugger* (Laggar Falcon), *Pavo cristatus* (Indian Peafowl), *Varanus bengalensis* (Bengal Monitor lizard), along with *Hystrix indica* (Indian Crested Porcupine) & *Semnopithecus entellus* (Bengal Hanuman Langur) has been prepared and submitted to DCF, Chittorgarh for authentication from CWW, Chittorgarh vide letter no. HZL/CLZS/43/2022-23 dated 10.11.2022. The Copy of the same is enclosed herewith with this EIA/EMP report as **Annexure 10 D**.
- 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 335.89 Ha. Out of which 125.02 ha area has already been developed under greenbelt/ plantation. The same will be maintained and enhanced by doing gap plantation to achieve the plantation density @ 2500/ha.
- Efficient Air Pollution Control Equipment (APCE) like Bag House / Bag Filter / ESP/ Venturi Scrubbers has been / will be installed at all major stacks to keep the emissions within the permissible limits.
- Use of water sprinkler on the haul road to control fugitive emissions in the surrounding environment.
- Using paved roads for transportation to minimize fugitive emissions.
- Transporting material in covered 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

Project potential impacts on socio-economic environment are summarized below and categorized either as positive / beneficial or negative / adverse impacts.

##### Construction Phase

##### ∞ Anticipated Impacts

- About 360 nos. of people i.e. (150 in Pyro Plant + Ausmelt, 60 in Hydro –I & Hydro –II (Including Fumer Plant and 150 in Minor Metal Unit) will get employment during the construction stage 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. Local people will be given preference for employment on the basis of their skill and experience.

- 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 behavioral 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 behavioral 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 behavioral 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.

#### **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<sub>x</sub>, NO<sub>x</sub>, Acid Mist, Hg 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 Chanderiya Lead Zinc Smelter Complex 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, 360 people will be given employment on a contractual basis 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 Concern	Effect/	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:

- In order to mitigate the long term health impacts, efficient Air Pollution Control Equipment (APCE) like Bag House / Bag Filter / ESP/ Venturi Scrubber are / will be installed at all major stacks to keep the emissions within the permissible limits. To reduce fugitive emission from vehicles and machineries will be regularly monitored and maintained.
- M/s. HZL have a well develop occupational health centre at site and a Hospital at Colony for its employees.
- CEMS have been / will be installed at all major stacks for manual pollution under check.

- 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 and it's interlinked captive mine.
- Based on the issues raised during Public Hearing held on 20.07.2022, HZL has prepared the socio-economic development plan in line with OM dated 30<sup>th</sup> September, 2020 and 20<sup>th</sup> Oct., 2020. Details have been incorporated in Chapter - 8, Section 8.4, of this EIA /EMP report & will be implemented in a time bound manner with the start of the implementation of expansion project. Company has allocated Rs.16.75 crores for Socio-economic development activities based on the Public Hearing issues / suggestions and needs of locals.

#### **4.13 ANTICIPATED IMPACT ON OCCUPATIONAL HEALTH AND MITIGATION MEASURES**

Hazards associated with Chanderiya Lead Zinc Smelter Complex 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 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

#### 8.2 Noise and Vibration Exposure

Exhaust fans, DG Set, Turbine set, Coal Fired Boilers, Calcine handling unit, Coal Crushers, compressors, and motors 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).

#### 8.3 Physical hazards

##### Anticipated Impacts

Injuries during Project operation are typically related to the following slips, tripping, 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 crushers, mills, mill separators, 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
<b>Direct Causes</b>	
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							
Name of Dept.	Total Employees	VC (litres)	EV 1	EV 1/ FVC %	EFR (litres/sec)	Conclusion	Chest X- Ray
Civil	59	WNL	WNL	WNL	WNL	WNL	WNL
Commercial	19	WNL	WNL	WNL	WNL	WNL	WNL
Process	239	WNL	WNL	WNL	WNL	WNL	WNL
Drawing & Design	15	WNL	WNL	WNL	WNL	WNL	WNL
Electrical	198	WNL	WNL	WNL	WNL	WNL	WNL
Finance/HR	31	WNL	WNL	WNL	WNL	WNL	WNL
Lab and QC	24	WNL	WNL	WNL	WNL	WNL	WNL
Medical	35	WNL	WNL	WNL	WNL	WNL	WNL
Instrumentation	26	WNL	WNL	WNL	WNL	WNL	WNL
Mechanical	164	WNL	WNL	WNL	WNL	WNL	WNL
Security	115	WNL	WNL	WNL	WNL	WNL	WNL
<b>Total No. of employees</b>	<b>925</b>	<b>Normal</b>	<b>Normal</b>	<b>Normal</b>	<b>Normal</b>	<b>100 % Normal</b>	<b>100 % Normal</b>

Audiometry			
Name of Dept.	Total Employees	Right Ear	Left Ear
Civil	59	WNL	WNL
Commercial	19	WNL	WNL
Process	239	WNL	WNL
Drawing & Design	15	WNL	WNL
Electrical	198	WNL	WNL
Techno Commercial	31	WNL	WNL
Lab and QC	24	WNL	WNL
Medical	35	WNL	WNL
Instrumentation	26	WNL	WNL
Mechanical	164	WNL	WNL
P & A & Security	115	WNL	WNL
<b>Total No. of employees</b>	<b>925</b>	<b>Normal</b>	<b>Normal</b>

Biochemical parameter (Urine)						
Name of Dept.	Total Employees	Sp. gravity	pH	RBC	Proteins	Sugar
Civil	59	WNL	WNL	Nil	Nil	Nil
Commercial	19	WNL	WNL	Nil	Nil	Nil
Process	239	WNL	WNL	Nil	Nil	Nil
Drawing & Design	15	WNL	WNL	Nil	Nil	Nil
Electrical	198	WNL	WNL	Nil	Nil	Nil
Techno-commercial	31	WNL	WNL	Nil	Nil	Nil
Lab and QC	24	WNL	WNL	Nil	Nil	Nil
Medical	35	WNL	WNL	Nil	Nil	Nil
Instrumentation	26	WNL	WNL	Nil	Nil	Nil
Mechanical	164	WNL	WNL	Nil	Nil	Nil
P & A & Security	115	WNL	WNL	Nil	Nil	Nil
<b>Total No. of employees</b>	<b>925</b>	<b>Normal</b>	<b>Normal</b>	<b>Normal</b>	<b>Normal</b>	<b>Normal</b>

#### Biochemical parameter (Blood)

Name of Dept.	Total Employees	CBC	Lipid Profile	Renel Profile	Liver Function Test	Blood Sugar
Civil	59	WNL	WNL	WNL	WNL	WNL
Commercial	19	WNL	WNL	WNL	WNL	WNL
Process	239	WNL	WNL	WNL	WNL	WNL
Drawing & Design	15	WNL	WNL	WNL	WNL	WNL
Electrical	198	WNL	WNL	WNL	WNL	WNL
Techno-commercial	31	WNL	WNL	WNL	WNL	WNL
Lab and QC	24	WNL	WNL	WNL	WNL	WNL
Medical	35	WNL	WNL	WNL	WNL	WNL
Instrumentation	26	WNL	WNL	WNL	WNL	WNL
Mechanical	164	WNL	WNL	WNL	WNL	WNL
P & A & Security	115	WNL	WNL	WNL	WNL	WNL
<b>Total No. of employees</b>	<b>925</b>	<b>Normal</b>	<b>Normal</b>	<b>Normal</b>	<b>Normal</b>	<b>Normal</b>

Circulatory system					Vision			
Name of Dept.	Total Employees	Pulse	ECG	BP	Right Eye	Left Eye	Color Blindness	Squint
Civil	59	Normal	WNL	Normal	Normal	Normal	NIL	Normal
Commercial	19	Normal	WNL	Normal	Normal	Normal	NIL	Normal
Process	239	Normal	WNL	Normal	Normal	Normal	NIL	Normal
Drawing & Design	15	Normal	WNL	Normal	Normal	Normal	NIL	Normal
Electrical	198	Normal	WNL	Normal	Normal	Normal	NIL	Normal
Techno-commercial	31	Normal	WNL	Normal	Normal	Normal	NIL	Normal
Lab and QC	24	Normal	WNL	Normal	Normal	Normal	NIL	Normal
Medical	35	Normal	WNL	Normal	Normal	Normal	NIL	Normal
Instrumentation	26	Normal	WNL	Normal	Normal	Normal	NIL	Normal
Mechanical	164	Normal	WNL	Normal	Normal	Normal	NIL	Normal
P & A & Security	115	Normal	WNL	Normal	Normal	Normal	NIL	Normal
<b>Total No. of employees</b>	<b>925</b>	<b>Normal</b>	<b>WNL</b>	<b>Normal</b>	<b>Normal</b>	<b>Normal</b>	<b>NIL</b>	<b>Normal</b>

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 – 79 (~ 0.5 km in West direction from plant site) .Nearest Railway Station is Chanderiya Railway Station which is about ~2.5 km in SW direction from the plant site. Nearest Airport is Maharana Pratap Airport - Udaipur which is approx. 85 km in SW direction from the plant site.

##### Mode of Transportation of Raw Material, Fuel & waste materials:

- Transportation of raw material, fuel and finished products will be done 100% by road.
- 35 T 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 Plant approach road and it is connected with NH - 79 (~0.5 Km in West direction from plant site).The traffic survey monitoring was done in Oct., 2020 to

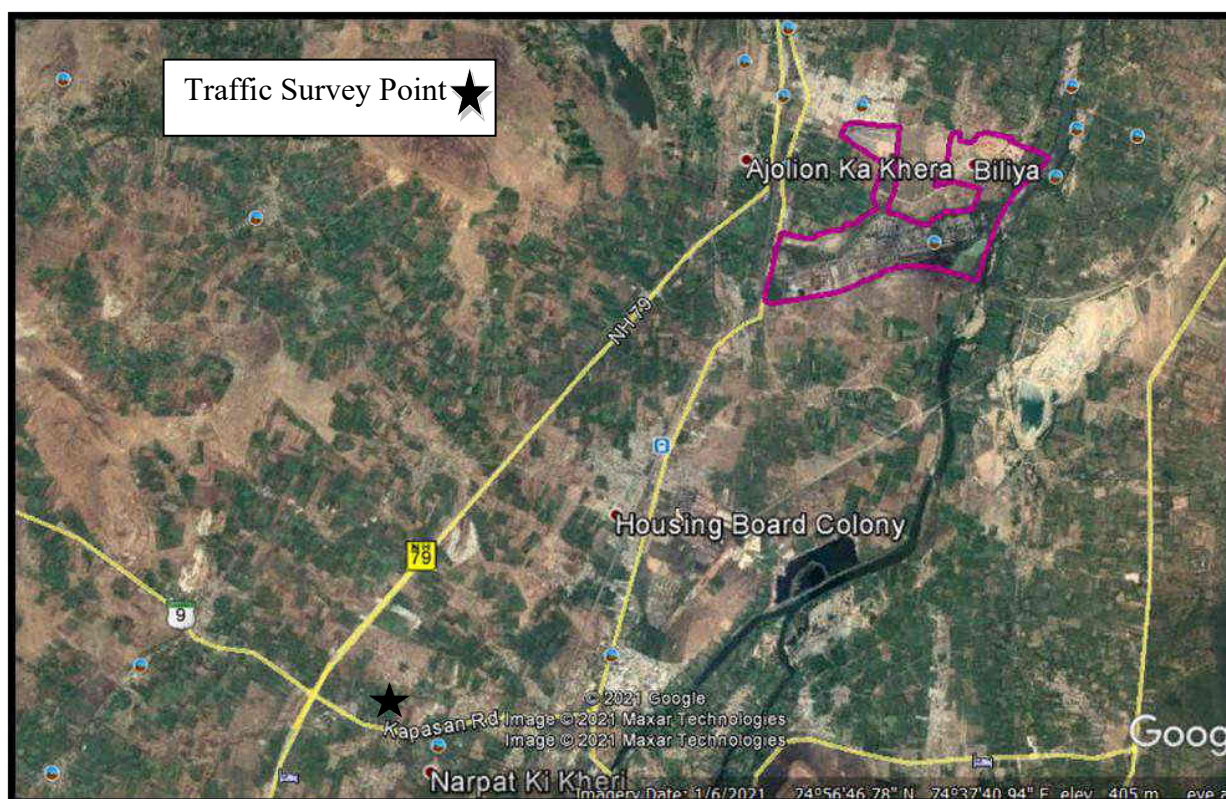
predict the future traffic growth and the load on the plant road and surroundings due to the expansion project.

**Table - 4.8**  
**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 – 79 Near Narpath Ki Khedi	24°54'20.85"N 74°35'3.32"E	4 lane (divided)	~ 7.35 Km in WSW direction from plant site

The above mentioned locations / selected survey points are shown in Figure - 4.7.

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:

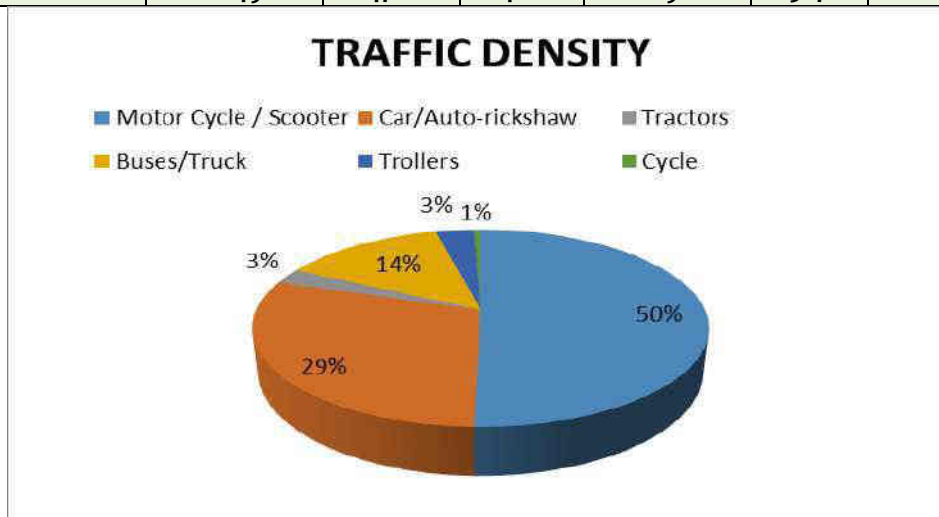


**Figure 4.4: Transportation Route Map**

**Table - 4.9(a)**  
**Traffic Volume Count Survey (Plant approach road to NH - 79)**

S. No.	Time	Type of vehicle						
		Motor Cycle / Scooter	Car/Auto-rickshaw	Tractors	Buses/Truck	Trollers	Cycle	Total vehicles
1.	6:01 to 7:00 am	392	156	19	95	19	5	686
2.	7:01 to 8:00 am	498	210	25	68	21	7	829
3.	8:01 to 9:00 am	610	296	29	86	17	4	1042

4.	9:01 to 10:00 am	653	319	26	79	16	9	1102
5.	10:01 to 11:00 am	611	361	21	105	17	7	1122
6.	11:00 to 12 noon	569	336	27	96	21	6	1055
7.	12:01 to 1:00 pm	591	315	31	89	15	8	1049
8.	1:01 to 2:00 pm	499	361	20	95	20	5	1000
9.	2:01 to 3:00 pm	576	337	26	87	19	6	1051
10.	3:01 to 4:00 pm	519	319	24	85	15	5	967
11.	4:01 to 5:00 pm	610	361	31	91	21	7	1121
12.	5:01 to 6:00 pm	619	329	20	81	15	4	1068
13.	6:01 to 7:00 pm	415	296	22	76	21	9	839
14.	7:01 to 8:00 pm	301	207	16	97	25	4	650
15.	8:01 to 9:00 pm	119	152	11	110	26	3	421
16.	9:01 to 10:00 pm	81	96	6	119	30	4	336
17.	10:01 to 11:00 pm	53	67	9	101	19	2	251
18.	11:01 to 12:00 pm	29	36	5	99	26	1	196
19.	12:01 to 1:00 am	18	26	3	86	18	-	151
20.	1:01 to 2:00 am	11	21	4	77	29	-	142
21.	2:01 to 3:00 am	9	19	6	69	20	-	123
22.	3:01 to 4:00 am	31	15	3	105	28	-	182
23.	4:01 to 5:00 am	96	28	9	86	22	1	242
24.	5:01 to 6:00 am	139	49	15	110	27	4	344
<b>Total Vehicles</b>		<b>8049</b>	<b>4712</b>	<b>408</b>	<b>2192</b>	<b>507</b>	<b>101</b>	<b>15969</b>



**Figure 4.5: Traffic Volume Count**

Figure 4.5 depicts that majority of vehicles running in the road are Motor Cycle / Scooter (50%), Car/ Auto-rickshaw (29%), Cycle (1%), Buses / Truck (14 %) and Tractor (3%).

**Table - 4.9(b)**  
**Traffic Volume Count: (Plant approach road to NH - 8)**

S. No.	Type of Vehicle	No. of vehicles / day
1.	Motor Cycle / Scooter/Cycles	8049
2.	Passenger Car / Van / Auto-rickshaw	4712
3.	Tractors	408
4.	Buses/ Truck	2192
5.	Trailer	507
<b>Total</b>		<b>15969</b>

Source: Survey

**No. of Vehicles with respect to PCU**

S. No.	Vehicle Type	Number of Vehicles / days	Passenger Car Unit (PCU) Factor	Total Number of Vehicle (PCU) / day
1.	Motor Cycle / Scooter/Cycles	8049	0.75	6036.75
2.	Passenger Car / Van / Auto-rickshaw	4712	1.0	4712
3.	Tractors	408	4.0	1632
4.	Buses/ Truck	2192	3.7	8110.4
5.	Trailer	507	4.0	2028
Total		15969	-	22519.15
PCU / hr = (PCU / day) / 24				938.2979

**Existing Traffic Scenario and LOS (Level of Service)**

Road	V (Volume in PCU/hr.)	C (Capacity in PCU/hr.)	Existing V/C Ratio	LOS
Narpath Ki Khedi	938.2979	5400	0.173	A

**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 Lead Smelter Plant manufacturing is Zinc and Lead concentrate; which will be transported from HZL mines- RA, SK & Zawar 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 - 4.10 and 4.11.

**Table - 4.10**

**Additional Inward Traffic due to the Raw Material Transportation\***  
**Zinc Lead Smelter Plant (Pyro Plant+ Ausmelt)**

S. No.	Name of Raw Materials	Quantity		% of transportation	Source	Type of vehicle and Capacity	No of Trips (Trucks / Day)
		TPA	TPD				
1.	Zinc concentrate	58000	175.75	100 %	HZL mines-RA, SK & Zawar mines	Truck / 35 Tonnes	6
2.	Lead concentrate	196500	595.45	100 %	HZL mines-RA, SK & Zawar mines	Truck / 35 Tonnes	18
3.	Zinc Oxide /Zinc Dust /Zinc Bearing material/ Zinc Dross	50000	151.51	100 %	Market/ HZL Smelters Approx. / From authorised recyclers	Truck / 35 Tonnes	5
4.	Lead Oxide /Lead Bearing Secondaries/Lead Dross /Lead Cake /Lead Bearing	50000	151.51	100 %	Market/ HZL Smelters Approx./ From authorised	Truck / 35 Tonnes	5



	Outsourced Secondaries				recyclers		
	<b>Total</b>						<b>34</b>

\*Considering 100% by Road to Calculate Maximum Pollution Load with 330 working days

Table - 4.11

## Additional Inward Traffic due to the Raw Material Transportation

## Hydro I &amp; Hydro-II (Incl. Fumer plant) and CPP

S. No.	Name of Raw Materials	Quantity		% of transportation	Source	Type of vehicle and Capacity	No of Trips (Trucks / Day)
		TPA	TPD				
1.	Limestone for FGD	131465	398.924	100 %	Nearby Mines	Truck / 35 Tonnes	12
2.	Zinc Cathode	140000	424.242	100 %	HZL Smelter	Truck / 35 Tonnes	13
	<b>Total</b>						<b>25</b>

Table - 4.12

## Additional Inward Traffic due to the Raw Material Transportation

## MINOR METAL UNIT

S. No.	Name of Raw Materials	Quantity		% of transportation	Source	Type of vehicle and Capacity	No of Trips (Trucks / Day)
		TPA	TPD				
1.	PF Cake	8800	26.66	100 %	HZL Smelter	Truck / 35 Tonnes	1
2.	Cadmium Sponge	4000	12.12	100%	HZL Smelter	Truck / 35 Tonnes	1
3.	Copper Matte	3500	10.6	100 %	HZL Smelter	Truck / 35 Tonnes	1
4.	Cobalt Cake	2000	6.06	100 %	HZL Smelter	Truck / 35 Tonnes	1
5.	Copper Dross	12000	36.36	100 %	HZL Smelter	Truck / 35 Tonnes	2
6.	Coal	1480	4.48	100%	HZL Smelter	Truck / 35 Tonnes	1
7.	Zinc Dust	2210	6.69	100 %	HZL Smelter	Truck / 35 Tonnes	1
8.	Sulphuric Acid	6500	19.69	100 %	HZL Smelter	Truck / 35 Tonnes	1
	<b>Total</b>						<b>09</b>

Table - 4.13

## Additional Outwards Traffic Details

## Zinc Lead Smelter Plant (Pyro Plant)

S. No.	Name of Raw Materials	Quantity		% of transportation	Type of vehicle and Capacity	No of Trips (Trucks / Day)
		TPA	TPD			
1.	Refined Lead	1,05,000	287.671	100 %	Truck / 35 Tonnes	9
2.	Refined Zinc	35,000	95.89	100 %	Truck / 35	3

S. No.	Name of Raw Materials	Quantity		% of transportation	Type of vehicle and Capacity	No of Trips (Trucks / Day)
		TPA	TPD			
					Tonnes	
3.	Zn-Cd Alloy /CadmiumMetal/ Cadmium Spnge (on equivalent cadmium basis) (By – product)	199	0.54	100 %	Truck / 35 Tonnes	1
4.	Copper Matte/Cu residue/Copper Cement/ Copper Compounds (on Equivalent copper basis) (By-product)	1238	3.391	100 %	Truck / 35 Tonnes	1
5.	Silver/ HGM/ Anode Slime (on equivalent silver basis) (By-product)	728.29	1.99	100%	Truck / 35 Tonnes	1
6.	Sulphuric Acid (By-product)	47,505	130.1	100 %	Truck / 35 Tonnes	4
7.	Antimony Slag/ Compounds/ Antimony Trioxide (Sb <sub>2</sub> O <sub>3</sub> ) (on equivalent Antimony basis) (By-product)	992	2.71	100 %	Truck / 35 Tonnes	1
8.	Lead Oxide Concentrate	20000	54.794	100%	Truck / 35 Tonnes	2
9.	Calomel/Mercury Compounds (on equivalent mercury basis) (By-product)	14.8	0.040	100 %	Truck / 35 Tonnes	1
	<b>Total</b>					<b>23</b>

Table - 4.14

**Additional Outwards Traffic Details**  
**Hydro I & Hydro-II (Incl. Fumer plant) and CPP**

S. No.	Name of Raw Materials	Quantity		% of transportation	Type of vehicle and Capacity	No of Trips (Trucks / Day)
		TPA	TPD			
Hydro-I + Hydro-II {Combined Capacity}						
1.	Zinc (Hydro- I + II) / Zinc Alloys and its Compounds*	126000	345.2	100 %	Truck / 35 Tonnes	10
2.	Zinc Sulphate (By Product)	4800	14.54	100%	Truck / 35 Tonnes	1
Total						11

Table - 4.15

**Additional Outwards Traffic Details**  
**Minor Metal Unit**

S. No.	Name of Raw Materials	Quantity		% of transportation	Type of vehicle and Capacity	No of Trips (Trucks / Day)
		TPA	TPD			
1.	Lead Bullion/Lead Cake/Low Grade Lead / Lead Silver Cake (on Equivalent metal basis)	8736	23.934	100 %	Truck / 35 Tonnes	1

S. No.	Name of Raw Materials	Quantity		% of transportation	Type of vehicle and Capacity	No of Trips (Trucks / Day)
		TPA	TPD			
2.	CUSO <sub>4</sub> Solution/ Copper Slag /Copper Cement /Copper Compounds (on Equivalent metal basis)	1460	4	100 %	Truck / 35 Tonnes	1
3.	Zn So <sub>4</sub> Solution (on Equivalent metal basis)	2780	7.61	100 %	Truck / 35 Tonnes	1
4.	Cadmium Sponge/Cadmium Sponge filter cake/ /Cadmium Ingot /Cadmium (on Equivalent metal basis)	2470	6.767	100 %	Truck / 35 Tonnes	1
5.	Cobalt Cake/Cobalt Compounds/Cobalt Filter Cake (on Equivalent metal basis)	50	0.13	100%	Truck / 35 Tonnes	1
6.	Ni cake / Ni Compounds (on Equivalent basis)	30	0.082	100 %	Truck / 35 Tonnes	1
7.	Copper Matte/ Residue /Copper Cement (on Equivalent metal basis)	960	2.63	100 %	Truck / 35 Tonnes	1
8.	Cadmium Alkali Slag/Cadmium Slag (on Equivalent metal basis)	450	1.23	100%	Truck / 35 Tonnes	1
9.	Lead Rich Dust from Bag House	300	0.821	100 %	Truck / 35 Tonnes	1
	<b>Total</b>					<b>09</b>

Table - 4.16

**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 / Day)
1.	Non-ferrous Sludge from ETP and scrubbers (MTPA)	16400	100 %	Truck / 35 Tonnes	2
2.	ISF Slag (MTPA)	28699	100 %	Truck / 35 Tonnes	3
3.	Fly ash (MTPA)	324188	100%	Truck / 35 Tonnes	29
4.	Bottom Ash (MTPA)	45543	100 %	Truck / 35 Tonnes	4
5.	Gypsum (MTPA) {FGD}	1,20,000	100 %	Truck / 35 Tonnes	11
	<b>Total</b>				<b>49</b>

\*Considering 100% by Road to Calculate Maximum Pollution Load with 365 working days

- Total No. of trucks / tankers per day (inward) = 34 (Pyro & Ausmelt) + 25 (Hydro I & II) + 9 (minor metal recovery unit)
- Total No. of trucks / tankers per day (outward) = 23 (Pyro) + 11 (Hydro I & II) + 9 (minor metal recovery unit) + 49 (Solid & Hazardous Waste)

- Total No. of trucks / tankers per day = 160
- Increase in PCU / day =  $160 \times 3.7 = 592$

**Modified Traffic Scenario and LOS (Level of Service)**

S. No.	Road	Increased PCU / hr.	V (Volume in CU/hr.)	C (Capacity in PCU/hr.)	Existing V/C Ratio	LOS
1.	Approach road to NH – 79	$592 / 24 = 24.67$	$938.2979 + 24.67 = 692.9679$	5400	0.178	<b>A</b>

**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 “Excellent” for approach road to NH - 79. 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 Element	Evaluation	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.
- 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 leveling phase will be generated such as waste vegetation, surface soil, shrubs, stumps and rubbish from site due to leveling which this 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 leveling.
- 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

- After the expansion, total Municipal solid waste generated from Plant is about 1 ton/day.
- Additional quantity of HW to be generated due to the expansion, include: Non-ferrous ETP & scrubbers Sludge[16400TPA], De Fluorination Cake [2000TPA] & ISF Dross [10000TPA].

##### ⌘ 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
			✓	

### 8 Mitigative Measures

- The organic waste is being treated at existing Organic Waste Converter (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.
- Additional quantity of HW to be generated due to the expansion, include: Non-ferrous ETP& scrubbers Sludge[16400TPA] to be reused/recycled/sold to registered recycler/Disposed in SLF/Co-processing in Cement plant, De-Fluorination Cake [2000TPA] to be disposed in SLF, ISF Dross [10000TPA] to be sold to registered recycler/disposed to SLF.
- Used Lead acid batteries (~18000 TPA) generated from the complex will be stored at designated area & will be disposed off / sold to registered vendors as per Battery Waste Management Rules, 2020.

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. 4.17.

**Table - 4.17**  
**Details of Solid and Hazardous Waste Generation and their mitigation**

S. No.	Type of Waste Quantity (Unit)	Cat. Code	Granted Quantity/ Latest EC	Additional	Total after Expansion	Method of Treatment and Disposal
1.	Cooler cake (MTPA)	7.2	6,000	NIL	6,000	Reuse/Recycle/Sale to registered recycler/Co-processing/ Disposal in SLF
2.	Anode mud (MTPA)	7.2	2,200	NIL	2,200	Reuse/Recycle/Sale to registered recycler /Disposed in SLF
3.	Used/Spent oil (KLA)	5.1	96	NIL	96	Reuse/ Sale to

S. No.	Type of Waste Quantity (Unit)	Cat. Code	Granted Quantity/ Latest EC	Additional	Total after Expansion	Method of Treatment and Disposal
						registered recycler
4.	Waste oil (KLA)	5.2	270	NIL	270	Reuse/Sale to registered recycler
5.	Cobalt cake (MTPA)	7.2	1,000	NIL	1,000	Reuse/Recycle/Sale to registered recycler /Disposed in SLF
6.	Purification cake / Enrichment cake (MTPA)	7.2	12,520	NIL	12,520	Reuse/Recycle/Sale to registered recycler /Disposed in SLF
7.	Spent catalyst (KL)	17.2	60	0	60	Sale to registered recycler/dispersed in SLF
8.	Non-ferrous Sludge from ETP and scrubbers (MTPA)	7.4	13,600	16400 *	30000	Reuse/Recycle/Sale to registered recycler /Disposed in SLF/Co processing in Cement industries
9.	Discarded containers/barrels/liners used for Haz. Waste/chemicals (Nos./yr)	33.1	1,400	NIL	1,400	Reuse/Recycle/Sale to registered recycler /Disposed in SLF
10.	Flue gas cleaning residue (MTPA)	37.2	2.0	NIL	2.0	Reuse/Recycle/Sale to registered recycler /Disposed in SLF
11.	Spent ion exchange resin containing toxic metal (MTPA)	35.2	1.0	NIL	1.0	Sale to registered recycler/dispersed in secure land fill
12.	Water purification Resin (MTPA)	34.2	2.0	NIL	2.0	Sale to registered recycler/dispersed in secure land fill
13.	Exhaust Air or Gas Cleaning Residue (Kg/Year)	35.1	100	NIL	100	Approved Incinerator
14.	Copper Bearing Lead Residue / Process Residue (MTPA)	7.2	11000	NIL	11000	Sale to registered recycler /Disposed in SLF
15.	HGP Dust/HGP Cake (MTPA)	7.2	7500	NIL	7500	Sale to registered recycler
16.	Filter and Filter material which contain organic compound (MTPA)		100	NIL	100	Sale to registered recycler/dispersed to secure land fill/approved Incinerator
17.	OilSoaked Jute/cotton waste/Used PPE's		10.0	NIL	10.0	Sale to registered recycler/dispersed to secure land fill/approved

S. No.	Type of Waste Quantity (Unit)	Cat. Code	Granted Quantity/ Latest EC	Additional	Total after Expansion	Method of Treatment and Disposal
						incinerator
18.	MEE Salt (MTPA)	HW	5,000	NIL	5,000	Recovery of Glauber Salt/ Disposal in SLF
19.	Process Residues and wastes / Geothite Cake/ (MTPA)	HW	11471	NIL	11471	Captive SLF/Co processing/Sales to registered recyclers
20.	De Fluorination Cake (MT)	HW	NIL	2000	2000	Disposal in SLF
21.	ISF Dross (MTPA)	HW	-	10000	10000	Sale to registered recycler/disposed to secure land fill
22.	Lead Acid Battery Plates and other lead scarp /ashes/residues not covered under Battery Management and handling rules 2001 (TPA)	HW	18000	NIL	18000	Recycling /reprocessing
23.	Ausmelt Slag (MTPA)	Non Haz	26000	-	26000	Reuse in process
24.	Fly ash (MTPA)	Non Haz	180312	276933	457245	100% in cement
25.	Bottom Ash (MTPA)	Non Haz	80657	124772	205429	Cement & bricks manufacturing
26.	Gypsum (MTPA) {FGD}	Non Haz	-	120000	120000	Utilization in Cement and other Industries.
27.	Slag (Fumer)	Non Haz	150000	NIL	150000	Utilization in Cement and other Industries
28.	Jarosite Cake (MTPA) (Hydro Plant)	Non HAZ	306000	81000	387000 [81000 To be used in Fumer]	Utilization in Cement Manufacturing / Road / Rail embankment / Concrete construction / disposal in Lined Jarofix yard
29.	ISF Slag (MTPA)	Non Haz	85000	55000	140000	Cement /highway /reuse in process
30.	Zn Dross	HW	0	12000	12000	Recycling /reprocessing

#### 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 shall be checked to acceptable levels. In this project activity use of latest technology, appropriate pollution control equipment, proper operation and densification and maintenance of greenbelt development (~37.21 % of the total plant area) helps/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 is using one of the best and proven technologies for the existing Chanderiya Lead Zinc Smelter Complex. Unit wise details are given as under:

1. Pyro Metallurgical Smelter (1, 05,000 TPA Zinc and 35,000 TPA Lead): Pyro-metallurgical plant is based on Imperial smelting process. This Process enables simultaneous production of zinc and lead metals. The main sections for this process route are Sinter, Imperial Smelting Furnace (ISF) and Refineries
2. Ausmelt Lead Smelter (60,000 TPA): Ausmelt technology is one of the direct smelting technologies which has been applied to commercial production of a broad spectrum of non-ferrous and precious metals and the high temperature treatment of various waste materials. The essence of the Ausmelt Technology system is a vertical lance submerged in a molten slag bath.
3. Hydro Metallurgical Zinc Smelter (5,04,000 TPA): Hydro metallurgical zinc extraction process employs roast leach electro-winning technology.
4. Captive Power Plants having 254 MW capacity (2 x 77 MW and 1 x 100 MW): In captive Power Plant, power generates by the utilization of thermal energy of steam in turbine that in turn rotates an alternator.
5. Waste heat recovery of 34.7 MW: 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.
6. 8 Emergency DG sets with total capacity of 38.34 MW.

The following updation in the existing process technology have been proposed for the proposed expansion project:

1. **Change of Product Mix in Pyro Plant on total metal basis: 140,000 TPA (Refined Lead or Refined Zinc or Product Mix of both Metal):** At present CLZS is having a capacity of refining 95 KTPA of lead. HZL needs to increase this capacity to 200 KTPA at CZLS due to increase its lead bullion production capacity as the ISF plant will be operated at different product mix mode as per availability of lead & zinc concentrate. Enhancement of refinery will be accomplished by installing 7 new kettles in the existing Lead Refinery plant along with two EOT cranes. Furthermore one Lead Electro-refining Plant (LEP) will be installed with a capacity to produce 100 KTPA refined lead



from it. This new proposed LEP plant will be comprising of lead kettles for its copper removal section and a series of electrolytic cells for electrolysis process.

2. **Expansion in melting capacity section of existing Hydro Zn Smelter:** By adding 1 induction furnace (24TPH) and 1 slab casting line (175000 MTPA) thereby increasing existing capacity from 504000 MTPA to 630000 MTPA.
3. **Integration of RZO {Raw Zinc Oxide} Unit:** In the Proposed RZO unit, RZO will be treated using leaching process wherein Zinc will be converted to Zinc Sulphate Solution and Lead will remain in the unleached cake. The complete RZO Conversion Process will be integrated in the Leaching Plant leveraging some inherent additional capacity to treat this material and some additional equipment like reactors and filter presses will also be added.
4. **Turbine Modification in the existing CPP (2x 77 MW to 2 x 95 MW):** The Capacity addition is being achieved by modifying the steam flow path by modifying the blade profiles and clearance between the static and rotary blade, the major components which will be replaced/ modified are Complete Rotor Assembly, Inner Casing Assembly including stationary blades, Guide Blade Carrier Assemblies including stationary blades, Labyrinths seals for rotor and stationary blades, Front, rear & Balance piston glands.
5. **Boiler Expansion and Back Pressure Turbine Generator:** Boiler expansion is proposed to increase the steam flow of each boiler to maximum of 360TPH, the required modification for increase the boiler capacity are burner block modification, SOFA arrangement, Addition of Final SH coil, addition of platen SH coils and modification in Bank tubes. Along with the control dampers and its drives. This will increase the capacity of the boiler by 10%. This does not require any extra area, as the modification shall be done in the existing boiler. The Boiler modification is technically proposed by Boiler OEM licensee.  
  
The Steam required for the Fertilizer is 60 TPH which will be supplied by the boiler after its modification as proposed above will be made go through the back-pressure turbine so that the high-pressure steam is used to produce power of 6MW before leaving to Fertilizer unit as required. This BPTG requires a new installation of Back Pressure Turbine Generator (BPTG) near the existing Boiler along with the TG building. This Installation requires construction of TG Building infrastructure.
6. **Minor Metal Recovery Unit:** Various metals will be recovered from various processes of the CLZS complex like Copper, Cadmium, Cobalt and Nickel by reducing overall waste generation in the complex to increase the efficiency of the system.

### 5.3 ANALYSIS OF SITE

The proposed expansion project will be carried out within the existing Chanderiya Lead Zinc Smelter Complex at Villages: Putholi, Ajoliya K aKhera & Biliya, Tehsil: Gangrar and Chittorgarh, District: Chittorgarh (Rajasthan). No additional land will be required for the same. Hence, no alternative site has been taken into consideration for the proposed expansion activity.



**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<sub>2</sub>, NO<sub>2</sub> measurement
5. Sound Level Meter
6. Water Level Indicator
7. Online continuous emission monitoring devices (CEMS, CAAQMS, CEQMS)

**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 are 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 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 - 6.1**  
**Post-Project Monitoring**

S. No.	Description	Frequency of monitoring	Monitoring Locations
1.	Meteorological data	Hourly	Plant Site
2.	Ambient Air Quality Monitoring	Quarterly	<b>Plant site</b> Near CISF Colony C1, Near Loco Shed C2, Near Slag Gate, Near DM Plant <b>Outside Plant Areas</b> Putholi, Munga Ka Khera, Nagari, Biliya, Ajoliya Ka Khera, Anwathera, Zinc Nagar
		Continuous by using CAAQMS	No.1 Near C1 Office No.2 DM Plant CPP No.3 Chittorgarh Fort No.4 Pond No.1 (New Station) No.5 Loco Shed
3.	Fugitive emissions	Quarterly	
1.	Stack Monitoring	Quarterly	As per CTO and EC
		Continuous by using CEMS	As per CTO and EC
2.	Water Quality & Level Monitoring	Quarterly	Bearach River Up Stream Bearach River Down Stream 18 Piezometric well.
3.	Waste water	Quarterly	ETP- Outlet Hydro-2, ETP- Outlet Pyro
		Continuous monitoring using online monitoring system	
4.	Noise Level Monitoring	Half yearly	Near Loco Shade C2 Near Slag Gate Near DM Plant Near CISF Colony C1
5.	Soil Quality Monitoring	Half yearly	
6.	Medical check-up of the employees	<ul style="list-style-type: none"> <li>• Preplacement</li> <li>• Periodic</li> </ul> <p>Once in 3 years for age &gt; 45 years Once in 5 year for age ≤ 45 years</p>	At Zinc Nagar Hospital
7.	Energy Audit	Once in three years	At Plant site
8.	Environment Audit	Once in three years	At Plant Site
9.	Performance	Once at the time of installation	At Plant site (for new Installation)

S. No.	Description	Frequency of monitoring	Monitoring Locations
	Guaranty Tests for Pollution Control Devise System	and at the time of repair / maintenance	
Note: The monitoring locations suggested will be subject to change as per conditions stipulated in EC & CTO issued for the expansion project.			

**CEMS, CAAQMS & EQMS**

As per the circular issued by CPCB vide letter no B-29016/04/06/PCI-II dated 23<sup>rd</sup> 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 complex for continuous monitoring of ambient air quality and effluent parameters, respectively and data is transmitted to SPCB/CPCB server on continuous basis.

22 no. of CEMS (Continuous Emission Monitoring System), 2 no. of EQMS and 1 FDD are already installed in CLZS Plant. The same will suffice for the proposed expansion project.

**6.3 METHODOLOGY ADOPTED**

Post project monitoring will be carried out as per conditions stipulated in Environmental Clearance Letter issued by MoEF&CC, New Delhi; Consent issued by RSPCB as well as according to CPCB guidelines.

Details of the experimental procedures followed for sample analysis are given below:

**Table - 6.2**  
**Standardized test procedures**

Attributes	Measurement method	Test procedure
<b>A. Meteorological data</b>		
(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>B. Ambient air environment</b>		
PM10 & PM2.5	Gravimetric method	As per CPCB guidelines
SO <sub>2</sub>	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 <sub>2</sub>	Modified Jacob & Hochheiser (Na-Arsenite)	Absorption in dil NaOH and then estimated colorimetrically with sulphanilamide and N (1-Nephthyl) Ethylene diamine Dihydrochloride and

Attributes	Measurement method	Test procedure
		Hydrogen Peroxide (CPCB Method).
Hg	Using GFAAS Method	EPA Filter paper digestion after filter extraction Analyze using GFAAS (atomic absorption spectroscopy) for metal concentration
Acid Mist	EPA Method 8 A	Absorption in 3 % H <sub>2</sub> O <sub>2</sub> hydrogen peroxide into each of the first two impingers. Pour 100 mL of distilled deionized Followed by titrate with Berium perchlorate using thorin indicator for end point
<b>C. Stack monitoring</b>		
PM	Gravimetric method	As per CPCB guidelines
SO <sub>2</sub>	As Per IS-11255 part (2) 1985 (Absorbing Solution of H <sub>2</sub> O <sub>2</sub> , Isopropanol Reagent)	Absorption in H <sub>2</sub> O <sub>2</sub> , Isopropanol followed by Colorimetric estimation using Sulphuric acid and Barium Chloride as Per IS-11255 part (2) 1985
NO <sub>2</sub>	As Per IS-11255 part (7) 2005 with NO <sub>x</sub> flask assembly.	Absorption of Sample in NO <sub>x</sub> flask assembly Followed by Colorimetric estimation using Phenol-di-sulphonic acid and other reagent as Per IS-11255 part (7) 2005
Hg and its Compounds	US EPA Method - 29:2017	Absorption in 5%HNO <sub>3</sub> +10%H <sub>2</sub> O <sub>2</sub> followed by digestion on hotplate after extraction Analyze using GFAAS (atomic absorption spectroscopy) for metal concentration
Acid Mist	USEPA Method 8, March-2017	Absorption in 80%IPA and 3%H <sub>2</sub> O <sub>2</sub> Followed by titrate with Berium perchlorate using thorin indicator for end point
Pb	US EPA Method - 29:2017	Absorption in 5%HNO <sub>3</sub> +10%H <sub>2</sub> O <sub>2</sub> followed by digestion on hotplate after extraction analyze using GFAAS (atomic absorption spectroscopy) for concentration
<b>D. Fugitive emission</b>		
PM	Gravimetric method	As per CPCB guidelines
<b>E. Water environment</b>		
<b>Ground Water</b> 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.
<b>Surface Water</b> pH, Turbidity, Colour, Odour, Taste, TDS, Total Hardness, Calcium hardness, Magnesium	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

Attributes	Measurement method	Test procedure
hardness, Chloride, Fluoride, Sulphate, Nitrates, Alkalinity, Iron, Copper, Manganese		wastewater analysis published by American Public Health Association.
<b>Waste Water</b> pH, TSS, Oil & Grease, Total Residual Chlorine, Ammonical Nitrogen, BOD, COD, Nitrate (as NO <sub>3</sub> ), Pb, Cd, Cu, Zn, Ni, CN, F, P, and S.	Potentiometric, Gravimetric, Titrimetric, Photometric as well as Atomic absorption techniques are used for given parameters.	Samples for water quality should be collected and analyzed as per: IS: 3025 (Part-1) and Standard methods for examination of water and wastewater analysis published by American Public Health Association.
<b>F. Noise monitoring (Ambient and Work Zone)</b>		
Noise levels at Day & night time - Leq dB (A)	IS: 4954-1968 as adopted by CPCB.	As per CPCB guidelines
<b>G. Soil Environment</b>		
PH, Soil Texture, Calcium, Sodium, Potassium, Zinc, Manganese, Phosphorus, 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
<b>H. Occupational Health</b>		
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

#### 6.4 DATA ANALYSIS

Monitoring data analysis will be done by MoEF&CC approved laboratory as per CPCB guidelines & timely submitted to concerned authority (specified in Environment Clearance Letter issued by MoEF&CC, New Delhi and Consent issued by RSPCB) on regular basis.

#### 6.5 REPORTING SCHEDULE

Environmental Monitoring Program is being/will be conducted for various environmental components as per the conditions stipulated in Environment Clearance Letter issued by MoEF&CC, New Delhi & Consent to Establish / Consent to Operate issued by RSPCB.

Six monthly compliance reports are being/will be submitted on regular basis to RO, MoEF&CC, Lucknow by 1<sup>st</sup> of June and 1<sup>st</sup> of December. Quarterly compliance Report for conditions stipulated in CTO/CTE is being/will be submitted to RSPCB on regular basis. The environmental and social audit reports will be communicated to the top management for their information and further corrective measures will be taken, if required.



## 6.6 EMERGENCY PROCEDURES

Company has adopted emergency procedures for Environmental Monitoring as mentioned below:

### ***Planned Preventive Maintenance***

Maintenance programmes has been established at the facility for the following equipment systems

- Process equipment
- Environmental process equipment
- Continuous monitors
- Laboratory equipment
- Sampling equipment

### ***Procedure***

- Routine round the clock maintenance programme for plant equipment
- 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.

## 6.7 DETAILED BUDGET

The budget proposed for Post project environmental monitoring for this this expansion Project is Rs. 20 lacs/-



## CHAPTER - 7

### ADDITIONAL STUDIES

#### 7.1 INTRODUCTION

As per EIA Notification dated 14<sup>th</sup> Sept. 2006, and its subsequent amendments; in reference to the Terms of Reference (ToR) issued by MoEFCC, New Delhi vide letter no.J-11011/279/2006-IA.II(I) dated 27<sup>th</sup> September, 2021 for carrying out the Environmental Impact Assessment (EIA) study for “Expansion within the existing Chanderiya Lead Zinc Smelter Complex ” by Hindustan Zinc Limited.

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

Public Hearing for “Expansion within the existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Smelter Unit by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II , Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 Back Pressure Turbine Generator, Recovery of Minor Metals & Installation of 5 DG Sets] At Villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan)” by Hindustan Zinc Limited was conducted on 20<sup>th</sup> July, 2022 (at 11:00 am) at Govt. Senior Secondary School, Ajoliya ka khera, Chittorgarh (Raj.).

Details of the Public Hearing Proceedings are appended herewith the Final EIA/EMP Report:

- ✓ Public Hearing Proceedings
- ✓ Public Hearing Notice published in Newspapers dated 15<sup>th</sup> June, 2022.
- ✓ Photographs of Public Hearing
- ✓ Action Plan for the issues raised during Public Hearing

##### 7.2.1 Public Hearing Proceedings

Public Hearing Proceedings along with attendance sheet have been appended with the Form 1 (Part c) uploaded on the Parivesh Portal.

##### 7.2.2 Public Hearing Notice published in Newspapers:

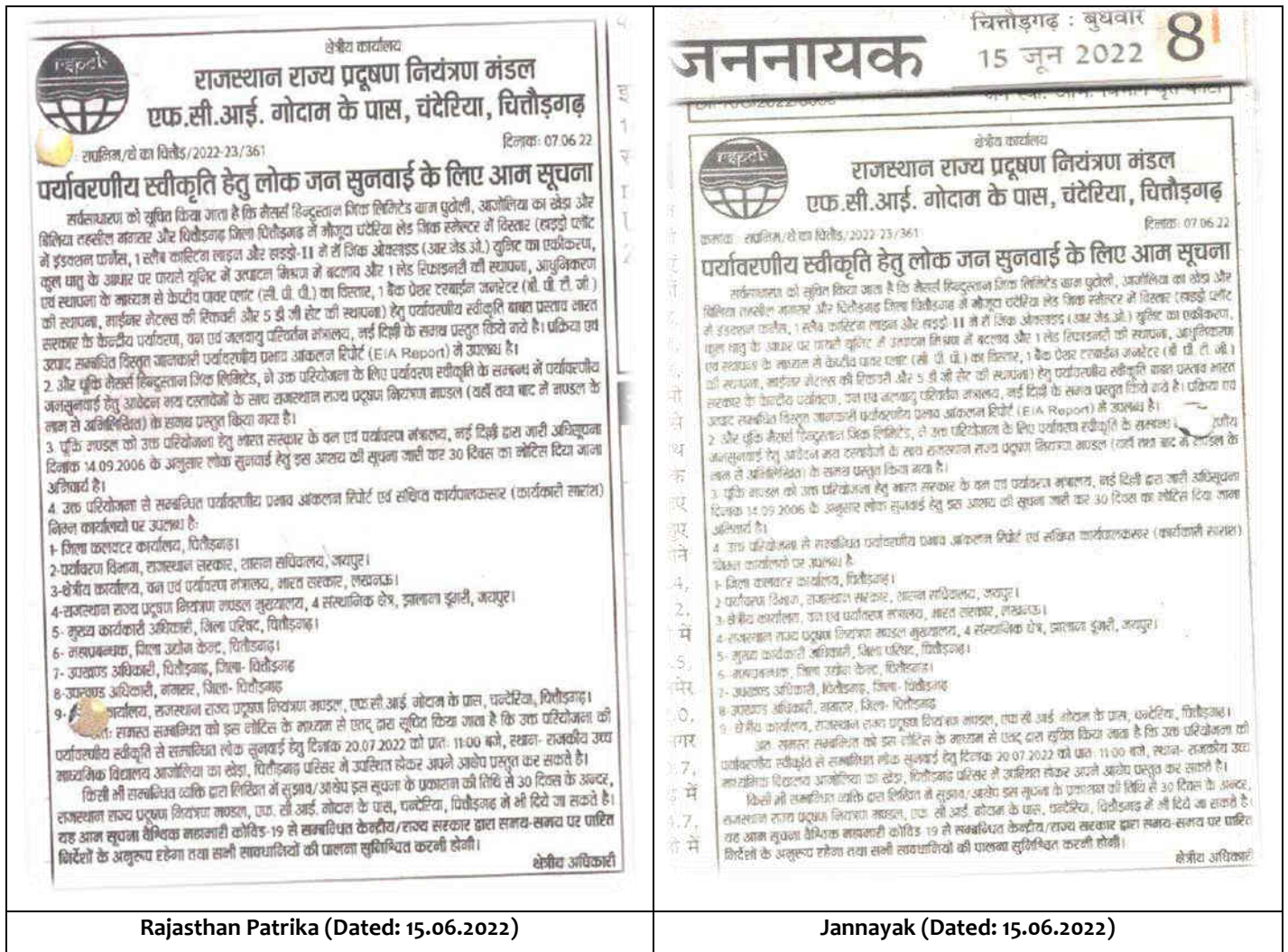


Figure 7.1(a) Public Hearing Notice published in Newspapers

## 7.2.3 Photographs of Public Hearing







Figure 7.1(b) Public Hearing Photographs

### 7.2.3 Action Plan for the issues raised during Public Hearing

Issues / Points / Opinions of Local Public raised during the Public hearing conducted for Expansion within the existing Chanderiya Lead Zinc Smelter Complex at Villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan) of Hindustan Zinc Limited along with action plan including Budgetary Allocation are given below:

**Table.7.1(a)**  
**Issues / Points / Opinions of Local Public raised verbally during the Public Hearing**

S. No.	Name of the Person	Issues / Points / Opinions of Local Public	Reply by Project Proponent	Action Plan along with Budgetary Allocation
<b>A. Employment</b>				
1.	I. Shri Jagdish Chandra Jat, Sarpanch of Gram Panchayat, Ajoliya Ka Khera II. Shri Mithulal Lodha, Village Billia III. Shri Parmeswarlal Jat, resident of Ajoliya ka Khera IV. Shri Amit Tiwari, Village Ajoliya ka Khera V. Shri Rajendra Kumar Keer, Resident of Nagri: VI. Shri Ravindra Singh Ranawat (Principal) Village Chogavadi	a) Employment should be provided to unemployed youth (between 20-30 years) according to their qualification. b) HZL should provide in written for Employment to Ajoliya ka Khera and Putholi. c) Unemployed youth of the area should be provided employment d) Zinc Administration should provide in written assurance that 50% employment will be given to the unemployed people of Gangrar area as per their eligibility. e) Many people of our village are unemployed	<ul style="list-style-type: none"> <li>Employment has been provided to the local people according to their qualification and company policy. 4500 personnel are from Rajasthan and about 3500 of them are residents of Chittorgarh and its surrounding area.</li> <li>The company is committed to provide preference in employment to the local unemployed based on their qualification, and the company's policy.</li> </ul>	<ul style="list-style-type: none"> <li>The total manpower requirement for the proposed project is 360 people, and they will be sourced locally.</li> <li>Apart from direct employment, indirect employment due to the Plant is also envisaged by the way of transportation, workshops, petty contractors and shopkeepers, network of retailers throughout the state and in its marketing regions.</li> </ul>
2.	Shri DevkishanJat, Former Deputy Sarpanch, Gram Panchayat Ajoliya ka Khera	a) Employment opportunities should be provided to locals. b) Their agricultural land is getting spoiled and other people are getting employment due to political influence c) 80% of the agricultural land of the farmers of Khera of Ajoliya has been acquired by Hindustan Zinc, but employment has not been given in that proportion. d) There should be complete transparency in employment as to which people are being	<ul style="list-style-type: none"> <li>The company is committed to provide preference in employment to the local unemployed based on their qualification, and the Company's policy.</li> <li>The Company, through its Corporate Social Responsibility initiatives, currently operates a skill training center, Zinc Kaushal. It trains students in courses such as BFSI, Front desk associates, assistant electrician, automobiles sales executive etc. Till date more than 400 students have been trained and 60% have already been placed. We</li> </ul>	

S. No.	Name of the Person	Issues / Points / Opinions of Local Public	Reply by Project Proponent	Action Plan along with Budgetary Allocation
		<p>given employment, how many persons are being skilled and how many unskilled.</p> <p>e) 30% labor should be reserved for Ajoliya Ka Khera.</p> <p>f) Those whose land is getting degraded should be given employment with 30% reservation.</p>	propose to train at least 200 students each year for capacity building.	
3.	Shri Mahipal Singh Shaktawat, Sarpanch, Gram Panchayat Putholi	<p>a) Employment should be provided to the people of Ajoliya ka Khera and Putholi on priority basis. Because the people of this area neither have enough land for farming nor have employment, so what should they do?</p> <p>b) The expansion of this Zinc which is being done should give employment to at least 200 skilled and unskilled local people.</p> <p>c) The people of these two villages are suffering more. Because as of first, their land has gone and second, they are not even getting the employment.</p>	<ul style="list-style-type: none"> <li>Preference has been and will be given to local residents based on their qualification, company requirement and policy.</li> <li>The Company, through its Corporate Social Responsibility initiatives, currently operates a skill training center, Zinc Kaushal. It trains students in courses such as BFSI, Front desk associates, assistant electrician, automobiles sales executive etc. Till date more than 400 students have been trained and 60% have already been placed. We propose to train at least 200 students each year for capacity building.</li> </ul>	
4.	Shri Suresh Luhar, Village Ajoliya ka Khera	<p>a) Provide employment to the unemployed. We want assurance in writing by giving 10 days' time to the Zinc administration that before the expansion of the Hindustan Zinc plant, 50 people of our village should be given employment and only after that the expansion of the plant to be done.</p>	<ul style="list-style-type: none"> <li>Preference has been and will be given to local residents based on their qualification, company requirement and policy.</li> </ul>	



S. No.	Name of the Person	Issues / Points / Opinions of Local Public	Reply by Project Proponent	Action Plan along with Budgetary Allocation
5.	Shri Raju Lal Kumawat, Village Anvalheda	a) 2-3 people of our village were employed now but they were fired back after working for 2-3 months. Every time people are imposed by them for 2-3 months and later they are thrown back due to which people are dissatisfied and then they are ready to agitate.	<ul style="list-style-type: none"> <li>We ensure to give employment to the local residents based on their qualification, company requirement and policy.</li> <li>Apart from regular employment there are many capex and one-time job/ short duration job opportunities for which the local residents are preferred and hired as on when required.</li> </ul>	
6.	Shri Gopal Lal Gadri (Sarpanch), Gram Panchayat Suwaniya	a) When people of other country and states are getting employment here, then why are local people not being given employment.	<ul style="list-style-type: none"> <li>Preference has been and will be given to the local residents based on their qualification, company requirement and policy.</li> </ul>	-
7.	Shri Radheshyam Vaishnav, Village Putholi	a) He said that for all the contractors working in Hindustan Zinc Ltd., the norms of turnover of Rs.5.00 crores have been fixed that work will be given only after such turnover, otherwise not, which should be terminated. Local people should get employment.	<ul style="list-style-type: none"> <li>As per company policy, vendors/ contractors having turnover of more than INR 5 crores are engaged, but nevertheless down the line contractors/ sub-contractors are engaged from the local areas itself.</li> </ul>	-
8.	Shri Parmeswarlal Jat, resident of Ajoliya ka Khera	a) Hindustan Zinc Administration should give in writing to the people of village Ajoliya Ka Khera and village Putholi that, the unemployed here would be given employment	<ul style="list-style-type: none"> <li>Preference has been and will be given to the local residents based on their qualification, company requirement and policy.</li> </ul>	-
9.	Shri Amit Tiwari, Village Ajoliya kaKhera:	a) If our unemployed youth will get employment, then we are ready to walk shoulder to shoulder with the Zinc administration. No matter how many plants you plant or expand, we have no objection, but since our village is located	<ul style="list-style-type: none"> <li>Preference has been and will be given to the local residents based on their qualification, company requirement and policy.</li> </ul>	-

S. No.	Name of the Person	Issues / Points / Opinions of Local Public	Reply by Project Proponent	Action Plan along with Budgetary Allocation
		very close to Hindustan Zinc, we have more rights to get employment in it.		
10.	Smt. Nutan Kanwar, Village Putholi	a) Women should also get proper employment opportunities.	<ul style="list-style-type: none"> <li>As per the Company's policy, women will be given equal opportunity in employment.</li> <li>The Company proactively promotes diversity at workplace.</li> <li>Employment will be given based on the candidate's qualification, the Company's requirement, and policy.</li> </ul>	-
11.	Shri Bhagwan Lal Jat, resident of village Ajoliya Ka Khera	a) I myself worked in Hindustan Zinc for 30 years, raised a lot of iron but they threw me and many other people with me out without giving gratuity. We should have given at least some amount of gratuity	<ul style="list-style-type: none"> <li>There is a proper mechanism in place to ensure resolution of genuine grievances, if any.</li> <li>The company representative will connect with the concerned person and take measures for resolution of the same, if found genuine. HZL also have a internal and external grievance committee wherein person can connect and resolve issues. Committee information is available on notice board at Main gate of company and SOP is in place for same.</li> </ul>	-
<b>B.</b>	<b>Education, Sports and Skill Development</b>			
1.	Shri Jagdishchandra Jat, Sarpanch of Gram Panchayat, Ajoliya Ka Khera:	a) All the schools of Gram Panchayat area should be upgraded to model schools and few buildings are lying incomplete in many schools, which should be completed	<ul style="list-style-type: none"> <li>HZL has been and continues to work for upliftment of the standard of living of the local community by undertaking various initiatives through its Corporate Social Responsibility programs.</li> <li>HZL will further analyze the feasibility of the same and accordingly expand the scope of educational related initiatives for the local community.</li> <li>Under the Company's Corporate Social Responsibility initiatives, development in</li> </ul>	HZL will spent Rs 1.0 crore for schools renovation in nearby villages in next five years under socio economic development. The same has been incorporated in Chapter 8, Section 8.4 of this EIA/EMP Report.
2.	Shri Shyamlal Menaria, resident of village Suwaniya	a) There is a shortage of staff in the school, which should be fulfilled by expanding the scope of the Unchi Udaan Yojna, the educated students of the area should be		

S. No.	Name of the Person	Issues / Points / Opinions of Local Public	Reply by Project Proponent	Action Plan along with Budgetary Allocation
		<p>given coaching for competitive examinations like IAS, IPS, RAS, RPS etc.</p> <p>b) Instead of showing data good work should be done on ground level under Anganwadi, Khushi and Sakhi Pariyojnas.</p>	infrastructure of school has been and will be done as and when the need arises.	
3.	Shri Happy Singh Chundawat, Deputy Sarpanch, Resident of Nagri	<p>a) The youth power of our village, which is going in wrong direction, an open Defense Academy should be open to bring them on right path.</p> <p>b) Zinc administration should provide employment to the ITI, B.Tech, Polytechnic, graduate passed students of the area.</p> <p>c) Zinc administration should open a gym in our village and a playground should be developed 28 students of our village have played in hockey at national level, who should be given employment and appointment of coach should be made in the village for hockey.</p>	<ul style="list-style-type: none"> <li>The Company, through its Corporate Social Responsibility initiatives, currently operates a skill training center, Zinc Kaushal. It trains students in courses such as BFSI, Front desk associates, assistant electrician, automobiles sales executive etc. Till date more than 400 students have been trained and 60% have already been placed. We propose to train at least 200 students each year for capacity building.</li> <li>An open gym has been installed in Sr. Secondary school, Nagri, post the Public Hearing.</li> <li>In FY'23 company has supported state level badminton, state level athletic, state level kabaddi tournament etc. benefitting more than 5000 athletes/ sports enthusiasts. Last FY we have provided hockey kits in nearby panchayat. We support through sports kits and event management in many such sports tournaments</li> </ul>	-
4.	Shri Mahipal Singh Shaktawat, Sarpanch, Gram Panchayat Putholi	a) HZL should give admission to the children of the local community in Zinc's school and motivate them for good education.	<ul style="list-style-type: none"> <li>The Hind Zinc school is open for admission to students from the local community as well.</li> </ul>	-

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5.	Shri Raju Lal Kumawat, Village Anvalheda	a) Develop a track in their village on 5 Bigha land for running, so students can prepare for various examination (Army, etc.)	<ul style="list-style-type: none"> <li>HZL has always promoted sports and culture in local areas, and in alignment with the same, a running track has already been developed in Segwa. HZL will explore the feasibility of this request, basis which a running track in anvalheda may be developed in partnership with the local government body.</li> </ul>	-
<b>C. Healthcare Facilities:</b>				
1.	Shri Shyamlal Menaria, resident of village Suwaniya	a) Trauma Center should be developed in Sanwariyaji as district hospital so that serious patient need not be referred to Udaipur. b) Only one ANM is working in the village, so a doctor should be appointed in the village.	<ul style="list-style-type: none"> <li>Chittorgarh have trauma center in district Hospital and all major Facilities available at very minimal cost.</li> <li>Medical Facilities are already being provided to the nearby villages through the Swasthya seva mobile health Van service, as part of our Corporate Social Responsibility program.</li> <li>Recently, in FY 2021-22, hi tech medical equipment such as E.C.G. machine, multi para cardiac monitors, ventilator, defibrillator, CSC machine etc. was provided to Gangrar CHC, Chittorgarh district hospital, to upgrade the services.</li> </ul>	-
<b>D. Animal Husbandry and Veterinary facilities:</b>				
1.	Shri Shyamlal Menaria, resident of village Suwaniya	a) We buy buffaloes / cattle worth one and a half lakh rupees, but the cattle die due to pollution of the fodder and water of the area. Insurance of cattle should be done by the Zinc administration and Surveys should be conducted from time to time for the treatment of sick cattle. b) There is no Veterinary hospital in the village therefore construction of	<ul style="list-style-type: none"> <li>Regular animal health camps are being organized by HZL, in collaboration with government veterinary doctors in local villages.</li> <li>Moreover, a veterinary clinic situated in Biliya is operational since past couple of years and covers nearby villages, including Suwaniya, providing services for animal treatment.</li> </ul>	-

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		Veterinary hospital should be approved and developed.		
2.	Shri Mahipal Singh Shaktawat, Sarpanch, Gram Panchayat Putholi	a) The farmers who do animal husbandry and their milch animals die prematurely, for them the animals should be insured under CSR program, so that the damage caused due to premature deaths of cattles, could be compensated to respective farmer.	<ul style="list-style-type: none"> <li>Although insuring cattle is not directly undertaken by the Company, but through its Samadhan program, a Corporate Social Responsibility initiative, the Company facilitates the district administration for animal insurance and creates awareness among farmers.</li> <li>Regular animal health camps are being organized by HZL, in collaboration with government veterinary doctors in local villages. Since last year more than 3000 Ais (1989 sorted semen Ais) performed, 30 animal health camps organized benefitting 11000+ animals. Company has supported farmers and administration in fighting lumpy through disinfectant spray in villages and medicine kits, benefitting around 19000 animals</li> <li>Moreover, a veterinary clinic situated in Biliya is operational since past couple of years and covers nearby villages, including Suwaniya, providing services for animal treatment.</li> </ul>	
3.	Shri Parmeswarlal Jat, resident of Ajoliya ka Khera	a) Affected people should get proper compensation for Premature death of cattle.		
4.	Shri Raju Lal Kumawat, Village Anvalheda	a) This land has been given to the people of Gaushalas, but they do not pay any attention to it.	<ul style="list-style-type: none"> <li>HZL Under its Corporate Social Responsibility initiatives, the Company will facilitate registration of gaushalas with Animal Husbandry department to get government funding for their operation.</li> </ul>	

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5.	Shri Bhagwan Lal Jat, resident of village Ajoliya Ka Khera	a) Today the cow grazing in our pasture is wandering from street to street, but not a single cowshed has been constructed in the area by Hindustan Zinc. b) We want that the cost of fertilizers and seeds should be given by Hindustan Zinc to the farmers of the area.	<ul style="list-style-type: none"> <li>The agricultural inputs are being provided to the community through the Company's Samadhan program, a Corporate Social Responsibility initiative. The entire project cost is covered by the Company and a minimal input cost is provided by the beneficiary as contribution amount.</li> <li>This practice and program will be continued in order to bring ownership and ensure proper utilization of agri-inputs which are made available to the beneficiaries.</li> </ul>	-
<b>E. Agriculture and Land Related Issues:</b>				
1.	Shri Jagdishchandra Jat, Sarpanch of Gram Panchayat, Ajoliya Ka Khera	a) The people of our gram panchayat area have barren land lying uncultivated on which no cultivation can be done. b) Therefore, this land should be acquired by the Zinc Administration for green belt and proper compensation should be given to the land owner.	<ul style="list-style-type: none"> <li>Additional land may be purchased by the Company, in the future, basis the Company's Expansion, New projects Etc.</li> </ul>	-
2.	Shri Shankarlal Jat, Village Ajoliya ka Khera	a) The land of our village is surrounded on three sides by the Jarofix yard of Hindustan Zinc. The crops of our fields are getting spoiled for the last 7-8 years. There is no or very less yield little is happening, so the zinc administration should think something about this land or crop compensation to the farmers about our land. Compensation should be fixed or one person of the family of the farmers	<ul style="list-style-type: none"> <li>HZL is using mycorrhiza technology for development of Green area on Jarofix Waste dump with TERI as Pilot Project.</li> <li>Rest area of Jarofix completely covered with HDPE liner to avoid fugitive emissions from the yard.</li> </ul>	HZL has allocated Rs. 120.5 Crores as Capital Cost and Rs. 15.14 Crores/annum as Recurring Cost for Environmental Protection Measures. The same has been



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		whose agricultural land is becoming barren, should be provided employment.		incorporated in Chapter 10, Section 10.9 of this EIA/EMP Report.
3.	Shri Ravindra Singh Ranawat (Principal) Village Chogavadi	<p>a) Some of the land in the area has been made fertile by the zinc people, can they make the land adjacent to their plant boundary wall also fertile? If not, then zinc administration should acquire that land and give proper compensation to the affected farmers and employment to one member of each family.</p> <p>b) Zinc administration should provide good quality seeds to every farmer and all other benefits related to agriculture should be given to the farmers.</p>	<ul style="list-style-type: none"> <li>Additional land may be purchased by the Company, in the future, basis the Company's Expansion, New projects Etc.</li> <li>HZL under its "Samadhan program" is continuously working for the development of farmers and animal husbandry. Initiatives such as agriculture package of practice, vegetable cultivation, hi-tech vegetable cultivation, low tunnel, trellis farming, conventional and ultra-high density plantation, artificial insemination (conventional as well as sorted semen) for breed improvement and to produce more female progenies etc., have been undertaken by HZL through its Corporate Social Responsibility initiatives.</li> </ul>	-
4.	Shri Happy Singh Chundawat, Deputy Sarpanch, Resident of Nagri	<p>a) There is one "Swatchh Hari Bhari Sanstha" in our village and city, by which the plants by sanstha planted have become very big but there is lack of support from zinc administration. Therefore, tree guards and saplings should be provided so that our village name can be spread in the state.</p>	<ul style="list-style-type: none"> <li>Since the last Financial Year, approximately 6900 saplings have been distributed in nearby villages through the Company's Corporate Social Responsibility initiatives. More than 700 saplings and more than 200 tree guards have been provided in Nagri panchayat</li> <li>Under its Corporate Social Responsibility Program, HZL will provide tree guards and saplings as and when need arises from the community.</li> </ul>	Company has allocated Rs. 1.0 Crores for Greenbelt Development. The same has been incorporated in Chapter 10, Section 10.9 of this EIA/EMP Report.

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5.	Shri Mahipal Singh Shaktawat, Sarpanch, Gram Panchayat Putholi	<p>a) Plantation is not complete on the land which is attached to the boundary of Hindustan Zinc. Due to which the gas coming out of the plant is ruining the crops. About 750 bighas of land is lying barren in our area, for which permanent solution should be made. The Zinc people had done the contract long ago to acquire this land, but now the Zinc administration has reneged on the contract that they do not need this land. Therefore, the administration should acquire this land and plant trees there and give proper compensation to the land owners.</p> <p>b) Those Gram Panchayats who want to do plantations around Zinc's boundary, they should be given proper cooperation.</p>	<ul style="list-style-type: none"> <li>Green &amp; dense plantation already done along the boundary wall in company premises.</li> <li>The company has established state-of-the-art facilities for pollution control for the existing plant and ensures implementation of the mitigation measures to keep the pollution level within the prescribed norms. The same practice will continue for the proposed expansion project.</li> <li>Additional land may be purchased by the Company, in the future, basis the Company's Expansion, New projects Etc.</li> <li>Company is supporting for plantation activities to nearby community &amp; will continue.</li> </ul>	Company has allocated Rs. 120.5 Crores as Capital Cost and Rs. 15.14 Crores/annum as Recurring Cost for Environmental Protection Measures. The same has been incorporated in Chapter 10, Section 10.9 of this EIA/EMP Report.
6.	Shri Mithulal Lodha, Village Biliya	<p>a) In the "Samadhan Yojana" of zinc administration, all the farmers of the area should be benefitted by considering the entire land.</p>	<ul style="list-style-type: none"> <li>Samadhan program reaches the farmers through various interventions such as POP, vegetable, wadi, artificial insemination, animal health camps and, also through technical support from agriculture experts</li> </ul>	
7.	Shri Raju Lal Kumawat, Village Anvalheda	<p>a) Plantation has been done on 25 bighas of land of our village but what is the condition of those plants, no one knows?</p>	<ul style="list-style-type: none"> <li>Plantation has been done twice in the panchfal area, and then handed over to the panchayat for its maintenance.</li> </ul>	Company has allocated Rs. 1.0 Crores for Greenbelt Development. The same has been incorporated in Chapter 10, Section 10.8 of this EIA/EMP Report.

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8.	Shri Radheshyam Vaishnav, Village Putholi	<p>a) the settlement, which was reached during the 1988 public hearing, based on that our farm/well was acquired by Zinc but none of our family members were given jobs. After this I tried from year 1998 to 2000 but we were not given any employment, rather we were assured that if there is any place suitable for you, then you will be given a job. Today I want to ask the Zinc administration whether even after 30 years, there is no vacant place for me there? In this regard, I have written many letters to the Honorable Chief Minister, District Collector and many other officials, but till date no one has listened to me. Every day 10-20 people come to me for employment, but no one listens to us.</p> <p>b) My remaining 10-15 bighas of land is also getting spoiled by the poisonous water coming out of Hindustan Zinc, which Zinc Administration should acquire for green belt development and compensate us at reasonable rates.</p>	<ul style="list-style-type: none"> <li>Out of the total plant area 37.21% (i.e. 125.02 ha) area has already been developed under greenbelt/ plantation. The same will be maintained and enhanced by doing gap plantation to achieve the plantation density @ 2500/ha.</li> <li>The same will be maintained and enhanced by doing gap plantation to achieve the plantation density.</li> <li>The company has established state-of-the-art facilities for pollution control for the existing plant and ensures implementation of the mitigation measures to keep the pollution level within the prescribed norms. the same practice will continue for the proposed expansion project.</li> <li>Preference for employment has been and will be given to the local residents based on their qualification, company requirement and policy.</li> <li>Additional land may be purchased by the Company, in the future, basis the Company's Expansion, New projects Etc.</li> </ul>	Company has allocated Rs. 1.0 Crores for Greenbelt Development. The same has been incorporated in Chapter 10, Section 10.8 of this EIA/EMP Report.
9.	Shri Gopal Lal Gadri (Sarpanch), Gram Panchayat Suwaniya	<p>a) All the people who have come around Gangrar, their agricultural land is getting spoiled due to the toxic water coming out from here, so all the landholders should be given proper compensation from DLC</p>	<ul style="list-style-type: none"> <li>No wastewater is discharged outside the plant. HZL maintains Zero Liquid discharge.</li> <li>The company has established state-of-the-art facilities for pollution control for the existing plant and ensures implementation of the mitigation measures to keep the pollution level within the</li> </ul>	Company has allocated Rs. 120.05 Crores as Capital Cost and Rs. 15.14 Crores/annum as Recurring Cost for Environmental

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		rate and green belt on this land should be developed by Hindustan Zinc	prescribed norms. the same practice will continue for the proposed expansion project.	Protection Measures. The same has been incorporated in Chapter 10, Section 10.8 of this EIA/EMP Report.
10.	Shri Parmeswarlal Jat, resident of Ajoliya ka Khera	a) He said that the Hindustan Zinc Administration should give in writing to the people of village Ajoliya Ka Khera and village Putholi that, land compensation should be provided at reasonable rates.	<ul style="list-style-type: none"> <li>Additional land may be purchased by the Company, in the future, basis the Company's Expansion, New projects etc.</li> </ul>	-
11.	Shri Rameshchand Suwalka, resident Putholi	a) After 30 years Zinc Administration have not provided employment to him. He asked to buy his unfertile land at reasonable cost for greenbelt plantation.	<ul style="list-style-type: none"> <li>The company is committed to provide preference in employment to the local unemployed based on their qualification, company requirement and policy.</li> <li>Additional land may be purchased by the Company, in the future, basis the Company's Expansion, New projects etc.</li> <li>The Company has already developed 37.21% (i.e. 125.02 ha) of the total plant area) area under greenbelt / plantation. The same will be maintained and enhanced via gap plantation to achieve the plantation density upto 2500 trees/ ha.</li> </ul>	Company has allocated Rs. 1.0 Crores for Greenbelt Development. The same has been incorporated in Chapter 10, Section 10.8 of this EIA/EMP Report.
12.	Shri Banshilal Vaishnav, resident of Ajoliya ka Khera	a) About 20 years ago, the land which we were given notice to develop in the name of green belt is still lying barren today. We	<ul style="list-style-type: none"> <li>Additional land may be purchased by the Company, in the future, basis the Company's Expansion, New projects etc.</li> </ul>	

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		are cultivating by taking others land, from which we do not get much. Proper compensation should be given to us by acquiring our land which is barren, because it cannot be cultivated now.	<ul style="list-style-type: none"> <li>The Company has already developed 37.21% (i.e. 125.02 ha) of the total plant area) area under greenbelt / plantation. The same will be maintained and enhanced via gap plantation to achieve the plantation density upto 2500 trees/ ha.</li> </ul>	Company has allocated Rs. 1.0 Crores for Greenbelt Development. The same has been incorporated in Chapter 10, Section 10.8 of this EIA/EMP Report.
13.	Shri Rajendra Kumar Keer, Resident of Nagri	a) The 30 % contribution that is being taken from the farmer under the Samadhan Yojana should be reduced and other villages of the area should also be benefited by adding them under the ambit of this scheme. b) Development works should be done for the farmers with under CSR and proper cooperation should be given to the farmers by motivating them to develop horticulture on their farms so that area can become prosperous.	<ul style="list-style-type: none"> <li>Contribution is taken from the beneficiaries of the Samadhan Program to ensure ownership and utilization of the agri-inputs that are being provided by the Company through the samadhan program.</li> <li>The Company, by way of its Corporate Social Responsibility initiatives, continues to provide assistance to famers to help improve their agricultural produce.</li> </ul>	-
14.	Shri Pannalal Jat, resident of village Ajoliya Ka Khera	a) He said that our agricultural land is polluted by the contaminated water of Hindustan Zinc, where we are not even able to do agriculture and are shouting for employment but we are not being heard b) He said that our agricultural land is polluted by the contaminated water of Hindustan Zinc, where we are not even able to do agriculture.	<ul style="list-style-type: none"> <li>No wastewater is discharged by HZL. The Company maintains its operations with Zero Liquid Discharge.</li> </ul>	-

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15.	Shri Bhagwan Lal Jat, resident of village Ajoliya Ka Khera	<p>a) Many lands of farmers of Khera, Putholi and Moonga Ka village Ajoliya Ka Khera were acquired by Hindustan Zinc in the name of Green Belt but people were not given adequate compensation or employment.</p> <p>b) The plants which are planted in Hindustan Zinc Complex and Green Belt are not Hindustani but have been sent from abroad/UK.</p> <p>c) In front of the gate of Hindustan Zinc, if any other type of plants are seen on the hills other than the plants grown from nature, then tell them, which have been planted by Hindustan Zinc in the name of Green Belt.</p> <p>d) We have been given very little compensation for the land we have in Ajoliya ka Khera. Zinc administration had taken our land by forgery in the name of green belt and later they set up their plant, so we should be given full compensation.</p>	<ul style="list-style-type: none"> <li>The Company has ensured to provide both compensation as well as employment in accordance with the terms as entered for the same.</li> <li>Out of the total plant area 37.21% (i.e. 125.02 ha) area has already been developed under greenbelt/ plantation. The same will be maintained and enhanced by doing gap plantation to achieve the plantation density @ 2500/ha.</li> <li>The same will be maintained and enhanced by doing gap plantation to achieve the plantation density.</li> <li>Green belt development done in consultation reputed agency i.e Terracon and survey also completed by State Remote Sensing Agency.</li> </ul>	Company has allocated Rs. 1.0 Crores for Greenbelt Development. The same has been incorporated in Chapter 10, Section 10.8 of this EIA/EMP Report.
F.	<b>Pollution:</b>			
1.	Shri Happy Singh Chundawat, Deputy Sarpanch, Resident of Nagri	a) Along with the plant, appropriate measures should also be taken for the prevention of environmental pollution.	<ul style="list-style-type: none"> <li>HZL at its Chanderiya Lead Zinc Smelter unit has implemented various environment pollution</li> </ul>	Company has allocated Rs. 120.05 Crores as Capital Cost and Rs.



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2.	Shri Bhagwan Lal Jat, resident of village Ajoliya Ka Khera	a) Here the grass has become poisonous due to the polluted air and gas of Hindustan Zinc, due to which our livestock is getting harmed. In my childhood, I had seen many types of birds roaming here, but today those birds are not visible, because pollution is spreading in the air here. The people of our area are leading a life in dire straits.	<p>control measures like ETP, RO Plants, Bag houses, Bag filters, ESP &amp; STP etc. Apart from this Company has facility of continuous ambient air quality monitoring systems at locations as well as system of online monitoring of emissions from plant, Proper monitoring of effluent generation &amp; recycling system is available.</p> <ul style="list-style-type: none"> <li>The company has established state-of-the-art facilities for pollution control for the existing plant and ensures implementation of the mitigation measures to keep the pollution level within the prescribed norms. the same practice will continue for the proposed expansion project.</li> <li>~ 37 % area has been covered under green belt.</li> </ul>	15.14 Crores/annum as Recurring Cost for Environmental Protection Measures. The same has been incorporated in Chapter 10, Section 10.9 of this EIA/EMP Report.
<b>G. Socio Economic Development:</b>				
<b>G(i). Water (Drinking):</b>				
1.	Shri JagdishchandraJat, Sarpanch of Gram Panchayat, Ajoliya Ka Khera	a) HZL should develop pipeline in nearby villages.	<ul style="list-style-type: none"> <li>The Company has ensured to supply clean drinking water in operational areas. In the last 2-3 years Over Head Tanks and pipeline initiatives were carried out by HZL, in Biliya, Munga Khera, shivpura, suwaniya, mediKhera, bhawanipura, salera, pavtiya</li> <li>Construction of overhead tank and pipeline will be taken up in Ajoliya ka Khera as well. Drinking water facility also implemented through ATM RO to Biliya/Nagari &amp; Ajolion ka Khera Villages.</li> </ul>	HZL has allocated Rs. 1.5 crore for construction and maintenance of Overhead tank and pipeline. The same has been incorporated in Chapter 8, Section 8.4 of this EIA/EMP Report.
2.	Shri Ravindra Singh Ranawat (Principal) Village Chogavadi	b) Under CSR Program drinking water and other development should be done in 11 panchayats of Gangrar area.		
3.	Shri DevkishanJat, Former Deputy Sarpanch, Gram Panchayat Ajoliya ka Khera	c) We have to take drinking water from home while going to our farms as the wells water is not portable anymore.		
4.	Shri Shyamlal Menaria, resident of village Suwaniya	d) There is a problem of drinking water in the area. Therefore, arrangement of drinking water should be made in all the villages of Gangrar area.		

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<b>G(ii) Roads and Infrastructure:</b>				
1.	Shri Shyamlal Menaria, resident of village Suwaniya	a) Road connectivity between Medikhera to village Suwaniya, Shiv Mandir to Devnarayan Mandir and village's cremation ground to be repaired and maintained. b) Internal road of village suwaniya are damaged and to be repaired. c) Village Road to Cremation ground and Road from Shiv Temple to Devnarayna Temple are in very bad shape the same to be repaired.	<ul style="list-style-type: none"> <li>More infrastructure development activities will be taken up, as part of the Company's Corporate Social Responsibility initiatives, according to need as well as priority, in the future, CC roads have been constructed in suwaniya panchayat (Shivpura, bhawanipura and suwaniya villages), kashmore, biliya etc.</li> </ul>	HZL has allocated Rs. 1.75 crore for construction and maintenance of CC roads. The same has been incorporated in Chapter 8, Section 8.4 of this EIA/EMP Report.
2.	Shri Ratanlal Sharma, resident of Ajoliya ka Khera	a) Development works like water, electricity, roads, drains, school buildings etc. should be done in those villages whose land is acquired.	<ul style="list-style-type: none"> <li>All categories of infrastructure development work is being done through the Company's Corporate Social Responsibility initiatives, as per the needs and requirement of community. The same will continue for the proposed expansion project as well.</li> </ul>	Apart from the CSR, the company has allocated Rs. 5.45 Crores for Socio-economic development activities in next 5 years. The same has been incorporated in Chapter 8, Section 8.4 of this EIA/EMP Report.
<b>H. Grievance Redressal:</b>				
1.	Shri Devkishan Jat, Former Deputy Sarpanch, Gram Panchayat Ajoliya ka Khera	a) The image of the people of our village Ajoliya is very bad here, under the Zinc Administration, that's why in today's public hearing too much police force has to be used. Zinc administration should talk directly to the local people about the development and employment here. Unless this happens, there cannot be a	<ul style="list-style-type: none"> <li>The company is committed to provide preference in employment to the local unemployed based on their qualification, company requirement and policy.</li> <li>Company intends to maintain Supportive, Developing peaceful &amp; Healthy environment to nearby community.</li> </ul>	-

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		permanent solution to any problem. 80 percent of the agricultural land of the farmers of village Ajoliya Ka Khera has been acquired by Hindustan Zinc, but employment has not been given in that proportion.		
2.	Shri Happy Singh Chundawat, Deputy Sarpanch, Resident of Nagri	a) Anyone should get employment, but there should not be any politics or discrimination regarding employment, because unemployment and poverty do not come after seeing the party. Desired people of the area do not get employment whereas politicians and goons get employment easily.	<ul style="list-style-type: none"> <li>The company is committed to provide preference in employment to the local unemployed based on their qualification, company requirement and policy. We have transparency in our system.</li> </ul>	-
3.	Shri Mithulal Lodha, Village Billia	a) the people of our village are infamous, they say that the people here are thieves b) No person from our village has appeared in today's public hearing, because the administration does not listen to our villagers, so what is the use of coming	<ul style="list-style-type: none"> <li>HZL and the people from villages near its operational areas have established good relationships owing to the continued support provided by HZL through its Corporate Social Responsibility initiatives, and preference given to the local unemployed youth by HZL.</li> </ul>	-
4.	Shri Radheshyam Vaishnav, Village Putholi	a) He said that HR of Vaman Company of Hindustan Zinc Ltd. is pushing and thrashing the workers out, which is wrong	<ul style="list-style-type: none"> <li>The Company took serious note of this issue. An explanation was sought from the concerned person, and an apology letter has been provided by the concerned along with a commitment to not repeat any such acts in the future.</li> </ul>	-
5.	Shri Naresh Kumar Sharma, temple priest, resident of village Ajoliya Ka Khera	a) He said that I worship the temple built in the zinc complex, but I have been refused for entry to worship by the Zinc administration. The temple priest is being prevented from worshipping and there the	<ul style="list-style-type: none"> <li>HZL deny to this representation as We, as a Company do not refuse or deny to any people for worship considering safe activities in the premises. From past many years we have been closely</li> </ul>	-

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		worship / service work of the temple is being done by a person wearing a pant-shirt, which is wrong. If another person is to be worshipped, then he should be worshiped by wearing a dhoti-shirt.	working and ensuring access to all villagers for their religious activity /service inside Zinc complex.	
I.	<b>Others:</b>			
1.	Shri Happy Singh Chundawat, Deputy Sarpanch, Resident of Nagri	a) Keeping in mind the religious sentiments, development of Thakurji and Balaji temples of the village should be done under CSR	<ul style="list-style-type: none"> <li>The Company runs different programs through its Corporate Social Responsibility initiatives, for the welfare of the residents residing in areas near its operations. The current legal framework in place does not allow for companies to investments in religious institutions under their Corporate Social Responsibility programs.</li> </ul>	-
2.	Shri Bhagwan Lal Jat, resident of village Ajoliya Ka Khera	b) We want that the cost of fertilizers and seeds should be given by Hindustan Zinc to the farmers of the area.	<ul style="list-style-type: none"> <li>The agricultural inputs are being provided to the community through the Company's Samadhan program, a Corporate Social Responsibility initiative. The entire project cost is covered by company and a minimal input cost is provided by the beneficiary as contribution amount. This practice and program will be continued to bring ownership and ensure proper utilization of agri-inputs which are made available to the beneficiaries.</li> </ul>	-

Table 7.1 (c)

Issues / Points / Opinions of Local Public raised written letters during the Public Hearing

S. No.	Name of the Person	Issues / Points / Opinions of Local Public	Reply by Project Proponent	Action Plan along with Budgetary Allocation
<b>A</b>	<b>Employment</b>			
1	Letter to DC, Chittorgarh Dated 20.07.2022 from Mr. Ramesh Suwalka Village: Putholi	<p>As per the agreement in 1988 for acquiring the land, HZL has not provided permanent employment to me or any of my family members.</p> <p>Since 1988, I have requested state government and HZL through correspondences. But the matter has not been taken into consideration till now. The company is getting land by the government and setting up new project has deprived us of employment.</p> <p>If the company does not provide employment, I will take legal action against the company. HZL and local administration will be solely responsible for the consequences.</p>	<p>HZL has ensured to provide employment in accordance with the terms as entered for the same.</p> <p>In this expansion project, no additional land acquisition will be required.</p> <p>HZL will prefer local residents for employment as per their eligibility, company requirement and policy.</p> <p>Apart from the above, HZL will enhance its skill development program for the local community so that locals can become self-reliant and self-sustainable for employment in other field and organizations as well.</p>	<p>Rs. 60 lacs will be allocated for skill development program in study area. The same has been incorporated in Chapter 8, Section 8.4 of this EIA/EMP Report.</p>

S. No.	Name of the Person	Issues / Points / Opinions of Local Public	Reply by Project Proponent	Action Plan along with Budgetary Allocation
2	i. Villagers of Ajoliya ka Khera, Awalheda, Bailya, Swaliya, Medikhera, Devri Putholi, Solera Gordiya, Nagri, Gurjar ka Khera, Shivpura, Bhwanipura, Saran, Salera ii. Jamnalal Jatt, Sagra Mata Sakti Path ewam Mandir Vikas Samiti	Provide employment to unemployed local youth. Preference should be given to local community.	Employment has been provided to the local people according to their qualification and priority, 4500 personnel are from Rajasthan and about 3500 of them are residents of Chittorgarh and its surrounding area. 500 personnel are the residents of the nearby villages. The company is committed to provide preference in employment to the local unemployed based on their qualification, Company requirement and policy. The total manpower requirement for the proposed project is 360 people, and they will be sourced locally. Apart from direct employment, indirect employment due to the Plant is also envisaged by the way of transportation, workshops, petty contractors and shopkeepers, network of retailers throughout the state and in its marketing region.	Rs. 60 lacs will be allocated for skill development program in study area. The same has been incorporated in Chapter 8, Section 8.4 of this EIA/EMP Report.
3	Bhaves	I have completed B.Sc. Mathematics and I request HZL to provide Employment in Laboratory.		
4	Unemployed youth from village Ajoloiya ka Khera, Putholi, Awalheda, nagri, Bailya and Medikhera	1. We request HZL to provide that it should provide employment to unemployed youth before public hearing i.e. scheduled on 20.07.2022 2. As per govt. guideline 70-75% employment should be given to local people. So, we request you to given proper consent to provide employment to the local villagers.	Apart from the above, HZL will enhance its skill development program for the local community so that locals can become self-reliant and self-sustainable for employment in other field and organizations as well.	
5	Laxmanla Jat Village: Ajoliya ka Khera	If Fertilizers plant is installed in our area employment should be given to us.	This Public Hearing is being conducted for expansion within the Chanderiya Lead Zinc	-



S. No.	Name of the Person	Issues / Points / Opinions of Local Public	Reply by Project Proponent	Action Plan along with Budgetary Allocation
			Smelter complex. However, we will give preference for employment to local as per eligibility criteria – their qualification, company requirement and policy.	
6	Radheshyam Vaishnav (Munna Bhai) District president industry cell Chittorgarh (ref: Ref/SPL/2022-23/005)	<ol style="list-style-type: none"> <li>Many local youths are unemployed and their economic condition is also not good. So, I request HZL to provide employment to local people and also motivate small scale industries.</li> <li>Hindustan Zinc gives opportunities to the contractors whose turnover is more than 5 cores. I request Hindustan Zinc to give chances to small scale industries whose turnover is less than 5 cores.</li> </ol>	<p>The company is committed to provide preference in employment to the local unemployed based on their qualification, Company requirement and policy.</p> <p>As per company policy, vendors/ contractors having turnover of more than INR 5 crores are engaged, but nevertheless down the line contractors/ sub-contractors are engaged from local areas itself.</p>	-
<b>B. Education, Sports and Skill Development</b>				
1	Shri Shyamlal Menaria Resident of village Suwaniya	Fulfil the ongoing school staff scarcity at village Suwaniya	Fulfilling school staff scarcity is a role of the district education department, however a science teacher has already been provided for Class 9 <sup>th</sup> and 10 <sup>th</sup> according to the scope of the shiksha sambal program for educational support to the community.	-
2	Principle Govt. Senior Secondary School Awalheda	<p>We need development in English medium School at village Awalheda</p> <ol style="list-style-type: none"> <li>Three room for teaching with common toilet facility for students, at least 50 table and chairs.</li> <li>Computer lab Facility.</li> <li>Repair of rooftop of the classrooms.</li> </ol>	<p>HZL will repair and develop new Classroom facility with chairs and table in Awalheda Village and also a full equipped computer lab for students under CSR as we doing.</p> <p>The Company has interacted with the school administration and encourage to utilise</p>	-

S. No.	Name of the Person	Issues / Points / Opinions of Local Public	Reply by Project Proponent	Action Plan along with Budgetary Allocation
			vidyalaya vikaas yojana for such development work	
3	<p>1. Principle, Govt. Senior Secondary School village Dhanykalam dated 18.07.2022 (ref: G.S.S.S./Dhanykalam/19)</p> <p>2. Principle, Govt. Senior Secondary School village, Ajoliya ka Khera Dated (ref: G.S.S.S./Ajoliya ka Khera)</p> <p>3. Principle, Govt. Secondary School, Village Dagla ka Khera Dated 18.07.022 (ref: G.S.S./Dagla ka Khera /2022/spl)</p>	<p>i. Hindustan Zinc is always supporting us in education facility and we hope this support will be there in future also.</p> <p>ii. We request Hindustan Zinc to Develop our school as model School</p>	<p>1. Major focus is on quality of education hence projects like shiksha sambal program is operational since last 5 years. Apart from that Unchi udaan, Vedanta P.G. girls college like initiatives give students opportunities for higher studies. Infrastructure related work is done according to the need arising from community.</p> <p>2. We will ensure to continue this support in the future as well.</p>	HZL will spent Rs 1.0 crore for schools renovation in nearby villages in next five years under socio economic development. The same has been incorporated in Chapter 8, Section 8.4 of this EIA/EMP Report.
4	<p>Principle, Govt. Adarsh Higher Secondary School Sukhwada(ref: G.S.S.S./SuKhera) Dated 18.07.2022</p>	<p>1. We request you to kindly repair the sanitary pad machine at our school so female students can get benefited from that.</p>	<p>All the sanitary pad machines installed by HZL in the study area, have handed over to the school administration. Repair and maintenance of the same is to be ensured by the independent school administration.</p>	-

S. No.	Name of the Person	Issues / Points / Opinions of Local Public	Reply by Project Proponent	Action Plan along with Budgetary Allocation
5	Principle, Govt. Adarsh Higher Secondary School Suwaniya (ref: G.S.S.S./Suwaniya /2022/346) Dated 19.07.2022	I request you to kindly appoint the following teachers on vacant seat. 1. Class 9 and 10th- Science 2. Class 11th and 12th Chemistry and Biology Teacher	Subject teacher for science has been provided in suwaniya school since more than a year for class 9 <sup>th</sup> and 10 <sup>th</sup> . Providing teachers for 11 <sup>th</sup> and 12 <sup>th</sup> is beyond our project scope. However, we will look into the matter and will resolve the same with school administration	-
<b>C.</b>	<b>Healthcare Facilities:</b>			
1	Shri Shyamlal Menaria Resident of village Suwaniya	There should be more doctors at the health centres	Appointing doctors to govt health centres fall directly within the scope of the government. However, in order to provide primary health care services, a mobile health van, as provided by HZL by way of its Corporate Social Responsibility initiatives, is operational, and it visits suwaniya once to twice per month and similarly covers 27 villages in total.	-
<b>D.</b>	<b>Animal Husbandry and Veterinary facilities:</b>			
1	Letter from Villagers of Ajoliya Ka Khera dated 20.07.2022	Cattles die every day.	Regular animal health camps are being organized in collaboration with government veterinary doctors in local villages.	Company has allocated Rs. 120.5 Crores as Capital Cost and Rs. 15.14 Crores/annum as Recurring Cost for Environmental Protection Measures. The same has been
2	Letter from Govardhan Lal Jatt Village: Ajoliya ka Khera to Loaction Head HZL Chanderiya	Animals are dying due to eating poisonous grass, due to which farmers are suffering huge economic loss	Moreover, a veterinary clinic situated in Biliya is operational since past couple of years and covers nearby villages, including Suwaniya, providing services for animal treatment. The company has established state-of-the-art facilities for pollution control for the	
3	Villagers of Baliya	i. Animals are dying because of the pollution.		

S. No.	Name of the Person	Issues / Points / Opinions of Local Public	Reply by Project Proponent	Action Plan along with Budgetary Allocation
		ii. At least insurance to provide to the milch animals and the calf.	existing plant and ensures implementation of the mitigation measures to keep the pollution level within the prescribed norms. The same practice will continue for the proposed expansion project. All monitoring system directly connected with RSPCB server & monitored.	incorporated in Chapter 10, Section 10.9 of this EIA/EMP Report.
4	Villagers of Ajoliya ka Khera and Baliya	iii. Lead poisoning found in animals around Hindustan Zinc was investigated and treated by First Class Veterinary Hospital, Gangrar, in which many animals have died prematurely. (Ref.: Letter from Veterinary Hospital Gangrar region dated 24.08.2020) iv. The domestic and milch animals are dying prematurely due to lead poisoning in the area.		
5	Shri Shyamlal Menaria Resident of village Suwaniya	Open a Veterinary Hospital	A veterinary clinic is situated in Biliya which covers Suwaniya village as well for treatment of animals	
<b>E.</b>	<b>Agriculture, Greenbelt and Land Related Issues:</b>			
1	Letter from Govardhan Lal Jatt Village: Ajoliya ka Khera to location head HZL	i. My 40 Bigha land is near to the HZL Chanderiya Plant. the farming has become is very difficult. The Crop is damaged due to the gas emitted from the plant. ii. I request you to give the compensation for damage crop or request you provide funds for my family expenditure.	<ul style="list-style-type: none"> <li>The company has established state-of-the-art facilities for pollution control for the existing plant and ensures implementation of the mitigation measures to keep the pollution level within the prescribed norms. the same practice will continue for the proposed expansion project.</li> <li>Emissions are kept in permissible norms by adopting PCRs and regular monitoring.</li> </ul>	Company has allocated Rs. 120.05 Crores as Capital Cost and Rs. 15.14 Crores/annum as Recurring Cost for Environmental Protection Measures. The same has been incorporated in Chapter 10, Section 10.9 of this EIA/EMP Report.
2	Letter to PH incharge from Chittorgarh from Villagers of nearby	i. Hindustan Zinc has been wrongly acquired farmers lands through government, despite not needing land But the process of setting up a fertilizer factory is a fraud with the farmers, already the environmental	<ul style="list-style-type: none"> <li>The company has established state-of-the-art facilities for pollution control for the existing plant and ensures implementation of the mitigation</li> </ul>	Company has allocated Rs. 120.05 Crores as Capital Cost and Rs. 15.14 Crores/annum as

S. No.	Name of the Person	Issues / Points / Opinions of Local Public	Reply by Project Proponent	Action Plan along with Budgetary Allocation
	villages dated 20.07.2022	conditions are not being followed by the above company, due to which the pollution on the nearby village is constantly affecting the crops of common man, animal birds, if another unit If it does, it will have a very harmful effect on the environment.	measures to keep the pollution level within the prescribed norms. the same practice will continue for the proposed expansion project. • HZL is compliant with all relevant and applicable environmental conditions.	Recurring Cost for Environmental Protection Measures. The same has been incorporated in Chapter 10, Section 10.9 of this EIA/EMP Report.
3	Villagers from Putholi and Ajoliya ka Khera	<p>i. That this land was to be acquired but due to any flaw in the mind of Hindustan Zinc, orders were brought from the government to free this land. The land which has become completely barren due to the pollution of this plant.</p> <p>ii. It is requested that this land should either be given crop compensation to the farmers or this land should be acquired again. The condition that Putholi is facing due to Hindustan Zinc, the same condition is happening to the farmers of Ajolia Ka Khera in the north direction of Hindustan Zinc.</p>	The company has established state-of-the-art facilities for pollution control for the existing plant and ensures implementation of the mitigation measures to keep the pollution level within the prescribed norms. the same practice will continue for the proposed expansion project. Additional land may be purchased by the Company, in the future, basis the Company's operational requirement, if any.	Company has allocated Rs. 120.05 Crores as Capital Cost and Rs. 15.14 Crores/annum as Recurring Cost for Environmental Protection Measures. The same has been incorporated in Chapter 10, Section 10.9 of this EIA/EMP Report.
4	Laxmanlal Jat Ajoliya ka Khera dated: 20.07.2022	<p>i. The land which has been acquired in 2006-2007 for greenbelt development.</p> <p>ii. Land owners should be compensated and employment should be provided to them.</p>	The Company has ensured to provide both compensation as well as employment in accordance with the terms as entered for the same.	-

S. No.	Name of the Person	Issues / Points / Opinions of Local Public	Reply by Project Proponent	Action Plan along with Budgetary Allocation
5	Land Owners of Ajoliya Ka Khera	i. Our land is adjacent to railway line (Kota), it is barren since 20 years because of pollution. We have appealed many times regarding this. Villagers of Ajoliya ka Khera, Putholi and Munga Ka Khera are suffering because of it. So, we request you to purchase our land on mutual consent rate or HZL should give compensations per bigha every year.	The company has established state-of-the-art facilities for pollution control for the existing plant and ensures implementation of the mitigation measures to keep the pollution level within the prescribed norms. the same practice will continue for the proposed expansion project. Additional land may be purchased by the Company, in the future, basis the Company's Expansion, New projects etc.	Company has allocated Rs. 120.05 Crores as Capital Cost and Rs. 15.14 Crores/annum as Recurring Cost for Environmental Protection Measures. The same has been incorporated in Chapter 10, Section 10.9 of this EIA/EMP Report.
6	Villagers of Baliya	i. As per the notification published and circulated by the State Government on 03.03.2006 and Section 6 dated 23.03.2007 under Section 4(1) of the Land Acquisition Act 1894 to develop Green belt, the said land was acquired for green belt in the public interest, for public hearing was held earlier on 12.02.2019 at village bailiya. It was failed due to the company's intention to set up a fertilizer factory on the green belt land. ii. The earlier public hearing was unsuccessful due to the problems of irregular compensation and less payment to the farmers and employment etc. by the company at that time. iii. HZL Chanderiya will be granted permission for the present expansion project after receiving fair market value compensation for the land or permanent employment to land losers. Otherwise green belt should be developed on that land.	This Public Hearing is being conducted for expansion within the Chanderiya Lead Zinc Smelter complex. However, we will give preference for employment to local as per eligibility criteria – their qualification, company requirement and policy. The Company has given compensation of acquired land in accordance with the terms as entered for the same	-



7	Letter to RO, RSPCB Chittorgarh dated 20.07.2022 from Villagers of Ajoliya ka Khera and Baliya	<p>i. At present, 431.34 hectares of land is located in the name of Hindustan Zinc Chanderiya. After 2005, Hindustan Zinc expanded its factory rapidly and many small and big units were established. For this, a large quantity of developed greenbelt was cut by the company from inside the plant located at Chanderiya (Putholi), for which permission was taken from the office of sub-divisional officer Gangrar for felling of trees and destroyed the entire green belt under the guise of permission.</p> <p>ii. As per the EC obtained for phase II expansion dated 06.12.2007, the greenbelt was to be developed on 33% (142 ha.) area of the complex. At that time the existing greenbelt area of the complex was 70 ha. HZL said that they will acquire about 100 hectares of land to develop greenbelt in the north-west of the previously established plant and develop greenbelt on it by 2010, on this condition the environment clearance of the fertilizer plant was issued to the company on false bases.</p> <p>iii. The company could not develop greenbelt on the above 100 greenbelt land till year 2019 and continued the work as per Phase-2 EC. Therefore, It was openly violating the condition number 8 of EC dated 06.12.2007 and NGT's guidelines, which caused huge damage to the environment to a large extent.</p> <p>iv. According to the condition of E.C. vide letter F.No. J-11011/350/2016-IA.11(1) for fertilizer plant dated 5th January, 2021 (for Fertilizer plant) was obtained while the HZL received the said possession taken on basis of forged documents and false public hearing. As per the agreement and HZL between state government point no.5 the Company should develop greenbelt on 101.51 ha. of land within 12 months of the receipt of the said possession. Also,</p>	<ul style="list-style-type: none"> <li>• Out of the total plant area 37.21% (i.e. 125.02 ha) area has already been developed under greenbelt/ plantation. The same will be maintained and enhanced by doing gap plantation to achieve the plantation density @ 2500/ha.</li> <li>• The same will be maintained and enhanced by doing gap plantation to achieve the plantation density.</li> <li>• HZL has ensured compliance and continues to be compliant with all relevant and applicable environmental conditions.</li> <li>• HZL has not indulged in any fraudulent activities and ensures strict compliance with all relevant and applicable rules and regulations.</li> <li>• The principles laid down in the cited case are in accordance with the specific facts of the same, and they have no relation to facts and circumstances in HZL's case.</li> <li>• HZL has not presented incorrect or false facts before any forum.</li> </ul>	<p>Company has allocated Rs. 1.0 Crores for Greenbelt Development. The same has been incorporated in Chapter 10, Section 10.9 of this EIA/EMP Report.</p>
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		<p>according to point no.7, only greenbelt can be developed on the said land.</p> <p>v. According to Annexure 7 of this letter, objection applications were also presented, in response to which it was said that many units have been established here, for which it is necessary to install greenbelt. It was stated in writing by the company that it would not be used other than greenbelt. In this way, EC for Phase 2 and Fertilizer Plant was based on false and baseless facts. According to the principle propounded by Hon'ble Supreme Court in the judgment dated 29.09.2011 of M/s. Royal Ochid Hotel Limited &amp; Ors vs G Jayaram Reddy et al. that the land acquired for Greenbelt cannot be converted to any other land-use form.</p> <p>vi. That Hindustan Zinc has from time to time presented wrong facts related to the land before the MoEFF&amp;CC, GOI and local administration for the expansion of its industry. The company presented a false and fabricated fact of having greenbelt on 121.77 hectares out of 335.89 hectares of land located in its name, which has been proved wrong by the inquiry committee report of the sub-divisional officer Gangrar.</p> <p>vii. According to the investigation done on 19/09/2020, greenbelt was found on the spot was 75 ha. land of the company, whose age was also 1 to 2 years. On checking by the Rajasthan State Pollution Control Board Regional Office Chanderiya also it was found that the company does not have greenbelts on the specified land. On 14/8/2020, the company was issued a notice regarding not having a greenbelt and ordered to plant 20,000 saplings with immediate effect. But till date the said order has not been complied with.</p>		
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		<p>viii. At present, out of 437.34 ha. of the company's land, 11.77 ha. of river drains and 3.61 ha. of public roads leading to village agricultural lands and 4 ha. of land to set up Chem Color India Ltd.'s industry on the basis of leave and license agreement that have given. Thus, even though there is no private possession of the Company on 19.38 hectares of land, the Company is getting approvals from the Ministry on the basis of false facts by claiming to be greenbelt on the said lands. Greenbelt located at Hindustan Zinc and environmental clearances of Phase 2 and Fertilizer Plant done earlier should be investigated and necessary legal action should be taken against the culprits. Current Public hearing should be revoked and kindly made to provide relief to the local residents.</p>		
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S. No.	Name of the Person	Issues / Points / Opinions of Local Public	Reply by Project Proponent	Action Plan along with Budgetary Allocation
8	1. Raghavlal Jatiya Village: Solera 2. Prabhulal Jatt Village: Solera	i. HZL has done various activity for upliftment of farmer community. Through Samadhan Pariyojana many local farmers have been benefited. ii. I request HZL to lower or stop the rate of "Anshdan Rashi" of "Samadhan Pariyojan" because I am not able to pay this, because of this from last 2-3 years I have stopped farming under Samadhan Pariyojana	Samadhan project provides support for only 1 bigha of land as demonstration plot. Expenses for cultivation in rest of the crop field is borne by farmer himself/herself. Minimal contribution amount has been kept to keep ownership intact and ensure proper utilisation of agri-inputs. The same practice will continue in future as well.	-
9	Letter to RO, SOCB Chittorgarh from Villagers of Ajoliya Ka Khera	i. From last 7-8 years the lands which are surrounded by Jarofix from the all the three direction i.e., West-North-South has been contaminated. Due to which the land has become unfertile and water has been polluted. ii. Due to this some of the farmers have left their land vacant. Because of helplessness some farmers have to cultivate their crop on the that polluted land. Raising a family has become difficult due to this.	Jarofix yards completely covered with HDPE Liner & no dust emission from the yards, Green capping of One Jarofix yard[Yard-II] is under progress with TERI-Delhi. The company has established state-of-the-art facilities for pollution control for the existing plant and ensures implementation of the mitigation measures to keep the pollution level within the prescribed norms. the same practice will continue for the proposed expansion project.	Company has allocated Rs. 120.05 Crores as Capital Cost and Rs. 15.14 Crores/annum as Recurring Cost for Environmental Protection Measures. The same has been incorporated in Chapter 10, Section 10.9 of this EIA/EMP Report.
F.	<b>Environment and Pollution:</b>			
1	Letter to RO, SOCB Chittorgarh from Villagers of Putholi, Munga ka Khera, Ajolian ka Khera dated 20.07.2022	i. The water of the nearby land and tube wells around the area has also become contaminated.	<ul style="list-style-type: none"> <li>The company has established state-of-the-art facilities for pollution control for the existing plant and ensures implementation of the mitigation measures to keep the pollution level</li> </ul>	

S. No.	Name of the Person	Issues / Points / Opinions of Local Public	Reply by Project Proponent	Action Plan along with Budgetary Allocation
			<p>within the prescribed norms. the same practice will continue for the proposed expansion project.</p> <ul style="list-style-type: none"> <li>The Company, through its Corporate Social Responsibility initiatives, has constructed Overhead tanks with pipeline in Munga ka Khera and handed the same over to the panchayat.</li> <li>Construction of overhead tank and pipeline for ajoliya ka Khera proposal is also in pipeline. ATM RO facility provided in Biliya Village for drinking water to the community.</li> </ul>	<p>HZL has allocated Rs. 1.5 crore for construction and maintenance of Overhead tank and pipeline. The same has been incorporated in Chapter 8, Section 8.4 of this EIA/EMP Report.</p>
3	Letter from Govardhan Lal Jatt Village: Ajoliya ka Khera to location head HZL	<p>i. Every time my crop gets spoiled due to the gases which are emitted from the plant the fodder which is produced on this land is also get rejected by our cattle's because it is also polluted.</p> <p>ii. The acid water from plant is has contaminated the well located on my farm. It is neither fit for drinking nor for cultivation.</p> <p>iii. I request you to give the compensations of crop and also request you to give cost of maintenance for my family.</p>	<ul style="list-style-type: none"> <li>The company has established state-of-the-art facilities for pollution control for the existing plant and ensures implementation of the mitigation measures to keep the pollution level within the prescribed norms. the same practice will continue for the proposed expansion project.</li> </ul>	<p>Company has allocated Rs. 120.05 Crores as Capital Cost and Rs. 15.14 Crores/annum as Recurring Cost for Environmental Protection Measures. The same has been incorporated in Chapter 10, Section 10.9 of this EIA/EMP Report.</p>
4	Villagers from Putholi and Ajoliya ka Khera	<p>The cultivators have to bring even drinking water from home while going to their fields because the water in the area has become completely polluted. We have also checked the water and samples and sent the samples to the pollution department in the year 2013-14, but the result was not in the favour of farmers.</p>	<ul style="list-style-type: none"> <li>Regular monitoring is carried out to ensure that our operations are carried out within the permissible operating limits as prescribed by way of our various consents and clearances.</li> </ul>	

S. No.	Name of the Person	Issues / Points / Opinions of Local Public	Reply by Project Proponent	Action Plan along with Budgetary Allocation
5	Ramlal Village Ajoliya ka Khera	i. My well is in the north direction of the factory, due to which the crop is getting spoiled because of polluting gases. ii. I have to carry portable water from home to farms. iii. I have a house on 20 bigha land where I reside with my family. Every night they release gases which make our land unfertile so I need proper compensations of land.	<ul style="list-style-type: none"> <li>No wastewater is discharged outside the plant. HZL maintains Zero Liquid discharge.</li> <li>The Company, through its Corporate Social Responsibility initiatives, has constructed Overhead tanks with pipeline in Munga ka Khera and handed the same over to the panchayat.</li> <li>Construction of overhead tank and pipeline for ajoliya ka Khera proposal is also in pipeline.</li> </ul>	HZL has allocated Rs. 1.5 crore for construction and maintenance of Overhead tank and pipeline. The same has been incorporated in Chapter 8, Section 8.4 of this EIA/EMP Report.
6	Letter to PH incharge from Chittorgarh from Villagers of nearby villages dated 20.07.2022	i. The polluted water from Hindustan Zinc's plant is continuously being discharged into the river with the help of underground drains in the drain near the plant. The confirmation of pollution is clear from the investigation report done by the Regional Officer Pollution Control Division Office, Chittorgarh. ii. Recently there was a gas leak on the date 25.12.2020, due to which more than 1000 bighas of crops were damaged. If one more unit is formed then there will be a very harmful effect on the environment due to which the nearby villages will have to suffer economic loss, which is in the form of reduction in agricultural produce, disease, animal wealth loss, for which there no arrangement has been made so far.	<ul style="list-style-type: none"> <li>HZL maintains Zero Liquid discharge from the premises &amp; regularly monitored, No discharge from the premises.</li> <li>The company has established state-of-the-art facilities for pollution control for the existing plant and ensures implementation of the mitigation measures to keep the pollution level within the prescribed norms. the same practice will continue for the proposed expansion project.</li> <li>No wastewater is discharged outside the plant.</li> <li>HZL has ensured and strives to ensure compliance with all relevant and applicable rules and regulations.</li> </ul>	Company has allocated Rs. 120.05 Crores as Capital Cost and Rs. 15.14 Crores/annum as Recurring Cost for Environmental Protection Measures. The same has been incorporated in Chapter 10, Section 10.9 of this EIA/EMP Report.



S. No.	Name of the Person	Issues / Points / Opinions of Local Public	Reply by Project Proponent	Action Plan along with Budgetary Allocation
7	Villagers of Ajoliya ka Khera and Baliya	<p>i. That Hindustan Zinc Chanderiya, according to the classification of industries issued by the State Board, is a heavy industry divided into "Red" category and is counted among the serious polluting industries of India. Many types of toxic gases are emitted from its processing, due to which accidents happen every day. Along with this, there is an excessive production of "mercury" and "acid", which is very fatal for the environment. The pollutants emitted have caused great damage to the local environment. Complaints were made by the local villagers to the Regional Office of Rajasthan State Pollution Control Board Chanderiya regarding the pollution of Hindustan Zinc, in respect of which the Regional Office of Hindustan Zinc on 24.7.2020 Investigations were done for air and water in which the facts of serious pollution were found.</p> <p>ii. On the complaint of villagers on gas leak from Hindustan Zinc on 26.12.2020, a list of crop degradation was prepared after investigation by Tehsildar Gangrar, District Chittorgarh, which clearly shows that excessive gas leak by the company has caused huge damage to the environment.</p> <p>iii. The company is currently continuously increasing the capacity of lead production through plant expansion, due to which serious diseases are being spreading in the area and causing problem to local people.</p> <p>iv. Due to this great damage has been caused to the surrounding environment. If the plant is expanded now, then it is likely to cause very heavy accidents in the future.</p>	<p>We have robust environmentally monitoring system with tracking by RSPCB.</p> <ul style="list-style-type: none"> <li>The company has established state-of-the-art facilities for pollution control for the existing plant and ensures implementation of the mitigation measures to keep the pollution level within the prescribed norms. the same practice will continue for the proposed expansion project.</li> <li>Regular monitoring is carried out to ensure that our operations are carried out within the permissible operating limits as prescribed by way of our various consents and clearances.</li> <li>No wastewater is discharged outside the plant. HZL maintains Zero Liquid discharge.</li> <li>HZL has ensured and strives to ensure compliance with all relevant and applicable rules and regulations.</li> <li>HZL carries out its activities in accordance with the standards and limits as prescribed in its various consents and clearances.</li> </ul>	<p>Company has allocated Rs. 120.05 Crores as Capital Cost and Rs. 15.14 Crores/annum as Recurring Cost for Environmental Protection Measures. The same has been incorporated in Chapter 10, Section 10.9 of this EIA/EMP Report.</p>

S. No.	Name of the Person	Issues / Points / Opinions of Local Public	Reply by Project Proponent	Action Plan along with Budgetary Allocation
8.	Kamlesh Purohit President (Chittorgarh Sahakari Bhoomi Vikas Bank Limited)	i. It has also come to notice that Hindustan Zinc is proposed to expand its business in the region. What is the action plan of the zinc plant in relation to the guidelines issued by the Government of India regarding environmental standards for what would be the adverse effects on the environment of the area in detail. In the past too, the pollution standards set by the Government of India have been disregarded by the zinc plant. They should not be repeated in future, so eco-friendly corporate system should be ensured, in this regard this letter should be included in the proceedings for the purpose of public hearing.		
G.	Socio Economic Development:			
G(i).	Water (Drinking):			
1	Letter from Govardhan Lal Jatt Village: Ajoliya ka Khera to location head HZL	1. We bring drinking water from another villages. So, I request you to please arrange portable drinking water facility in our village	<ul style="list-style-type: none"><li>ATM RO facility already installed at Biliya, Nagari &amp; Ajolionka Khera for drinking water to community.</li><li>Proposal for construction of overhead tank and pipeline installation in Ajoliya ka Khera is in pipeline</li><li>Open well and pipeline has been installed in suwaniya village for clean drinking water purpose</li></ul>	HZL has allocated Rs. 1.5 crore for construction and maintenance of Overhead tank and pipeline. The same has been incorporated in Chapter 8, Section 8.4 of this EIA/EMP Report.
2	Shri Shyamlal Menaria Resident of village Suwaniya	1. There is no drinking water supply from the tap. 2. Sometimes there is no water from the tap for 15 days.		
G(ii)	Infrastructure and Road			
1	Villagers from Putholi and Ajoliya ka Khera	1.Construction of solid wall around sagra mata temple 2. Construction of stadium 3. Open Gym in our village 4. Provide Sports equipment	1. HZL will construct a solid wall around Sagra Mata Temple and proposal under planning & discussion with committee.	HZL has allocated Rs. 1.2 crore for Infrastructure Development in the nearby villages. The

S. No.	Name of the Person	Issues / Points / Opinions of Local Public	Reply by Project Proponent	Action Plan along with Budgetary Allocation
			2. Open Gym and a common garden will be constructed in Ajoliya ka Khera Village with all modern sports facilities. Under planning & will implement based on priority in phased manner.	same has been incorporated in Chapter 8, Section 8.4 of this EIA/EMP Report.
2	Shri Shyamlal Menaria Resident of village Suwaniya	In our village there are problems with infrastructure, so kindly keep an eye on it. 1. Road construction between Medikhera and Suwaniya village 2. Due to lack of a proper drainage system in Medikhera, there is a blockage of dirty water on roads every year. Also, there is a blockage of water outside the Charbhuj Mandir 3. Village roads are in bad condition. 4. Road construction leading to the village cremation ground at Suwaniya. 5. The road from Shiv Mandir to Devnarayan Mandir is very bad in condition throughout the year. Dirty water from drainage is on the roads, which creates problems for students of nearby schools.	1. CC roads have been constructed in Suwaniya panchayat (Shivpura, Bhawanipura and Suwaniya villages). Apart from that laying and installation of water pipeline in Medikhera, Bhawanipura and Suwaniya villages, Community centre has been constructed in Suwaniya Village. overhead tank has been constructed in Shivpura village. More infrastructure development activities will be taken up according to need as well as priority.	HZL has allocated Rs. 1.75 crore for construction and maintenance of CC roads. The same has been incorporated in Chapter 8, Section 8.4 of this EIA/EMP Report.
3	Villagers of Awalheda	Construct a Running Track and a Cricket Stadium so that youth can participate in different sports activities	HZL has always promoted sports and culture in local areas, and in alignment with the same a running track has already been developed in segwa. HZL will explore the feasibility of this request, basis which a running track in anwalheda may be developed in partnership with the local government body. In FY'23 company has supported state level badminton, state level athletic, state level kabaddi tournament etc. benefitting more	Government has already approved approx. Rs. 60 lacs for stadium construction in Anwalheda

S. No.	Name of the Person	Issues / Points / Opinions of Local Public	Reply by Project Proponent	Action Plan along with Budgetary Allocation
			than 5000 athletes/ sports enthusiasts. Last FY we have provided hockey kits in nearby panchayat. We support through sports kits and event management in many such sports tournaments	
4	Devikishan Regar Sarpanh Village Nagri (Ref: No.G.P./nagri/2022-23/SPL-3)	We request you to construct the open bridge on Berach River in Nagri Village because it is blocked due to anikat.	Presently a Causeway provided on the same location on Berach River. Will see later as this comes under government authority.	-
5	Kamlesh Purohit President (Chittorgarh Sahakari Bhoomi Vikas Bank Limited)	I would like to request that by adopting a complete transparent system in the recruitment process in Hindustan Zinc, employment should be provided to the local skilled, unskilled youth on priority. That how much under the CSR fund (Corporate Social Responsibility Fund) by Hindustan Zinc The amount is being spent and what is the procedure / policy to spend it. In this regard, it is requested that a clear and transparent policy should be made by constituting a committee to spend the amount of CSR Fund. This amount should be ensured by identifying the primary and basic needs of the area.	<ul style="list-style-type: none"> <li>Preference for employment has been and will be given to the local residents based on their qualification, company requirement and policy.</li> <li>There is a dedicated Corporate Social Responsibility committee and the detailed project and expenditure plan is approved by the board. All the projects, operation and expenses are regularly reviewed and monitored by HZL senior management</li> </ul>	-
6	i. Parvat Kuwar Villager Bodiya ii. Raghavlal Jatiya Village: Solera iii. Kaluram Mali Village: Ganeshpura	I request Hindustan Zinc to connect the farmers with latest technologies of farming so that our financial growth can be done	HZL will continuously provide help to local farmers and upgrade them with latest farming techniques under its Samadhan Pariyojana	-

S. No.	Name of the Person	Issues / Points / Opinions of Local Public	Reply by Project Proponent	Action Plan along with Budgetary Allocation
	iv. Kali Village Munga ka Khera v. Ratni Gadri Village Munga ka Khera vi. Kali Jatt Minga ka Khera vii. Nand Lal Mali Village Ganeshpura viii. Nirmal Kuwar Village Bodiya ix. Mohanlal Village Munga ka Khera			
7	Shyamlal Sawli Village Biliya	Kindly repair the village roads as there are very bad in condition	Construction of CC road is being carried out in Biliya village under CSR initiative.	HZL has allocated Rs. 1.75 crore for construction and maintenance of CC roads. The same has been incorporated in Chapter 8, Section 8.4 of this EIA/EMP Report.
8	Jamnallal Jatt, Sagra Mata Sakti Path ewam Mandir Vikas Samiti	Kindly clean the ground after public hearing	Noted & Done	
<b>G(iii)</b>	<b>Temples</b>			

S. No.	Name of the Person	Issues / Points / Opinions of Local Public	Reply by Project Proponent	Action Plan along with Budgetary Allocation
1	Prakash Sharma Village Ajoliya ka Khera	1. In the premises of Hindustan Zinc our ancestral land has gone. On it the ancient statue of Lord Shri Devnarayan ji is established, whose worship and cleanliness and all other types of care were done regularly by our ancestors. and is currently done. Therefore, it is a humble request to you that the puja material used by me for regular worship of Lord Shri Narayan for Havan be fixed at a fixed amount every month, so that regular worship of Lord Shridevnarayan can be done.	As per policy company not contributing on religious matter. However, support will be provided as per suitability for supply of water/electricity.	-
2	Jamnalal Jatt, Sagra Mata Sakti Path ewam Mandir Vikas Samiti	There should be development near Sagra mata temple	The road leading to Sagra mata temple in Ajoliya ka Khera has been constructed by HZL through its Corporate Social Responsibility initiatives. Any other activities will be taken up as and when need arises from community, and in order of priority.	HZL has allocated Rs. 1.2 crore for Infrastructure Development in the nearby villages. HZL has allocated Rs. 1.75 crore for construction and maintenance of CC roads. The same has been incorporated in Chapter 8, Section 8.4 of this EIA/EMP Report.
<b>H. Grievance Redressal:</b>				
1	Villagers from Putholi and Ajoliya ka Khera	Notices were issued by the Gram Panchayat Nagari on the irregularities being committed by Hindustan Zinc, in response to which the Sarpanch was threatened with legal action. Due to this, no action has been taken by the Panchayat on the irregularities. Village Panchayat Nagari has also opposed this fertilizer factory due to pollution hit by Hindustan Zinc on nearby villages. Many letters and complaints have been filed	The company has established state-of-the-art facilities for pollution control for the existing plant and ensures implementation of the mitigation measures to keep the pollution level within the prescribed norms. the same practice will continue for the proposed expansion project. We have	Company has allocated Rs. 120.05 Crores as Capital Cost and Rs. 15.14 Crores/annum as Recurring Cost for Environmental Protection Measures.



S. No.	Name of the Person	Issues / Points / Opinions of Local Public	Reply by Project Proponent	Action Plan along with Budgetary Allocation
		by the affected farmers to the administrative officers and politicians, but till date no action has been taken on Hindustan Zinc Company on environmental pollution and other irregularities	transparent grievances resolution mechanism to resolve any concerns.	The same has been incorporated in Chapter 10, Section 10.9 of this EIA/EMP Report.
2	Dinesh Chandra Teli Bolo ka Sawanta	I was hired as cab driver by the Logistics Limited Company and worked for Hindustan Zinc Limited. Staying under Chanderiya Chittorgarh, with my own vehicle Innova having registration number RJ09-1 TA-2005, during 13/08/2015 to 12/01/2016, subject to the condition that maximum distance of 4000 kms and Rs.72000/- per month and additional charges of Rs.10/- per km. The total outstanding of the hired by Chanderiya Chittorgarh is Rs. 7,50,000 / - which is still pending despite repeated requests. I am a poor person and earn my livelihood by driving only and I have no other source of income and due to non-payment of my dues, me and my family have come to the point of starvation. Hindustan Zinc Ltd., should recover the amount from Logistics Limited Company and give it to me.	This seems to be a contractual dispute between two independent parties, to which HZL is not a party. It is requested that the concerned person take up the contractual dispute directly with the relevant party. Concern person may raise their point in grievance cell if so required. HZL also have an internal and external grievance committee wherein person can connect and resolve issues. Committee information is available on notice board at Main gate of company and SOP is in place for same.	-
I.	<b>No Objection:</b>			
1	1. Gopallal Gadri Sarpanch Village Suwaniya (Ref: No.G.P./nagri/2022-23/SPL-5) 2. Devikishan Regar Sarpanch Village Nagri	HZL expansion should be granted only after taking No objection letter from our village.	All activities are being and will be done based on the prevailing rule & regulations.	-

S. No.	Name of the Person	Issues / Points / Opinions of Local Public	Reply by Project Proponent	Action Plan along with Budgetary Allocation
	(Ref: No.G.P./nagri/2022-23/SPL-5) 3. Jagdish Jatt Sarpanch Village Ajoliya ka Khera (Ref: No.G.P./nagri/2022-23/SPL-3)			

Table 7.1(b)

Summary of Issues / Points / Opinions of Local Public raised during the Public hearing is given below -

Issue	Point Raised	Reply by project proponent	Action plan along with budgetary allocation
<b>Employment</b>	<ul style="list-style-type: none"> <li>Employment should be provided to unemployed youth according to their qualification.</li> <li>HZL administration should assure that 50% employment will be given to the unemployed people of Gangrar area.</li> <li>The employment to land losers.</li> <li>Preference should be given to local community.</li> </ul>	<ul style="list-style-type: none"> <li>Employment has been provided to the local people according to their qualification and company policy. 4500 personnel are from Rajasthan and about 3500 of them are residents of Chittorgarh and its surrounding area.</li> <li>The company is committed to provide preference in employment to the local unemployed based on their qualification, and the company's policy.</li> <li>The Company, through its Corporate Social Responsibility initiatives, currently operates a skill training centre, Zinc Kaushal. It trains students in courses such as BFSI, Front desk associates, assistant electrician, automobiles sales executive etc. Till date more than 400 students have been trained and 60% have already been placed. We propose to train at least 200 students each year for capacity building.</li> </ul>	<p>The total manpower requirement for the proposed project is 360 people, and they will be sourced locally.</p> <p>Apart from direct employment, indirect employment due to the Plant is also envisaged by the way of transportation, workshops, petty contractors and shopkeepers, network of retailers throughout the state and in its marketing regions.</p> <p>Rs. 60 lacs have been allocated for skill development program in study area under existing CSR initiative.</p>

Issue	Point Raised	Reply by project proponent	Action plan along with budgetary allocation
<b>Education, Sports and Skill Development</b>	<ul style="list-style-type: none"> <li>All the nearby Gram Panchayat schools in the area should be upgraded to model schools by developing the existing infrastructure.</li> <li>HZL adoration should alleviate the shortage of staff in nearby schools.</li> <li>The company should develop open sports infrastructure, such as a track, playground, open gym, and stadium, for the youth of nearby villages.</li> <li>Skill development centres like TI, B.Tech., polytechnics, open defence academy, etc. should be developed in nearby areas for the local youth.</li> <li>Company should fulfill the school staff scarcity of nearby villages.</li> </ul>	<ul style="list-style-type: none"> <li>Under the Company's Corporate Social Responsibility initiatives, development in infrastructure of school has been and will be done as and when the need arises.</li> <li>An open gym has been installed in Sr. Secondary school, Nagri, post the Public Hearing.</li> <li>In FY'23 company has supported state level badminton, state level athletic, state level kabaddi tournament etc. benefitting more than 5000 athletes/ sports enthusiasts. Last FY we have provided hockey kits in nearby panchayat. We support through sports kits and event management in many such sports tournaments</li> <li>Major focus is on quality of education hence projects like shiksha sambal program is operational since last 5 years. Apart from that Unchi udaan, Vedanta P.G. girls college like initiatives give students opportunities for higher studies. Infrastructure related work is done according to the need arising from community.</li> <li>We will ensure to continue this support in the future as well.</li> <li>HZL will repair and develop new Classroom facility with chairs and table in Awalheda Village and also a full equipped computer lab for students under CSR as we doing.</li> <li>The Company has interacted with the school administration and encourage to utilise vidyalaya vikaas yojana for such development work</li> </ul>	HZL will spend Rs. 1.0 Crore for School renovation in village Munga ka Khera, village Putholi, Village Nagri, Village Biliya, Village Ajoliya ka khera. The details of the same has been incorporated in the Chapter section 8.4, Table no. 8.3 of Final EIA/EMP Report.
<b>Healthcare Facilities</b>	<ul style="list-style-type: none"> <li>Trauma Center should be developed in village Sawariyaji as district hospital.</li> </ul>	<ul style="list-style-type: none"> <li>Chittorgarh have trauma center in district Hospital and all major Facilities available at very minimal cost.</li> </ul>	-

Issue	Point Raised	Reply by project proponent	Action plan along with budgetary allocation
	<ul style="list-style-type: none"> <li>A doctor should be appointed in the village Suwaniya.</li> <li>There should be more doctors at the health centres.</li> </ul>	<ul style="list-style-type: none"> <li>Medical Facilities are already being provided to the nearby villages through the Swasthya seva mobile health Van service, as part of our Corporate Social Responsibility program.</li> <li>Recently, in FY 2021-22, hi tech medical equipment such as E.C.G. machine, multi para cardiac monitors, ventilator, defibrillator, CSC machine etc. was provided to Gangrar CHC, Chittorgarh district hospital, to upgrade the services.</li> <li>Appointing doctors to govt health centres fall directly within the scope of the government. However, in order to provide primary health care services, a mobile health van, as provided by HZL by way of its Corporate Social Responsibility initiatives, is operational, and it visits suwaniya once to twice per month and similarly covers 27 villages in total.</li> </ul>	
<b>Animal Husbandry and Veterinary facilities</b>	<ul style="list-style-type: none"> <li>Animals are dying because of the pollution from the company. Compensation to the affected farmers or insurance to the milch animals and the calf should be provided by the administration.</li> </ul>	<ul style="list-style-type: none"> <li>Regular animal health camps are being organized by HZL, in collaboration with government veterinary doctors in local villages.</li> <li>Moreover, a veterinary clinic situated in Biliya is operational since past couple of years and covers nearby villages, including Suwaniya, providing services for animal treatment.</li> <li>Although insuring cattle is not directly undertaken by the Company, but through its Samadhan program, a Corporate Social Responsibility initiative, the Company facilitates the district administration for animal insurance and creates awareness among farmers, also continuously working for the development of farmers under animal husbandry for Initiatives such as artificial insemination (conventional as well as sorted semen) for breed</li> </ul>	-

Issue	Point Raised	Reply by project proponent	Action plan along with budgetary allocation
		<p>improvement and to produce more female progenies etc.,</p> <ul style="list-style-type: none"> <li>Regular animal health camps are being organized by HZL, in collaboration with government veterinary doctors in local villages. Since last year more than 3000 Ais (1989 sorted semen Ais) performed, 30 animal health camps organized benefitting 11000+ animals. Company has supported farmers and administration in fighting lumpy through disinfectant spray in villages and medicine kits, benefitting around 19000 animals.</li> </ul>	
<b>Agriculture, Land &amp; Plantation Related Issues</b>	<ul style="list-style-type: none"> <li>The company has wrongly acquired the land of local farmers for the development of Greenbelt, but instead of that, HZL has proposed a fertilizer plant.</li> <li>Land losers should be compensated and employment should be provided to them.</li> <li>The nearby land which are in vicinity of the plant has become barren because of the pollution from the plant. Land compensation for the same should be provided.</li> <li>The agricultural crop is spoiled due to contamination of land. Proper compensation on fair market price should be provided to affected families.</li> <li>The area proposed under greenbelt is not as per the actual on ground.</li> </ul>	<ul style="list-style-type: none"> <li>Out of the total plant area (335.89 ha), 37.21% (i.e. 125.02 ha) has already been developed under greenbelt / plantation. The same will be maintained and enhanced by doing gap plantation to achieve the plantation density @ 2500/ha.</li> <li>HZL has ensured compliance and continues to be compliant with all relevant and applicable environmental conditions.</li> <li>HZL has not indulged in any fraudulent activities and ensures strict compliance with all relevant and applicable rules and regulations.</li> <li>HZL under its “Samadhan program” is continuously working for the development of farmers and animal husbandry. Initiatives such as agriculture package of practice, vegetable cultivation, hi-tech vegetable cultivation, low tunnel, trellis farming, conventional and ultra-high-density plantation have been undertaken by HZL through its Corporate Social Responsibility initiatives.</li> </ul>	<p>Company has allocated Rs. 1.0 Crores for Greenbelt Development. The same has been incorporated in Chapter 10, Section 10.9 of this EIA/EMP Report.</p> <p>Company has allocated Rs. 120.05 Crores as Capital Cost and Rs. 15.14 Crores/annum as Recurring Cost for Environmental Protection Measures. The same has been incorporated in Chapter 10, Section 10.9 of this EIA/EMP Report.</p>

Issue	Point Raised	Reply by project proponent	Action plan along with budgetary allocation
	<ul style="list-style-type: none"> <li>Provide tree guards and saplings to nearby villages.</li> </ul>		
<b>Environment</b>	<ul style="list-style-type: none"> <li>HZL Chanderiya is causing land, water, air and noise pollution in nearby areas.</li> <li>Nearby areas are affecting due to Jarofix Yard contamination in soil and water.</li> <li>Due contaminated water, nearby villagers have to carry water from their houses.</li> <li>Polluted water discharge in the Berach river have caused serious problem in the area.</li> </ul>	<ul style="list-style-type: none"> <li>HZL at its Chanderiya Lead Zinc Smelter unit has implemented various environment pollution control measures like ETP, RO Plants, Bag houses, Bag filters, ESP &amp; STP etc. Apart from this Company has facility of continuous ambient air quality monitoring systems at locations as well as system of online monitoring of emissions from plant, Proper monitoring of effluent generation &amp; recycling system is available.</li> <li>The company has established state-of-the-art facilities for pollution control for the existing plant and ensures implementation of the mitigation measures to keep the pollution level within the prescribed norms. the same practice will continue for the proposed expansion project.</li> <li>More than 37% area covered with green belt.</li> <li>HZL is using mycorrhiza technology for development of Green area on Jarofix Waste dump with TERI as Pilot Project.</li> <li>Rest area of Jarofix completely covered with HDPE liner to avoid fugitive emissions from the yard.</li> <li>The plant is Zero Liquid Discharge unit and will remain the same after the proposed expansion as well.</li> </ul>	Company has allocated Rs. 120.05 Crores as Capital Cost and Rs. 15.14 Crores/annum as Recurring Cost for Environmental Protection Measures. The same has been incorporated in Chapter 10, Section 10.9 of this EIA/EMP Report.
<b>Socio-Economic Development</b>	<ul style="list-style-type: none"> <li>HZL should develop pipeline and provide regular water supply from tap to nearby villages.</li> <li>Under CSR Program drinking water and other development</li> </ul>	<ul style="list-style-type: none"> <li>The Company has ensured to supply clean drinking water in operational areas. In the last 2-3 years Over Head Tanks and pipeline initiatives were carried out by HZL, in Biliya, Munga Khera, shivpura, suwaniya, mediKhera, bhawanipura, salera, pavtiya</li> </ul>	HZL has allocated Rs. 1.5 crore for construction and maintenance of Overhead tank and pipeline. Company has allocated Rs. 120.05 Crores as Capital Cost and Rs. 15.14 Crores/annum as Recurring Cost for Environmental



Issue	Point Raised	Reply by project proponent	Action plan along with budgetary allocation
	should be done in 11 panchayats of Gangrar area.	<ul style="list-style-type: none"> <li>Construction of overhead tank and pipeline will be taken up in Ajoliya ka Khera as well.</li> <li>Drinking water facility also implemented through ATM RO to Biliya/Nagari &amp; Ajolion ka Khera Villages.</li> </ul>	Protection Measures. The same has been incorporated in Chapter 8, Section 8.4 of this EIA/EMP Report.
	<ul style="list-style-type: none"> <li>Road connectivity between Medikhera to village Suwaniya, Shiv Mandir to Devnarayan Mandir and village's cremation ground to be repaired and maintained.</li> <li>Construction and Maintenance of road, bridge on bearch river, temples and drainage infrastructure in MediKhera, Nagri, Baliya, Ajoliya ka Khera and Suwaniya villages.</li> </ul>	<ul style="list-style-type: none"> <li>More infrastructure development activities will be taken up, as part of the Company's Corporate Social Responsibility initiatives, according to need as well as priority, in the future, CC roads have been constructed in suwaniya panchayat (Shivpura, bhawanipura and suwaniya vimllages), kashmore, biliya etc.</li> <li>HZL will construct a solid wall around Sagra Mata Temple and proposal under planning &amp; discussion with committee.</li> <li>Open Gym and a common garden will be constructed in Ajoliya ka Khera Village with all modern sports facilities. Under planning &amp; will implement based on priority in phased manner.</li> <li>More infrastructure development activities will be taken up according to need as well as priority.</li> <li>Presently a Causeway provided on the same location on Berach River.</li> </ul>	Company has allocated Rs. 1.75 Crores for Community Infra development like construction of CC Roads and Rs. 1.20 Crores for construction of Community halls in Biliya village, Anwalheda village, Semalpura village, Abhayapura village. The same has been incorporated in Chapter 8, Section 8.4 of this EIA/EMP Report.
	<ul style="list-style-type: none"> <li>Construction of Running Track, Cricket stadium at Aawalheda.</li> </ul>	<ul style="list-style-type: none"> <li>Government has already approved approx. Rs. 60 lacs for stadium construction in Aawalheda.</li> </ul>	-
	<ul style="list-style-type: none"> <li>Development works like water, electricity, roads, drains, school buildings etc. should be done in those villages whose land is acquired.</li> </ul>	<ul style="list-style-type: none"> <li>All categories of infrastructure development work is being done through the Company's Corporate Social Responsibility initiatives, as per the needs and requirement of community. The same will continue for the proposed expansion project as well.</li> </ul>	Apart from the CSR, the company has allocated Rs. 5.45 Crores for Socio-economic development activities in next 5 years. The same have been

Issue	Point Raised	Reply by project proponent	Action plan along with budgetary allocation
	<ul style="list-style-type: none"> <li>We want that the cost of fertilizers and seeds should be given by Hindustan Zinc to the farmers of the area.</li> </ul>	<ul style="list-style-type: none"> <li>HZL under “Samadhan Pariyojana” is continuously working for development of farmers and animal husbandry. Under this CSR Program HZL will provide all assistance and help to nearby farmers.</li> </ul>	incorporated in Chapter 8, Section 8.4 of this EIA/EMP Report.
<b>Grievance Redressal</b>	<ul style="list-style-type: none"> <li>Local having grievance regarding land crop, compensation, legal threatening by company against the local people, some pending amount</li> </ul>	<ul style="list-style-type: none"> <li>The company has established state-of-the-art facilities for pollution control for the existing plant and ensures implementation of the mitigation measures to keep the pollution level within the prescribed norms. the same practice will continue for the proposed expansion project. We have transparent grievances resolution mechanism to resolve any concerns.</li> <li>HZL also have a internal and external grievance committee wherein person can connect and resolve issues. Committee information is available on notice board at Main gate of company and SOP is in place for same.</li> </ul>	Company has allocated Rs. 120.05 Crores as Capital Cost and Rs. 15.14 Crores/annum as Recurring Cost for Environmental Protection Measures. The same has been incorporated in Chapter 10, Section 10.9 of this EIA/EMP Report.

Note: Socio - economic development activities (Education/Sports / Health & Sanitization / Infrastructure Development /livelihood and Skill Development etc.) during next five years. Details are given in Chapter 8, Section 8.4, Table 8.3 of this EIA/EMP Report.

### 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 - Putholi, Ajoliya Ka kera & Biliya, Tehsil- Gangrar & Chittorgarh, District- Chittorgarh, Rajasthan by M/s Hindustan Zinc Limited. Location details are given in Chapter 2, section 2.3 of this EIA/EMP Report.

#### 7.3.2 GEOMORPHOLOGY AND TOPOGRAPHY

The district is characterized by undulating topography. The western, southern and northern parts are generally plain area. Hills are scattered in Chhoti Sadri, Bari Sadri and Pratapgarh tehsils. Hill ranges towards east of Chittorgarh town runs north-south with intervening valleys parallel to each other. Chittorgarh and Pratapgarh tehsils are partly hilly and partly plain. The district has the regional slope from south to north. The height varies from 317m to 637m, Pemakhera, Kanarkhera hill is the highest, having height of 637m. Details are given in Chapter 3, section 3.6.3 of this EIA/EMP Report.

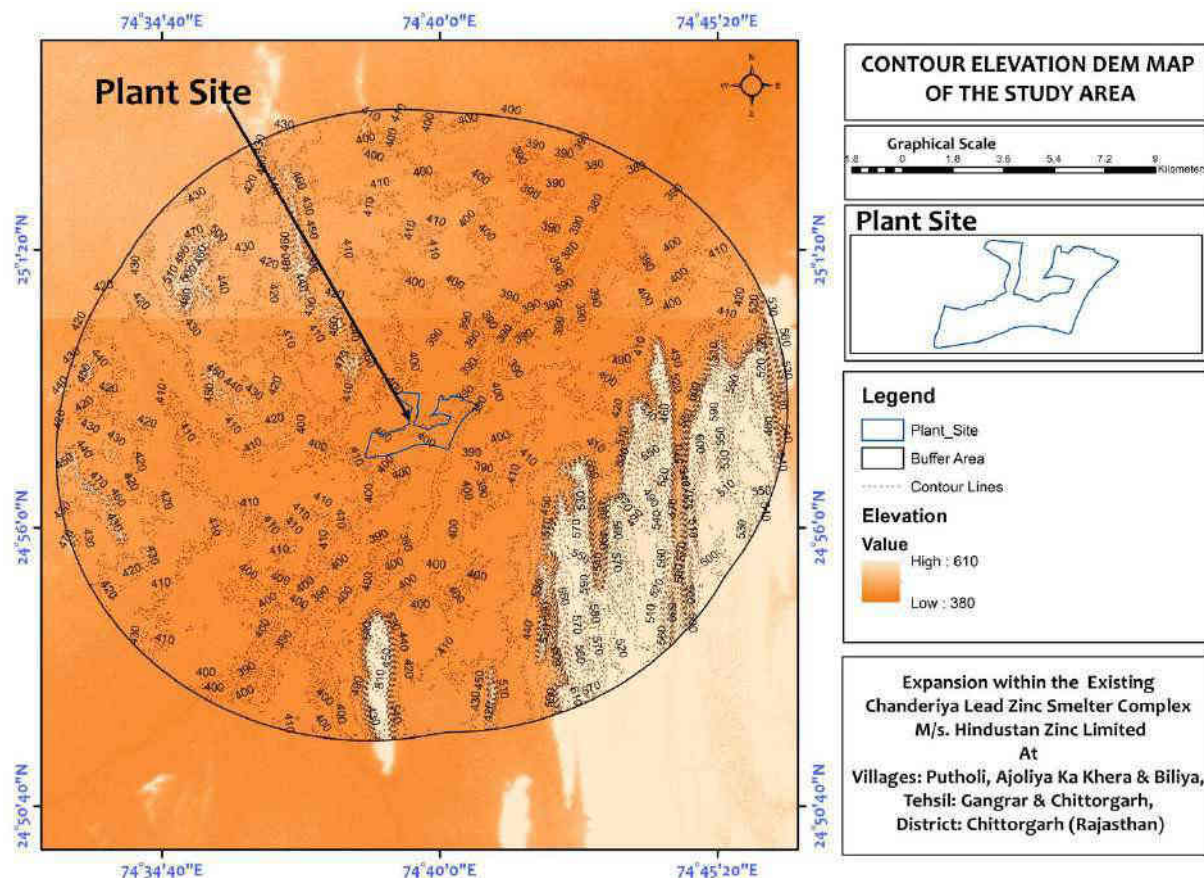


Figure 7.2(a): Map showing Digital Elevation Model 10 km study area of CLZS Complex (Source: Bhukosh)

**7.3.3 CLIMATE AND RAINFALL**

Details are given in Chapter 3, para 3.6.5 of this EIA/EMP Report.

**7.3.4 WATER REQUIREMENT AND ITS SOURCE FOR THE PROPOSED EXPANSION IN CLZSC**

Existing water requirement for the project is 38570 KLD which is being sourced from Gosunda Dam (Captive) /Proposed STP Chittorgarh/ Udaipur/ other proposed STP's (Recycled Water). No additional fresh water will be required for the proposed expansion project. Details of Permission obtained for supply of water for CLZS Complex are given in Chapter 2, section 2.5.3.1 of this EIA/EMP Report.

**7.3.5 GEOLOGY OF THE STUDY AREA****REGIONAL GEOLOGY**

The Chittorgarh district comprises rocks of Bhilwara Supergroup, Aravalli Supergroup, Vindhyan Supergroup, Deccan Traps and recent alluvium. The undeformed Middle Proterozoic sediments forming the Vindhyan Supergroup occur in a large arcuate basin in the northern region of the Indian shield. Basement rocks (PreAravalli) i.e. the Bhadesar formation and Berach Granite are overlain by Vindhyan rocks with unconformity in it. The Bhadesar formation consists of quartzite, dolomitic limestone, shale, slate. Lower Vindhyan rests unconformably on Bhilwara Supergroup and at certain places this Group is overlain by Khairmalia Andesite, Khardeola Conglomerate or Bhagwanpura Conglomerate.

The rock formations were first studied and mapped by Hacket C.A. in 1881 and then by Dr. A.M. Heron in 1936. Dr. A.M. Heron classified the limestone formations of the area under Nimbahera limestone belt, equivalent to Semri series of lower Vindhyan. The regional stratigraphic sequence according to Dr. Heron is as follows:

**Table 7.2(a)**  
**Regional Geology**

Age	Group	Formations
Recent to sub-recent		Alluvium & Soil
Pleistocene		Laterite
Upper cretaceous		Deccan trap
Vindhyan Super Group	Kaimur Group	Kaimur Sandstone
	Khorip Group	Suket Shales Nimbahera Limestone Bari Shales

The limestone named after its typical place of occurrence is continuously found from Jawad in Madhya Pradesh to Nimbahera in Rajasthan and thereafter in patches in Chittorgarh, Binota, Khor and Sawa.

**LOCAL GEOLOGY**

Stratigraphically, the area form part of Berach Granite of Aravali Supergroup(Archean age) which is Overlain by Semri group (Mesoproterozoic age) which belongs to vindhyan supergroup. The lithostratigraphy consists of Granite, Granitic gneiss of berach granite formation.

**7.3.6 HYDROGEOLOGY OF THE AREA (AQUIFER TYPES, WATER LEVEL AND YIELD POTENTIAL)**

Rainfall is the main source of ground water recharge in the Chittorgarh district. Various geological formations ranging in age from Archaeans to Recent occurs in different part of area and contributes to a complex geological set up in the district. However, Vindhyan are the main rock units of the area, covering more than 95% of geographical area of the district.

Occurrence and movement of ground water in hard rock is essentially by development and nature of secondary joints and fractures. Solution cavities in limestones also play an important role in groundwater movement at certain places. Ground water in general occurs under unconfined to semi-confined conditions. Groundwater occurs under unconfined condition in saturated zone of rock formation. Its occurrence is controlled by topography, physiography and structural features of the geological formations. The movement of the groundwater in hard rock areas is governed by size, openness, interconnection and continuity of structural weak planes while in unconsolidated rocks, ground water movement takes places through pore space between grains. Water bearing properties of different aquifers are described below.

The occurrence and movement of ground water in different lithological units is majorly controlled by following formations:

**Akoda Mahadev Sandstone Formation:** Lithologically the Akoda Mahadev Sandstone formation comprise pebbly sandstone, orthoquartzite with intercalations of shales which are locally ferruginous. The shale occurs as interbeds within Akoda Mahadev Sandstone, locally it is ferruginous. The shales are thinly laminated. The Akoda Mahadev Sandstone exhibit conformable contact with the underlying Suket Shale.

The Suket clayey shales locally sandy towards the top. The shales are well jointed. The shales have developed fissility along bedding.

#### **7.3.7 SITE SPECIFIC HYDROGEOLOGY IN AND AROUND CORE ZONE**

The plant lies in Vindhyan Super group. Granitic gneiss are the principal aquifer in the area having potential yield in the range of 40 KLD. Groundwater in these units occurs at a deeper level.

#### **7.3.8 AQUIFER DESCRIPTION:**

The area has been found to be occupied by thin layer of black colour silty soil followed by limestone & at some places shale also occur. Ground water generally occur in water table conditions and is transmitted through the fractures, joints, bedding planes and solution cavities of limestone and fracture and cleavage plane of shale.

Water level results indicate that there may be two sets of aquifer system in the area upper aquifer and lower aquifer. Upper is not so productive aquifer and hold the seepage and rainwater only in the monsoon and winter seasons and even during these seasons does not support the production and only fulfil the domestic water requirement. The lower aquifer is productive and often controlled by deep-seated fractures, which generally occurs between depth ranges of 100 to 150m depth. Also occurrence of fractures does not show any homogeneity due to the fact that most the mines having depth up to 50m in nearby area has dry bottom conditions in the summer and winter seasons.

In the investigated area the movement of ground water is governed mainly by secondary fractures as limestone are impervious in nature and do not possess primary porosity. The alluvial thickness is very low and remains unsaturated during major part of the year. The general land slope and drainage in the area is towards north western part. The ground water flow follows the surface flow direction and moves in the northern direction.



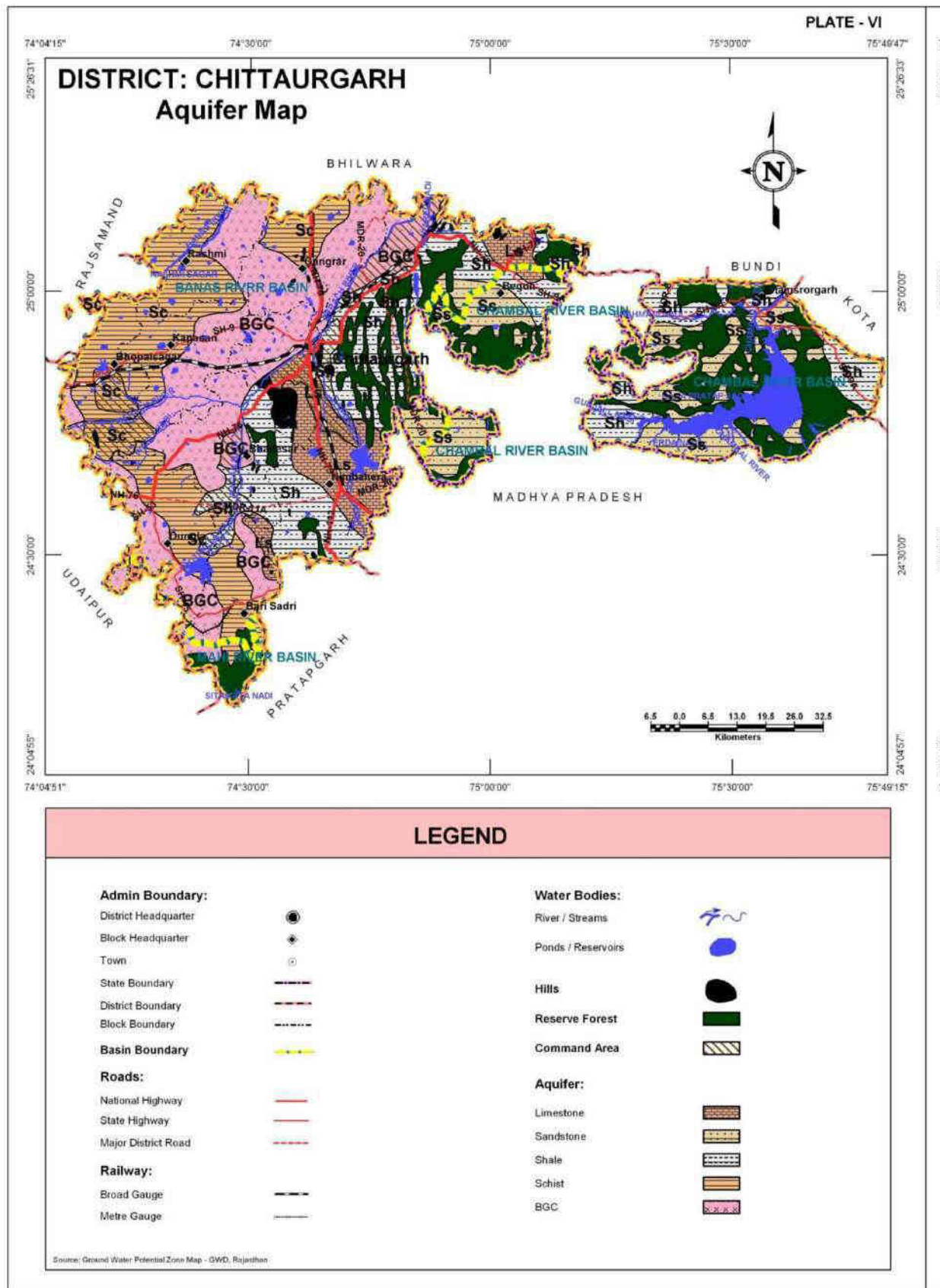


Figure 7.2(b): Aquifer Map of Chittorgarh District (Source: CGWB)



**7.3.9 DRAINAGE PATTERN OF THE STUDY AREA**

The drainage system is well developed and drainage density varies from 0.3 to 1 km/sq.km. Chambal is the only perennial river. It enters the district near Gandhi Sagar and flows towards NE for about 50 km and then passes into Kota district. The other main rivers are Banas, Gambhiri, Gujjali, Bamani, Berach, Jakham and Wagon.

The Banas River originates in Udaipur district and enters Chittorgarh through Rashmi tehsil. It passes through Somi, Sankhli, Pahunia, and Unchkia villages.

The Ghabhir River originating in Madhya Pradesh flowing through Nimbahera and Chittorgarh tehsils joins Berach River. It passes through villages of Khor, Myara, Sarthal and Tai.

The local drainage pattern in and around the area is dendritic to sub-parallel in nature with low drainage density.

**7.3.10 WATER QUALITY**

The quality of ground water was studied by collecting 8 water samples from ground water.

The analysis of the samples have been carried out in J.M. EnviroLab Pvt. Ltd. located in Gurgaon, The lab is NABL certified and has approval from MoEF and state boards.

Details of ground water sampling location and their analysis report are given in **Chapter 3 of Final EIA/EMP Report**.

**7.3.11 GROUND WATER RESOURCES****GROUND WATER RESOURCES FOR BUFFER ZONE**

The study area is coming about 416.58 sq.km. (As per land use/land cover map). The area of Buffer zone (416.58 sq.km – 3.3589 sq.km = 413.22 sq.km.) lies in Chittorgarh & Gangrar Block of Chittorgarh district. This buffer zone has Granite/Granite Gneiss & metamorphic rock of Berach Granite Group as main aquifer. Main recharging factors in this area is recharge due to rainfall, due to return flow from the applied irrigation from surface and ground water and recharge from the surface water bodies. Annual average rainfall of last 10 year is 908.15 mm.

Geographical area, specific yield and infiltration index are the parameters for determining the amount of water which is stored in the aquifer.

**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)	413.22
2.WaterTableFluctuation(m)	3.5
3.SpecificYield for metamorphic	1%
4.Total GroundwaterStorage [(1)*(2) *(3) ](Mcum)	413.22*3.5*0.01
5.Total(M cum)	14.46

**(b) BY RAINFALL INFILTRATION FACTOR**

RECHARGE IN BUFFER ZONE BY RAINFALL INFILTRATION FACTOR METHOD	
Description of items	Quantity
1.Area (sq.km)	413.22

RECHARGE IN BUFFER ZONE BY RAINFALL INFILTRATION FACTOR METHOD	
2. Average Annual Rainfall (m)	0.908
3. Rainfall infiltration factor	5%
4. Rainfall recharge in Buffer zone by Rainfall Infiltration Factor Method	$413.22 \times 0.908 \times 0.05$
Gross Rainfall Recharge (Mcum)	18.76

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)	14.46
1b) By Rainfall Infiltration Factor Method (Mcum)	18.76
2. Difference between (1a) and (1b) expressed as a percentage of (1b), 'PD' $\left[\frac{(1a) - (1b)}{(1b)} \times 100\right]$	-20%
3. Rainfall Recharge in the Buffer Zone during monsoon season (Mcum) $\begin{aligned} &= (1a) \text{ if 'PD' is between } -20 \text{ and } +20\% \\ &= 0.8 \times (1b) \text{ if 'PD' is less than } -20\% \\ &= 1.2 \times (1b) \text{ if 'PD' is greater than } +20\% \end{aligned}$	14.46

**TOTAL RECHARGE OF BUFFER ZONE**

NET ANNUAL GROUNDWATER AVAILABILITY IN BUFFER ZONE	
Description of items	(Mcum)
1. Rainfall Recharge in Buffer Zone	
Water Table Fluctuation Method	14.46
2. Recharge from 'Other Sources'	
A. Return flow to Ground water system (30%) through Irrigation Total groundwater applied for irrigation is 17.76 mcm/annum ( $17.76 \times 0.3$ )	5.3
B. Recharge through surface water bodies in the area: (6.51 sq km $\times$ 0.4)	2.604
Total Annual $[(2a) + (2b)]$	6.304
3. Gross Annual Ground water Recharge	<b>22.364</b>

Table 7.2(b)

**GROUNDWATER DRAFT OF BUFFER ZONE**

GROSS ANNUAL GROUNDWATER DRAFT FOR 'ALL USES' IN BUFFER ZONE	
GROUNDWATER DRAFT	Mcum
<b>NET IRRIGATION USE</b>	
For Combined	12.46
Return flow to Ground water system (30%)	5.3
Net irrigation use	17.76

GROSSANNUAL GROUNDWATER DRAFT FOR 'ALL USES' IN BUFFER ZONE	
<b>COMMUNITY USE</b>	
Total population 72797 (@ 100 lpcdf for 365 days)	2.65
For cattle population (5% of community use):	0.13
Industrial/Mine use (for all industries/ mines falling in the buffer zone)	2.55
Total Community use	5.33
<b>GROSSANNUAL GROUNDWATER DRAFT FOR 'ALL USES' IN BUFFER ZONE</b>	<b>23.09</b>

Total recharge of the buffer zone is 20.76 mcm/annum while total groundwater draft is 23.09 mcm/annum.

The groundwater development in the area is about 85% of total groundwater recharge. Therefore, buffer zone is coming under **Over-Exploited** category as per groundwater development status.

In spite of the above clarification the plant lies in **Gangrar & Chittorgarh** Assessment Block of **Chittorgarh** District which comes under **Over-Exploited** Category as per CGWB Categorization 2017.

<http://cgwb.gov.in/GW-Assessment/Categorization%20of%20AU.pdf>

So in view of the above the project will not bring any adverse impact to the ground water conditions within 10 km of the study area.

Table 7.3

**SUMMARY OF BUFFER ZONE WATER BALANCE**

STAGE OF GROUNDWATER DEVELOPMENT IN BUFFER ZONE	
Description of items	Buffer Zone
1. Stage of Ground water Development	
a. Net Groundwater Availability (Mcum)	22.364
b. Annual Gross Groundwater Draft (Mcum)	23.09
c. Balance Available Annual Ground water Recharge	-0.726
d. Stage of Ground water Development [ $\{(1b)/(1a)\} * 100$ ]	103%
e. Category of Groundwater Development	<b>Over-Exploited</b>

**7.3.12 RAINWATER HARVESTING**

Rainwater harvesting is a technique of collection and storage of rainwater into natural reservoirs or tanks, or the infiltration of surface water into subsurface aquifers (before it is lost as surface runoff). The process involves collection and storage of rainwater with help of artificially designed systems, that runs off natural or man-made catchment areas e.g. rooftop, compounds, rocky surface, hill slopes or artificially repaired impervious / semi-pervious land surface. The collected rainwater from surfaces on which rain falls may be filtered, stored and utilized in different ways or directly used for recharge purposes. Rainwater harvesting is unrestricted from any kind of impurity, with relatively less storage cost and no maintenance cost involved except for periodical cleaning.

With depleting groundwater levels and fluctuating climate conditions, this measure can go a long way to help mitigate the adverse effects of rising water scarcity. Reserving rainwater can help recharge local aquifers, reduce urban flooding and most notably, ensure water availability in water-scarce zones. Artificial recharge techniques normally address to following issues –

- (i) To enhance the sustainable yield in areas where over-development has depleted the aquifer.

- (ii) Conservation and storage of excess surface water for future requirements, since these requirements often change within a season or a period.
- (iii) To improve the quality of existing groundwater through dilution.
- (iv) To remove bacteriological and other impurities from sewage and waste water so that water is suitable for re-use.

The basic purpose of artificial recharge of groundwater is to restore supplies from aquifers depleted due to excessive groundwater development.

### 7.3.13 DETAILS OF RAINWATER HARVESTING STRUCTURES INSIDE THE PLANT

The project area falls under Over Exploited zone for ground water development. Existing water requirement of the CLZS Complex is 38570 KLD which is being sourced from Gosunda dam. No additional fresh water will be required for the expansion of the capacity. The plant do not use any Ground water. Being an existing complex, CLZS has adequate Rain water harvesting as well as recharge structures within the premises. Major rain water harvesting structures within the complex have been shown in the figure no. 10.2 given in Chapter 10 of this report. Apart from the above, HZL has constructed approx. 90 rainwater harvesting structures (comprising of Check dams, Gabion, Weirs, Earthen check dams and Cemented check dams etc.) in the nearby area. As the proposed expansion will be carried out within the existing plant premises and no additional fresh water will be required for the proposed expansion, the existing rain water harvesting practices will suffice for the proposed expansion project. However, additional storm water ponds need to be constructed in the northern area of the complex to prevent storm water run-off to get in to the nallah. The details of the major 6 existing Rain water/storm water harvesting structures available within the plant premises are given in the below table.

**Table 7.4**  
**Rain water/storm water harvesting structures**

S. No.	Particulars	Details (approximate)						Total
		Water pond	Storm water pond 1	Storm water pond 2	Storm water pond 3	Storm water pond 4	Storm water pond 6	
1.	Storage Capacity (cum)	16000	6200	7800	7000	4500	3500	45000

## 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 programmes in plant. Hence, an emergency preparedness plan will be planned properly and documented for ease of implementation at the time of need without losing time and avoiding delays. Identification of Hazards at CLZS Chittorgarh 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

Table 7.5

Hazard Identification

S.No.	Chemical	Location	Hazard
1.	Propane / LPG	Propane / LPG Storage Yard & associated transfer lines and equipment	Fire: Pool Fire, Jet Fire, Flash Fire Explosion: Vapour Cloud Explosion(VCE), Boiling Liquid Expanding Vapour Explosion (BLEVE)
2.	LDO	LDO 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 <sub>2</sub> / SO <sub>3</sub> )	Acid Plant and transfer lines from GCP to Acid Plant	Release of Toxic Gas caused by the sudden escape of SO <sub>2</sub> / SO <sub>3</sub> in large medium or small quantities
6.	Chlorine	Hydro 1 & 2 Acid Plant & Pyro Acid Plant	Release of Toxic Gas caused by the failure of cylinder/tonner.

S.No.	Chemical	Location	Hazard
7.	Ammonia Liquor	Copper Recovery Plant	Release of toxic fumes containing ammonia due to failure of storage vessel/pipe line / Valve, etc.
8.	Carbon Monoxide (CO)	PYRO Plant (Coke Pre heater, etc.)	Release of toxic gas due to failure of transfer lines

#### 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 prioritised 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 equipments; and
- Danger signs will be displayed at appropriate locations.

#### 7.4.5 Disaster Management Plan

**Emergency Scenario:** Flood in CLZS location / Chittorgarh City because of heavy rain or water released from Ghosunda Dam or Ghosunda Dam wall collapsed.

**Purpose to prepare this plan:** To minimise vulnerability to floods and consequent loss of lives, livelihood systems, property and damage to infrastructure and public utilities.

**Causes of Floods:** Inadequate capacity of the rivers to contain within their banks the high flows brought down from the upper catchment areas following heavy rainfall, leads to flooding. The tendency to occupy the flood plains has been a serious concern over the years. Because of the varying rainfall distribution, many a time, areas which are not traditionally prone to floods also experience severe inundation. Areas with poor drainage facilities get flooded by accumulation of water from heavy rainfall.

**Response Plan:** An effective and prompt response to floods 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 floods are essential components of flood response.

Management and control of the adverse consequences of floods will require coordinated and effective response systems at all levels-national, state, district and local.

Communication flow / Warning system:

1. Hourly monitoring of water level at Ghosunda dam & plant reservoirs by respective HZL operators.
2. Rate of increasing of water level in Dam, nearby rivers or Nallha shall be reported to Head Civil by respective HZL operators.
3. Head Civil will assess the situation & take appropriate decision to inform District Authority & Senior Management of location before opening Dam gate.
4. After receiving information from Head Civil, District Authority will inform to affected area population as per District Disaster Management Plan before opening the Ghosunda Dam gate.

**Evacuation Plan** - Evacuation of human population is the only prescribed means to save them from the fury of floods. Evacuation needs to be carried out as a precautionary measure based on warning indicators, prior to impact, in order to protect flood-threatened persons from the full effects of the disasters. Evacuation may also be necessary after the area has been flooded in order to move persons from a flood-affected area to safer and better surroundings. Continuous dialogue with Local Administration, stakeholders such as, early warning providers, transportation authorities, health-care authorities/ personnel, food and essential commodity suppliers, civil societies.

#### **7.4.6 Onsite Emergency Plan**

The **On-site Emergency Management Plan** of CLZS covers the identification of hazards, consequence and risk analysis for the following facilities:

1. Hydro Smelters
2. Pyro Smelter & Ausmelt Plant (Lead Plant)
3. Captive Power Plant

An Integrated Emergency Management System comprising of Planning, Preparedness and Response has also been described to tackle any incident & emergency in CLZS, Chittorgarh. It also describe the likely hazardous situations, procedures for dissemination of proper warning, key personnel and their responsibilities for rapid execution of assigned tasks, a structure for exercising effective command, control, coordination and monitoring, etc.

#### **Emergency Scenario**

Management and control of the adverse consequences of floods will require coordinated and effective response systems at all levels-national, state, district and local.

Communication flow / Warning system:

1. Hourly monitoring of water level at Ghosunda dam & plant reservoirs by respective HZL operators.
2. Rate of increasing of water level in Dam, nearby rivers or Nallha shall be reported to Head Civil by respective HZL operators.
3. Head Civil will assess the situation & take appropriate decision to inform District Authority & Senior Management of location before opening Dam gate.
4. After receiving information from Head Civil, District Authority will inform to affected area population as per District Disaster Management Plan before opening the Ghosunda Dam gate.
5. After the communication flow to affected area population, District Authority will revert back to Head Civil to open the Ghosunda Dam gate in controlled manner depending upon the situation.
6. After releasing excess volume / flow of water Head Civil will close the gate & will inform to District Authority.

#### **Existing Controls:**

1. Regular stability monitoring of Dam
2. Maintaining water level at safe point
3. Regular maintenance of Dam wall & Gates
4. Planned & limited release of water from Dam to river with informing to local administration.

5. Scheduled drainage cleaning before monsoon.

#### Emergency Response:

1. Trained rescue team available at location
2. In case of severe flood – assembly point will be security control room for CLZS & Zinc Colony.

#### Purpose

The purpose of this working guide is to address those 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 CLZS Complex.
- Identifying the equipment necessary for safe procedures and methods,
- Establishing a Plan of Action in the event of emergencies

**Table 7.6(a)**  
**Role & Responsibility of Each Coordinator**

Role of Coordinator	Overall responsibility
ROLE OF KEY PERSONNEL ON HEARING EMERGENCY SIREN:	Location Head/ Chief Emergency Controller (CEC) will reach to Emergency Control Centre (ECC) or Alternate Emergency Control Centre depending upon wind direction & situation of emergency if ECC is affected.
Chief Emergency Controller (CEC) or Location Head:	Final authority on all matters related with declaration of emergency, fire-fighting, rescue operation, calling outside for assistance, transportation, liaison, evacuation, media, all clear signal for emergency, etc.
Unit Incident Controller (UIC) or Unit Head:-	Rush to the site of emergency / incident after getting information from Shift In charge, assesses the situation and immediately inform to: Site Emergency Controller
Shut down Coordinator:	Give instructions to respective plant I/C for shut down and follow up the actions taken and ensure proper shut down of the plant
Fire & Safety Coordinator:	Ensure the availability of emergency safety equipment and PPE and the On-site emergency handling operations are carried out as per On-site emergency plan.
Facilities Coordinator	Assess the situation in consultation with Chief emergency controller and Unit incident controller and ensure that casualties get adequate transport / medical help.
Medical Coordinators	Inform the hospitals to be ready for receiving the injured persons Ensure the safe transport of the injured persons to the hospital Ensure proper first aid for injuries in the first aid centre Mobilize additional medical facilities if required Guide the medical team members and involve them in giving first aid to the injured persons Any other work assigned by chief Emergency Controller.
Traffic & Security Coordinator	Immediately send some of the guards to the incident site to restrict unauthorized entry Main gate and other gates to be closed to restrict further entry of visitors/vehicles.

Role of Coordinator	Overall responsibility
	Post security personal in Acid loading station, concentrate unloading, to stop the movement of vehicle and direct the drivers to assistance to reach safe assemble point/Emergency shelters Post one of the security people to go round the plant to guide the security staff and to regulate the movement of visitors/labours/ Vehicles
Public Relations & Communication Coordinator	Inform Press, TV / Radio, Local authorities about the severity of situation in close coordination with chief emergency controller Maintain good relation with nearby industries/villages Establish and maintain good rapport with the Govt. agencies, large scale industries in the area and media Evacuation of adjoining areas and village, if required and seek help from police if necessary
Power Coordinators	Ensure the availability of power for emergency operations Arrange for safe electrical circuits needed by the Unit Incident Controller/ Shut down Controller Ensure power supply without interruption for the critical equipment and their functions as advised by shutdown controller/ Unit incident controller Arrange for emergency maintenance of electrical equipment /services need by the shutdown coordinator

#### 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 OF HANDLING EMERGENCY:

At CLZS 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<sub>2</sub>), 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 CLZS by using the resources and facilities available at CLZS.

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 CLZS by using the resources and facilities available at CLZS.

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 CLZS may require the support from the District Crisis Group and the Local Crisis Group (DLCCG) 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 pipe line or storage tanks.

#### **SYSTEM ELEMENTS OR EVENTS THAT CAN LEAD TO AN ACCIDENT**

On the basis of preliminary hazard analysis done by a team of professional, expert opinions, etc. the major process/ operational deviation in the following systems can lead to an accident.

#### **PYRO Plant (Unit-1)**

- Crushing of raw material and igniting of mixed and conditioned pallet
- Transfer of SO<sub>2</sub> gas to Acid plant
- Sulphuric Acid plant
- Coke Pre-heater
- Smelting Furnace
- Kettle at LRP
- Column at ZRP
- Ausmelt Furnace
- Boiler

#### **HYDRO Plant (Unit-2)**

- Raw material Handling from RMH area to Roaster Furnace
- Roaster for converting zinc sulphide to zinc oxide and sulphur dioxide in fluid bed furnace
- Transformation of SO<sub>2</sub> and gas cleaning system
- Waste heat boiler
- Leaching & purification (Hot & Cold leaching process)
- Electrolysis process for the Zinc deposition on cathode sheets
- Melting furnace for Zinc sheet melting
- Finish goods (Zinc Ingots) handling
- Acid tank of 02 x 5000 MT capacity at Hydro-II.

#### **Captive Power Plant**

- Coal Handling Plant
  - a. Coal conveyor belts
  - b. Coal bunkers

- c. Coal crusher
- d. Coal burners and Mill areas
- Steam Generation
- Power Generation by Steam Turbine
- 132 KV Switch yard
- Power transmission.

#### **Storage and Handling of Chemicals**

- Storage and handling of LPG/Propane
- Storage and handling of LDO, HSD
- Storage and handling of H<sub>2</sub>SO<sub>4</sub>
- Storage and handling of Chlorine in Roster Gas Cleaning Plant and Pyro Acid plant
- Transfer of SO<sub>2</sub>/ SO<sub>3</sub> gas

#### **Fire Hazard Areas**

- Propane storage tank and transfer lines of Propane
- LDO / HSD storage tank and transfer lines.
- Transportation of Propane / Unloading bay for Propane
- Coal Handling Plant and conveyor galleries including Transfer points
- Cables in cable galleries/Cellars
- Transformer oil and lube oil storage facilities
- Burners area in boilers
- Control room
- Turbine area
- Turbine oil Tanks in Units
- Power Transformers
- Mill plant & Milling area
- PNG Facility Area

#### **Explosion Hazard Areas**

- Propane / LPG storage and transportation
- Transformer (oil cooled)
- Boiler (Coal/oil Fired)
- Coal dust in Mills ,Bunkers/ Hoppers and Boilers
- Liquid oxygen bullet

#### **Areas susceptible to release of chemicals**

- Acid storage tanks and associated distribution pipelines.
- Petroleum tanks at their respective storage areas.

#### **Hazardous locations due to bursting of pipe lines**

- Steam pipes due to high pressure/temperature
- SO<sub>2</sub>/ SO<sub>3</sub> gas lines and acid lines



- Propane / LPG transportation Pipes
- Compressed air header

**Hazardous locations susceptible to release of gases/dust**

- Release of SO<sub>2</sub>/SO<sub>3</sub> from generation points, transfer lines and acid plant
- Mills and associated piping due to flue gases and pulverized coal dust
- Coal dust at Transfer points of Coal Handling Plant (CHP), Crushers and mill area;
- Ducts for flue gases

**Hazard Identification**

The following hazards are likely to be present at CLZS, Chittorgarh:

**Table-7.6(b):  
Hazards at CLZS Chittorgarh**

Sr. No.	Chemical	Location	Hazard
1.	Propane / LPG	Propane / LPG Storage Yard & associated transfer lines and equipment	Fire: Pool Fire, Jet Fire, Flash Fire Explosion: Vapour Cloud Explosion(VCE), Boiling Liquid Expanding Vapour Explosion (BLEVE)
2.	LDO	LDO 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 <sub>2</sub> / SO <sub>3</sub> )	Acid Plant and transfer lines from GCP to Acid Plant	Release of Toxic Gas caused by the sudden escape of SO <sub>2</sub> / SO <sub>3</sub> in large medium or small quantities
6.	Chlorine	Hydro 1 & 2 Acid Plant & Pyro Acid Plant	Release of Toxic Gas caused by the failure of cylinder/ tonner.
7.	Ammonia Liquor	Copper Recovery Plant	Release of toxic fumes containing ammonia due to failure of storage vessel /pipe line / Valve, etc.
8.	Carbon Monoxide (CO)	PYRO Plant (Coke Pre-heater, etc.)	Release of toxic gas due to failure of transfer lines

**Safety & Mitigation Measures****Safety Relevant Components**

The following safety relevant components are being used in CLZS, Chittorgarh for the safe handling of the systems or elements that can minimise / control any accident/ major accident:

**Imperial Smelting Furnace (ISF)**

The operation of ISF involves many processes those provide chances for generation of dust containing toxic material like Lead, Zinc, CO etc. Some of the noteworthy safety features available at ISF are detailed below:-

1. Venturi System is provided for the de-dusting during the Charge Preparation and Coke Handling.
2. Bag filters are provided for the de-dusting during charge preparation
3. Condenser floor fume/dust extraction is achieved through bag filters.

- Slag Granulation de-dusting is achieved through Venturi System.
- The waste gases of ISF contain CO. These gases are passed through Gas Cleaning System and the clean gas so obtained is used for the preheating of furnace blast air and Steam Generation.

#### Ausmelt Plant

Ausmelt technology is direct smelting technology which has been applied to commercial production of a broad spectrum of non-ferrous and precious metals and the high temperature treatment of various waste materials.

The plant consists of the following sections:

- Feed material handling system
- Ausmelt furnace
- Off gas handling system
- Oxygen Plant

Fumes produced in the smelting stage is collected in waste heat boiler and Hot Electrostatic Precipitators and recycled to the Ausmelt furnace in a subsequent smelting cycle.

#### Lead Refinery Plant

The molten lead from ISF is transferred to the Kettle in the lead refinery for refining. The dross containing silver, copper etc. are removed by the sequential kettle operations. The noteworthy safety features are detailed below:

- Bag filters are provided for dust/ fumes extraction in the Lead Refinery and Silver Plants.
- Bag filters are also provided for copper drossing fumes/dust extraction.
- Keeping in the view of hazards of area, the workers are provided with Personal
- Protective Equipment like Gum boot, Face shield, and Heat resistance hand gloves, aprons, foot wear, etc.

#### Zinc Refinery Plant

There are several points in the Zinc refinery from where there is a possibility of release of zinc fumes. The relevant safety features are detailed below:

- Fume Extraction and treatment section is provided with the bag filters.
- All the points from where there is a chance for the zinc fumes to get released are provided with canopies with proper ducting to remove the hot zinc fumes from the point of generation.

#### FIRE FIGHTING FACILITY

The plant is protected against fire hazards and it is well equipped with fire protection systems. The details of the fire fighting facilities available at CLZS are as under.

**Table 7.7**  
**Fire Fighting Equipment**

S.No.	Fire System	UNIT-I (PYRO)	Lead Plant	UNIT-II (HYDRO I & II)	UNIT-III (CPP)	TOTAL
1	Fire hydrant single	70	16	86	56	236
2	Risers (at internal	40	4	31	50	125
3	Water monitors	4	-	6	22	32

S.No.	Fire System	UNIT-I (PYRO)	Lead Plant	UNIT-II (HYDRO I & II)	UNIT-III (CPP)	TOTAL
4	Deluge valve Sprinkler	3	-	8	33	44

### Medical Arrangements

The CLZS Chittorgarh stores and/or Handles Propane, FO, HSD, CO, Chlorine, Acid & Alkali, 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 CLZS Chittorgarh for the effective management of Medical Emergency.

The CLZS Chittorgarh operates a Hospital in the CLZS Colony and a dispensary at the plant premises. CLZS, Chittorgarh has one Hospital with more than 21 beds. The hospital is equipped with a team of qualified doctors, operation theatre and full range of emergency and normal treatment facilities. There is also a first-aid center within the complex for treatment of minor occupational injuries. Refer Annexure 13 for more details.

### Transport & Evacuation Arrangements:

24 hrs vehicles are also available in the company premises with driver. Detailed Transport & Evacuation arrangements are also available in the factory. Refer Annexure 11 for more details.

### 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.

**Table 7.8**  
**Communication during Emergency**

EMERGENCY CONTROL CENTRE AND	01472-25-4444
RESCUE TEAM – LAND LINE	01472-25-4609
OHC / AMBULANCE	01472-25-4431/4432 9116797333
COLONY HOSPITAL	9116548555
FIRE TENDER - MOBILE	9660142236
EMERGENCY CONTROL CENTRE - MOBILE	9116584555
FIRE OFFICER	01472-25-4442 / 9929901904
LOCATION FIRE & SAFETY HEAD	01472-25-4440 / 8938806369

### 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 shelter points with respect to the sources of major emergency scenarios in CLZS are

- Assembly Point-I: Site Office
- Assembly Point-II: Time Office
- Assembly Point-III: Slag Gate
- Assembly Point-IV: KPS Office CPP
- Assembly Point-V: Unit 3 Cooling Tower CPP
- Assembly Point-VI: CDSS Building
- Assembly Point-VII: Hydro-02 Main gate.
- Assembly Point-VIII: DM Plant Hydro-01
- Assembly Point-IX: In front of BE Office
- Assembly Point-X: Commercial Office Building

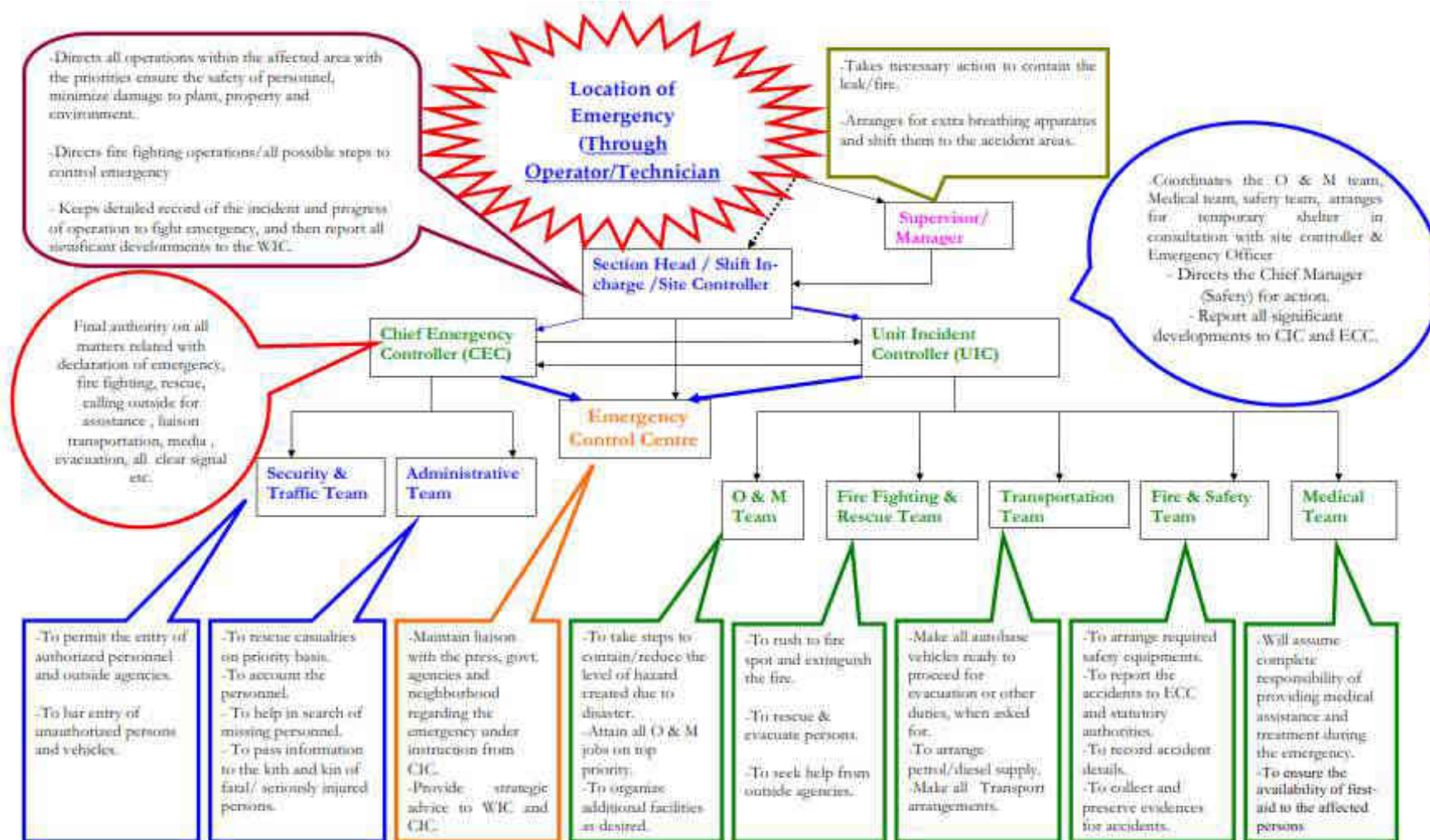


Figure 7.3: Emergency Communication Chart

#### 7.4.7 Off-Site Emergency Planning

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 (Pyro, Hydro 1 & 2 Acid Plant):**

###### **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.

##### **Ammonia Liquor (Copper Recovery Plant):**



- Leakage from the vessel or associated piping holding or transferring the Ammonia liquor; caused by the impact or corrosion or heat or stress.

**Sulphur Dioxide Handling (From Roaster/ Sinter to Sulphuric Acid Plant):**

- Leakage from the transfer lines holding the SO<sub>2</sub> caused by the impact or corrosion or heat or stress.
- Escape of SO<sub>2</sub> 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.

**Other Fire & Explosion related Accidents**

**Pyro Plant**

- Sinter Plant
- Sulphuric Acid Plant
- Imperial Smelting Furnace (ISF)
- Zinc Refinery
- Lead Refinery
- Ausmelt

**Hydro Plant 1 & 2**

- Roaster
- Acid Plant
- Leaching
- Purification Plant
- Cell House
- Melting & Casting Plant

**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 CLZS may require the support from the District Crisis Group and the Local Crisis Group (DLCCG) in terms of both i.e. manpower and there 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 (DLCCG & LLCCG). These crisis groups have been given the responsibility of management of chemical accidents in a given industrial area. The CLZS comes under the district Chittorgarh and is situated at VPO Putholi. Accordingly as per the Schedule-7 and Schedule-8 of the CAEPPR-1996, the composition of these two crisis groups is detailed below. The CLZS is the member of DLCCG Chittorgarh and LLCCG Gangrar and it may take the help of these two crisis groups during the emergency situation.

The members of these groups may vary according to the changes in positions at local and district levels. As per law the District and Local Level Crisis Management Group shall be the apex body in the district and local industrial area respectively to deal with major chemical accidents and to provide expert guidance for handling chemical accidents.

**Table - 7.9**  
**Details of Local Agencies**

S.No.	Authority	Residence Address	Contact No.
1.	Collector & DM	Chittorgarh	240001 (O), 240002 (R)
2.	ADM (Admin.)	Chittorgarh	240944 (O), 241289 (R)
3.	ADM (Development)	Chittorgarh	241265(O), 241072 (R)
4.	SDM, Chittorgarh	Chittorgarh	240111(O), 240905 (R)
5.	SP, Chittorgarh	Chittorgarh	240006 (O), 240003 (R)
6.	ASP	Chittorgarh	242603(O), 242702(R)
7.	DSP	Chittorgarh	241057 (O), 244877 (R)
8.	DSP	Gangar	01471-255157
9.	Regional Transport Officer	Chittorgarh	248598 (O), 248771 (R)
10.	District Transport Officer	Chittorgarh	241292 (O), 246661(R)
11.	Sr. Medical Officer Govt. General Hospital	Chittorgarh	241102/241346 (O) 241761 (R)
12.	Officer In charge, Rajasthan Pollution Control	Chittorgarh	241159(O), 241236 (R)

S.No.	Authority	Residence Address	Contact No.
	Board,		
13.	Sr. Inspector (Factories & Boilers)	Chittorgarh	241213
14.	Municipal (EO)/ Fire Officer	Chittorgarh	241327/9829988633
15.	Public Relation Officer	Chittorgarh	241135(O), 245946 (R)
16.	Commandant, Home guard	Chittorgarh	245227
17.	Deputy Director (Agriculture)	Chittorgarh	240982
18.	Depot Manager	RSRTC, Chittorgarh	241038/241177 (O) 241342(R)
19.	Deputy Rail Manager	Western Railway	240004
20.	TDM	Chittorgarh	244122 (O), 244133 (R)
21.	President/Member of LCG	Marble Association, Chittorgarh	240324(O), 241324 (R)
22.	President/Member of DLCC	Vypar Udyog Prakashan	244557 (O), 240557(R)
23.	Editor	Dainik Mewari Meera	242595 (R)
24.	Sarpanch	Village Nagri	283781
<b>Hospitals at Chittorgarh</b>			
1.	Central Hospital, Zinc Nagar,	Chittorgarh	01472-257531
2.	Govt. General Hospital	Chittorgarh	01472 - 241102, 01472-241346
3.	Manish Nursing Home	Chittorgarh	01472 - 241528, 941409124
4.	Jenani Nursing Home	Chittorgarh	01472 - 240222, 9829225597
<b>FIRE STATIONS</b>			
1.	Nagar Palika Fire Station	Chittorgarh	01472 - 241101, 01472 - 241327
2.	Birla Cement Works	Chittorgarh	01472 - 256605, 01472 - 241482
3.	J.K. Cement Works	Nimbahera	01477 - 220098, 01477 - 220568
4.	Aditya Cement Works	Sawa Sambhupura	01472 - 229100, 01472 - 229342
5.	Wonder cement limited	Nimbahera	01477-307400,01477- 307651
6.	Lafarge cement Bhawaliala	Gram- Bhawaliala Nimbahera	07727006113
<b>POLICE STATIONS/ CHOWKI</b>			
1.	Police Station, Chanderiya	Chanderiya	01472 - 256100
2.	Police Station, Chittorgarh	Chittorgarh	01472 - 243004
3.	Police Choki	Station Road	01472 - 240998
4.	Police Station	Kotwali	01472 - 241060
5.	Police Station City	Fort Road	01472 - 243903
6.	Police Station, Gangrar	Gangrar	01471 - 220227

## 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**

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.

This chapter is focused 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:

- Environment
- Employment
- Social
- Economic

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**

Till now, out of the total plant area i.e. 335.89 ha, 125.02 ha area has already been developed under green belt / plantation. The same will be maintained and enhanced via gap plantation to achieve the plantation density upto 2500 trees/ ha.

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. Trees 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.

Rainwater harvesting and recharge structures established by the company in 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 2919 persons. Additional manpower of 360 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 numerous 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 CLZSC as well as other nearby industries.

#### 8.2.3 ECONOMIC BENEFITS

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.

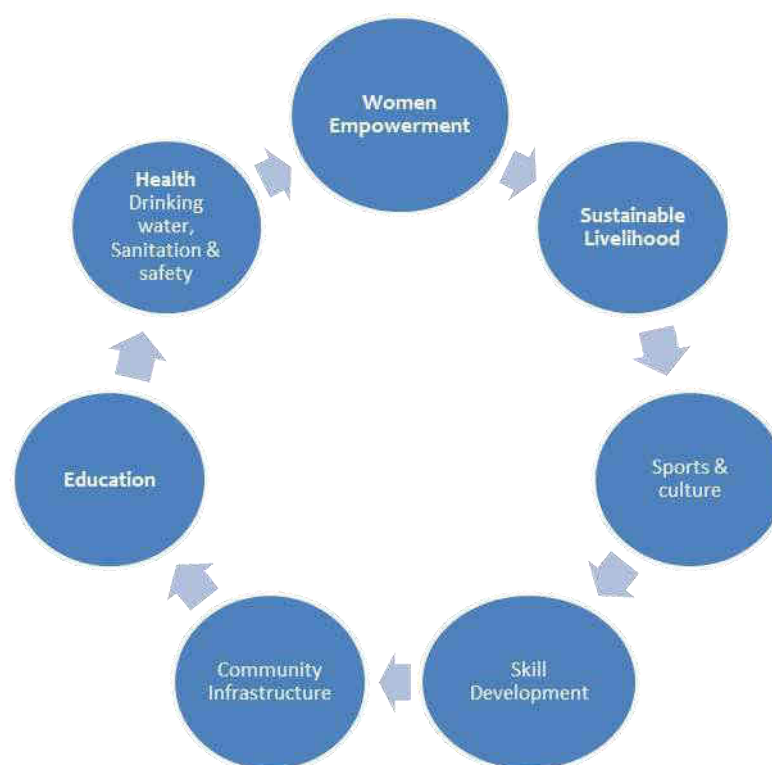
Special emphasis on financial and social benefits will be given to the local people. Development of social amenities will be in the form of medical facilities, education to underprivileged and creation of self-help groups. Business opportunities for the local people will be enhanced like transport of 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.

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



**Figure 8.1: Focus areas for CSR activities**

### 8.3 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 & Misc. development including community assets creation as below:

Table – 8.1

**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 25 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 17 schools and vatering to 7500+ students Personalized and adaptive cloud-based learning solution called 'Mindspark' Under, anganwadis strengthening program, supporting preschool education, health of 0-6 kids/pregnant women, stakeholder engagements and developing Nand Ghars. Benefitting 578 anganwadis 18000+ children of 0-6 years of age
3.	Sustainable Livelihood	Farmers training, Micro Irrigation program, Improved Agriculture-Horticulture, orchard development, Rainwater harvesting, Artificial Insemination, Veterinary camps and mass vaccination programme Programs benefitting 2000+ farmers
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 centres, collective microenterprises- pickle, pulses grading, fabric stitching, spices etc. Overall 4100+ women associated with SHGs.
5.	Infrastructure Development	Need based infrastructure like Construction of village roads, culverts, school class rooms, kitchens, boundary wall and solar street lights, drainage, Community hall, Bus Station, Stadium etc.
6.	Drinking water and sanitation	Works under MJSY for water conservation, drinking water structures like OHT and pipeline, construction of toilets, water supply through tankers during summers
7.	Skill Development	Mobilizing educated youths, training under different trades like hospitality, front office executive, BFSI etc, placement support.
8.	Environment Management & Misc.	Bio Investment, Natural calamity-relief to flood victim etc.

## PHOTOGRAPHS OF THE CSR ACTIVITIES CARRIED OUT SO FAR



Construction of school building at Ajolia ka kheda



School classrooms Village Kashmore



Girls toilet block in more than 100 schools



School upgradation and renovation - Putholi

## EDUCATION



Health check up for Anganwadi kids



Students using work sheets



Summer Camp at Vidya Bhawan Campus under Siksha Sambal Project



Appreciation event for awarding cash and kind prizes to meritorious students



SIKSHA SAMBAL PROJECT" & "KHUSHI" - ANGANWADI PROJECT

WOMEN EMPOWERMENT



Celebration of International Women's Day at CLZS every year Participation of 2200 Women of SHG & AWCs



UN Women Initiative in Agriculture



Advance Garment stitching center - Putholi



SAMADHAN" – HITECH FARMING & LIVESTOCK DEVELOPMENT PROGRAM



Hi – Tech Farming Production - Tomato



Wadi and UHDP plantation in Horticulture



Figure 8.2 Photographs of CSR Activities

**8.3.1 EXPENDITURES INCURRED ON CSR ACTIVITIES BY M/S. HINDUSTAN ZINC LIMITED**

The company has spent Rs.5784.392 Lacs in last 5 years on CSR activities under various heads. Details are given as under:

**Table – 8.2**  
**Expenditures Incurred on CSR Activities in last 5 years**

S. No.	Activity Heads	Years (Rs. In Lacs)					Total (Rs in Lacs)
		2016-17	2017-18	2018-19	2019-20	2020-21	
1.	Health & Hygiene	45.49	60.00	87.77	53.99	48.00	295.25
2.	Education	138.012	275.16	739.24	551.78	698.51	2402.702
3.	Sustainable Livelihood	12.89	72.20	106.99	94.38	327.00	613.46
4.	Women Empowerment	21.29	53.31	84.23	90.43	93.00	342.26
5.	Infrastructure Development	23.11	190.74	408.75	188.02	255.00	1065.62
6.	Drinking water and sanitation	145.14	213.79	38.47	145.88	132.00	675.28
7.	Environment Management & Misc.	76.36	31.50	150.51	69.95	61.50	389.82
<b>Grand Total</b>		<b>462.31</b>	<b>896.71</b>	<b>1616.00</b>	<b>1194.89</b>	<b>1615.00</b>	<b>5784.392</b>

#### 8.4 PROMOTION OF SOCIAL AND ECONOMIC STATUS

Projects will be implemented based on community priorities and with significant local contributions. Important areas identified through socio-economic survey will be considered for social welfare activities covered under EMP. This approach will strengthen the groups, empower the members.

As per OM dated 30<sup>th</sup> September 2020 and 20<sup>th</sup> October 2020, company has proposed a detailed action plan along with budgetary allocation for implementation of the commitments made during Public Hearing held on 20<sup>th</sup> July, 2022.

Detailed activity wise action plan has been given as under with budget allocation and time line:

**Table 8.3**  
**PROPOSED SOCIO-ECONOMIC DEVELOPMENT PLAN**

Sector	Activity	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	4 <sup>th</sup> Year	5 <sup>th</sup> Year	Total Amount (Rs Lacs)
Community Infra	CC Roads i. Nagri to Dhordia village ii. Suwaniya village iii. Ajoliya ka kheda	75	50	50	-	-	175
Education	School renovation i. Munga ka kheda ii. Putholi iii. Nagri iv. Biliya v. Ajoliya ka kheda	20	20	20	20	20	100
Water	Overhead tank and pipeline i. Ajoliya ka kheda ii. Chogawadi	85	-	-	65	-	150
Infra	Community halls & Sagra mata Temple compound wall construction i. Biliya ii. Anwalheda iii. Semalpura iv. Abhaypura v. Ajoliya ka Khera (including Sagra mata Temple compound wall construction)	30	30	30	30	-	120
<b>Total</b>		<b>210</b>	<b>100</b>	<b>100</b>	<b>115</b>	<b>20</b>	<b>545 Lacs</b>

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. 120.05 Crores/- & Annual Recurring cost: Rs. 15.14 Crores /annum)

\*\*\* Village Development Committees will be formed to engage with the community; plan, monitor and coordinate the social developmental activities.

## **8.5 CONCLUSION**

Apart from providing direct employment opportunities the proposed expansion project will generate a fair amount of direct and indirect employment in the study area. The local economy will receive a boost due to employment generated by the expansion project. The overall effect will help in improving the 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

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

As per the ToR issued by MOEFCC, New Delhi vide letter no. F. No. J-11011/279/2006-IA.II(I) dated 27<sup>th</sup> September, 2021 for the proposed expansion project, the ‘Environmental Cost Benefit Analysis’ is not required.



## 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 and Thermal Power Plants
- Concept of Waste Minimization and Natural Resource Conservation including Rainwater Harvesting
- Greenbelt Development/plantation programme
- Occupational Health and Safety
- Budgeting of Environmental mitigation measures

## 10.1 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 environmental sustainable company and a site level Environment Policy duly signed by COO Smelters and Location Head CLZS .

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 is to be incorporated here).



Figure 10.1 Group Corporate HSE Policy


### Environmental Policy HZL – Chanderiya Lead Zinc Smelter

At HZL-Chanderiya Lead Zinc Smelter, we believe in sustainable development and are committed to effective environmental management as an integral part of our business. HZL-CLZS Smelter will comply with all environmental laws and regulations applicable to our activities i.e. Smelting, Power Generation, storage and transportation of Hazardous Waste and Gainful Utilizing of Process Waste, and Follow Reduce, Reuse, Recycle, and Reclaim for Management of Waste and will continue to work for reducing negative footprint on environment and will fulfil the requirements of ISO 14001.

To achieve this, we will:

- Conserve natural resources, through adopting environmentally friendly & energy efficient technology and process improvements for reduction and prevention of pollution;
- Adopt and maintain globally best practices on Carbon and energy management;
- Prevent wherever possible, minimize and mitigate Biodiversity risks throughout our operations;
- Maintain a water balance that minimize the amount of fresh water consumed by beneficiation process by reutilizing the tailing water as much as possible and will also encourage Rain water harvesting;
- Improve and enhance environmental conditions and avoid, reduce or mitigate the environmental impacts due to Smelting & Power Generation operations to neighbouring communities and aquatic lives in areas where we operate including air, water, land and noise. We will ensure to abide by the following at our Chanderiya Lead Zinc Smelter Unit.
  1. We will ensure that all environmental impact during the Smelting, Refining and During Power Generation operations will be minimised by taking proper mitigation measures
  2. Ensure 100% zero Liquid discharge philosophy
  3. Fugitive, Stack and Ambient emissions will be controlled by regular monitoring and State of art technology with effective Emission Control available at our Smelter Units like TGT, ESP's DCDs and Water spray system
  4. Ensure Best waste management and to focus on zero waste and metal recovery from residues & wastes
  5. Disposed in landfill in eco-friendly manner after neutralization and stabilization with cement and lime at Capex Yard
- Address employee concerns about environmental performance fairly and seriously;
- Influence our contractors and suppliers to adopt principles and practices adopted by us and work in accordance with our policies;
- Communicate with all our stakeholders on the progress and performance of our Environmental Management System.

We will measure and report progress against this policy and review performance on periodic basis to ensure on-going management of environment. The content and implementation of this policy will be reviewed periodically, actions taken accordingly including the sharing of good practices throughout the HZL-Chanderiya Lead Zinc Smelter.



(C Chandru)  
Chief Operating Officer Smelters and Location Head  
For HZL Chanderiya Lead Zinc Smelter

Date: 1<sup>st</sup> December, 2021

**Figure 10.2 Site Environment Policy**

#### 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 II & IV 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.

CLZS has an efficient and operational Environmental Management Cell, which handles all environmental related issues at plant level and also at corporate level. CLZS is an ISO 14001 and OHSAS 45001 certified unit and accordingly, all Environmental issues are addressed as per EMS-ISO 14001 system. CLZS 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 CLZS plant

The Organizational structure of EMC is given below:

### 10.3.2 Structure of EMC

Structure of Environment Management Cell at CLZS Complex is given in Figure 10.3.



**Figure 10.3: Organizational Structure of EMC at Hindustan Zinc Limited**

### 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 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/ 3<sup>rd</sup> 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 <sub>2</sub> emission limit (2 Kg/tonne of H <sub>2</sub> SO <sub>4</sub> produced), 50 mg/Nm <sup>3</sup> of acid mist by Dec 2006. Action Plan to be submitted by July 2003.	<p>Industry is complying with all the revised standards for emission as prescribed in respective ECs and CTOs. Details are given as under:</p> <ul style="list-style-type: none"> <li>• In Hydro 1 and Hydro-2 (SO<sub>2</sub> - 1 Kg/ tonne of H<sub>2</sub>SO<sub>4</sub> produced), 30 mg/Nm<sup>3</sup> of acid mist.</li> <li>• In Pyro &amp; Ausmelt (SO<sub>2</sub>- 2 Kg/ Ton of 100 % concentrated acid produced from acid plant), 50 mg/Nm<sup>3</sup> of acid mist is complying with the revised standards.</li> <li>• The SO<sub>2</sub> emission from Acid Plant (At Pyro Plant) will be reduced upto 1.5 Kg/ton of Acid production. The same will be achieved by improving the acid plant converter (SO<sub>2</sub> conversion efficiency by using super cesium catalyst in 4th bed). The same will be achieved by December, 2023.</li> </ul>



S. No.	Conditions	compliance
		<ul style="list-style-type: none"> <li>Regular monitoring is being done and emissions level are within stipulated norms and reports are being sent to RSPCB/ MoEFCC.</li> </ul>
2.	SO <sub>2</sub> Emissions monitoring – Installation/ Proper operation, maintenance and calibration of continuous SO <sub>2</sub> monitoring system by 30th September 2003.	The Company has installed Continuous Emission Monitoring Systems (CEMS) with proper calibration system with major stacks and the 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 as Jerosite cake, ETP cake and spent catalyst as per CPCB guidelines by 30 <sup>th</sup> June 2003.	Already 3 Jarofix Yards & 3 SLF developed within the premises as disposed as per prevailing norms. Out of which two are exhausted while 1 is active.
4.	Wastewater treatment and disposal: To achieve Zero discharge through 100% recycle/ reuse of treated wastewater by 31 <sup>st</sup> December 2004.	<ul style="list-style-type: none"> <li>➤ Total Wastewater generated from CLZS Complex is 7598 KLD (1500 KLD Pyro, 450 KLD Ausmelt, 3296 KLD H-I, and 2352 KLD H-II).</li> <li>➤ Treated waste water is being recycled from two existing ETPs (8400 KLD and 4200 KLD, respectively).</li> <li>➤ MEE is already operational at site to strengthen ZLD.</li> <li>➤ Effluent generated is treated in the Effluent treatment plant &amp; Reverse osmosis plant. Treated water is completely recycled/ reused in the plant and zero discharge maintained.</li> <li>➤ Hence, No wastewater is being/will be discharged outside the plant.</li> </ul>
5.	House Keeping: To reduce the generation of fugitive dust from vehicle movement and improve overall housekeeping – by 31 <sup>st</sup> December 2003.	<p>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;</p> <ul style="list-style-type: none"> <li>✓ Concreted internal roads</li> <li>✓ Vacuum road cleaning system</li> <li>✓ Systematic stacking of materials</li> <li>✓ Mechanized coal/coke handling plant</li> <li>✓ Covered conveyor to transfer the material.</li> <li>✓ Truck and tyre washing systems</li> </ul>

S. No.	Conditions	compliance
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. The same will be maintained and enhanced by doing gap plantation. 33% green cover area is already been completed at site.

Table 10.2

Point wise compliance of CREP Guidelines for Thermal Power Plants are given as under:

S. No.	Conditions	compliance
7.	Implementation of Environmental Standards (emission & effluent) in non- compliant Power Plants.	The environmental standards (emission & effluent) are being complied with as per the prescribed norms.
8.	For existing thermal power plants, a feasibility study will be carried out by Central Electricity Authority (CEA) to examine possibility to reduce the particulate matter emissions to 100 mg/Nm <sup>3</sup> . The studies shall also suggest the road map to meet 100 mg/Nm <sup>3</sup> . The studies shall also suggest the road map to meet 100 mg/Nm <sup>3</sup> wherever found feasible. CEA shall submit the report by March 2004.	The Particulate Matter emission from the CPP stacks is being maintained less than 50 mg/Nm <sup>3</sup> .
9.	New / expansion power projects to be accorded environmental clearance on or after 1.4.2003 shall meet the limit of 100 mg/Nm for particulate matter.	The Particulate Matter emission from the CPP stacks is being maintained less than 50 mg/Nm <sup>3</sup> .
10.	Development of SO <sub>2</sub> & NO <sub>x</sub> emission standards for coal based plants by December 2003. <ul style="list-style-type: none"> <li>New/ expansion power projects shall meet the limit of SO<sub>2</sub> &amp; NO<sub>x</sub> w.e.f. 1.1.2005.</li> <li>Existing power plants shall meet the limit of SO<sub>2</sub> &amp; NO<sub>x</sub> w.e.f. 1.1.2006.</li> </ul>	As per the CTOs obtained for the project, standards prescribed for SO <sub>2</sub> and NO <sub>x</sub> are 600 mg/Nm <sup>3</sup> and 300 mg/Nm <sup>3</sup> . While site is in process for installation of FGD.
11.	Install/activate opacity meters/ continuous monitoring system in all the units by December 31, 2004 with proper calibration system.	Opacity meters as well as Continuous Emission Monitoring Systems (CEMS) with proper calibration system have been installed with major stacks and the same have been connected with the CPCB/SPCB server.

S. No.	Conditions	compliance
12.	Development of guidelines/ standards for mercury and other toxic heavy metals emissions by December 2003.	As per the CTO obtained for the project, standard prescribed for Hg is 0.03 mg/Nm <sup>3</sup> . The same are being / will be complied with.
13.	Review of stack height requirement and guidelines for power plants based on micro meteorological data by June 2003.	Stack height of 165 m has been provided with the Boiler Stack against 120 m of stack height required as per the prevailing stipulation by the EP Act, 1986 based on the SO <sub>2</sub> emission.
14.	Implementation of use of beneficiated coal as per GOI Notification	We are using Good quality Imported/Indian Coal at CLZS with specified ash 35 %.
15.	Power plants will indicate their requirement of abandoned coal mines for ash disposal & Coal India/ MOC shall provide the list of abandoned mines by June 2003 to CEA.	The Ash is temporarily stored in the Silos within the plant premises and is 100% utilized in the Cement /Brick manufacturing by the nearby Plants.
16.	Power plants will provide dry ash to the users outside the premises or uninterrupted access to the users within six months.	Dry fly ash is collected and is stored in Fly ash silos and ash from the silos is being 100% utilized in the Cement /Brick manufacturing by the nearby Cement Plants & Brick manufacturing units, respectively.
17.	Power Plants should provide dry fly ash free of cost to the users.	In Rajasthan, there are many Cement Plants, which require Fly Ash for manufacturing Cement (PPC) and Fly Ash is used for making bricks in this area. Considering the fact, Fly Ash is a material in demand instead of a waste, which needs disposal.  Therefore, Fly Ash is sold to the users (Cement Plants and brick manufactures) on mutually agreed terms & conditions.
18.	State P.W.Ds/ construction & development agencies shall also adhere to the specifications/Schedules of CPWD for ash based products utilization MoEF will take up the matter with State Governments.	Already complied as per guidelines.
19.	(i) New plants to be accorded environmental clearance on or after 1.04.2003 shall adopt dry fly ash extraction or dry disposal system or Medium (35-40%) ash concentration slurry disposal system or Lean phase with hundred percent ash	Dry Ash disposal system has been installed in the Plant. The Ash is temporarily stored in the Silos within the plant premises and is 100% utilized in the Cement /Brick manufacturing by the nearby Cement Plants & Brick manufacturing units,

S. No.	Conditions	compliance
	water re-circulation system depending upon site specific environmental situation. (ii) Existing plants shall adopt any of the systems mentioned in 13 (i) by December 2004.	respectively. Therefore, no water consumption is there for ash management.
20.	Fly ash Mission shall prepare guidelines/manuals for fly ash utilization by March 2004.	Fly Ash utilization is being done in compliance to the MOEFCC Notification dated 21.05.2020 as well as MOEFCC OM dated 11.11.2020 regarding change in Coal and Ash Content.
21.	New plants shall promote adoption of clean coal and clean power generation technologies	The Proposed expansion involves expansion of existing CPP by modernisation of turbine internal and rotor.

## 10.5 CONCEPT OF WASTE MINIMIZATION, 3R's (REUSE, RECYCLE and RECOVER TECHNIQUES)

### 10.5.1 Waste Minimization - 3R's

#### Reuse

- Due to proximity with many cement producing industries in nearby areas, all the ash generated by company till date has been taken away by cement manufacturers/ Brick manufacturing industries. We will continue to dispose all the fly ash generated from the CPP to cement industries.
- Blow down water is being/will be treated in neutralization pit and further reused in dust suppression.
- 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 CLZS Complex is 7598 KLD (1500 KLD Pyro, 450 KLD Ausmelt, 3296 KLD H-I & 2352 KLD H-II), which is being treated in two existing ETPs (8400 KLD and 4200 KLD, respectively).
- In ETP-1, 1037 (KLD) Reused in Lime Slurry preparation /slag cooling (Pyro), 1099 (KLD ) Reused in slag Granulation (Ausmelt), 2486 (KLD) Reused in process (H1) from RO-1 Permeate & 550 KLD from RO-2 Permeate. In ETP-2, 72 (KLD) Reused in Lime slurry preparation, 1825 KLD Reused in process (H2) in RO-2 from RO Permeate.
- Domestic Waste water (300 KLD) generated from the office toilets is being/will be treated in existing STP (1000 KLD) and treated water (290 KLD) is being /will be used in process/Plantation.
- Hence, No wastewater is being/will be discharged outside the plant.

#### Recovery

- In Minor Metal Recovery, various metals will be recovered from various processes of the CLZS Complex like Copper, Cadmium, Cobalt and Nickel. Overall Waste reduction from Chanderiya Lead Zinc Smelter and recovery of Precious Minor Metal from Waste.

- In Fumer Plant, Jarosite shall be treated during Pyro Metallurgical process to recover Zn which could not recover in Hydro Metallurgical Process. Thereby, reducing Jarosite as a hazardous waste.
- Dross age and other waste will be treated to recover Zn from the hazardous waste.

## **10.6 ENERGY & NATURAL RESOURCE CONSERVATION MEASURES**

### **10.6.1 Energy Conservation**

Energy management may broadly be said to have two aspects - energy conservation and energy efficiency. Energy conservation includes behavioral 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. Chanderiya Lead Zinc Smelter Complex has implemented numerous process control measures as well as energy efficient technologies which ensure proficient management of its energy resources.

The following measures have been adopted by Hindustan Zinc Limited for further reduction in specific energy consumption:

- 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 and Colony area
- 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

### **10.6.2 Natural Resource Conservation**

- In Minor Metal Recovery, various metals will be recovered from various processes of the CLZS Complex like Copper, Cadmium, Cobalt and Nickel. Overall Waste reduction from Chanderiya Lead Zinc Smelter and recovery of Precious Minor Metal from Waste.
- In Fumer Plant, Jarosite shall be treated during Pyro Metallurgical process to recover Zn which could not recover in Hydro Metallurgical Process. Thereby, reducing Jarosite as a hazardous waste.
- Dross and other waste will be treated to recover zn from the hazardous waste.
- The ash generated from CPP is sold to the cement manufacturers/ Brick manufacturing industries.
- 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.

### 10.6.3 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 complex, CLZS has adequate Rain water harvesting as well as recharge structures within the premises. Major rain water harvesting structures within the complex have been shown in the figure no. 10.4. Apart from the above, HZL has constructed approx. 90 rainwater harvesting structures (comprising of Check dams, Gabion, Weirs, Earthen check dams and Cemented check dams etc.) in the nearby area. As the proposed expansion will be carried out within the existing plant premises and no additional fresh water will be required for the proposed expansion, the existing rain water harvesting practices will suffice for the proposed expansion project. However, additional storm water ponds need to be constructed in the northern area of the complex to prevent storm water run off to get in to the nallah.

The details of the major 6 existing Rain water/storm water harvesting structures available within the plant premises are given in the below table 10.3.

**Table 10.3**  
**Rain water/storm water harvesting structures**

S. No.	Particulars	Details (approximate)						Total
		Water pond	Storm water pond 1	Storm water pond 2	Storm water pond 3	Storm water pond 4	Storm water pond 6	
1.	Storage Capacity (cum)	16000	6200	7800	7000	4500	3500	45000



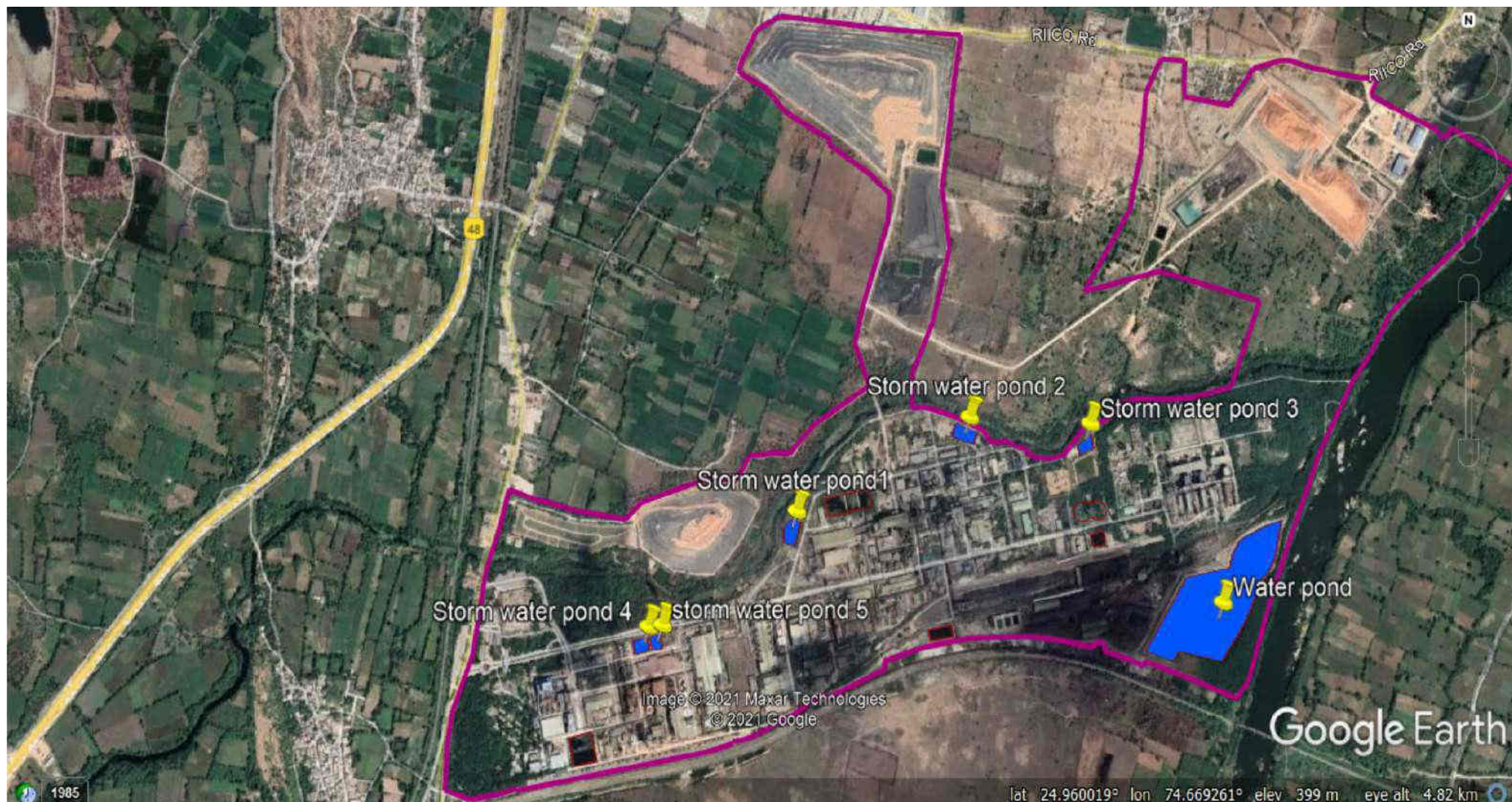


Figure 10.4.: Photographs of Existing RWH Structure

Water reservoir is also located at the plant site. Apart from these the recharge pit needs to be proposed inside the plant area to recharge the rooftop runoff water. The total catchment runoff for rooftop area is 2550 cum/hr. The rooftop area water will be recharged through recharge pits.

The project proponent will propose three number of recharge pit structure through rooftop area. Thus, the rainwater recharging pit can accommodate 696 m<sup>3</sup>/hr of the rain water.

#### 10.6.4 Carbon Management Plan

Chanderiya Smelting Complex is the largest Zinc producing plant in India where zinc can be produced using pyro metallurgical or hydrometallurgical processes, depending on the type of concentrate used as charge. Coke and power are main inputs which are responsible for GHG emissions. A lot of amount of heat and flue gases are generated in different process of zinc manufacturing. There is high scope in utilizing the heat and flue gases to reduce the energy consumption as well as the GHG gas emissions. In 2020-21 the total emissions were 2282540 tCO<sub>2</sub>e and specific emissions 3.92 tCO<sub>2</sub>e per ton of metal. In 2021-22 the total emissions were reduced to 2226962 tCO<sub>2</sub>e and specific emissions reduced to 3.77 tCO<sub>2</sub>e per ton of metal. In the financial year FY'22 total emission and specific emission reduced due to energy saving projects, fuel replacement from propane to PNG and other emission reduction projects. Chanderiya Smelting Complex carbon emissions in FY 2016-17 were reported 2056034 tones CO<sub>2</sub>e in scope 1 (Direct Emissions from fuel burn at CPP & DG Sets, Coke burn at Pyro, Use of Propane & PNG at Pyro, H1 & H2) and 22430 tones CO<sub>2</sub>e in Scope 2 (Emission associated with the use of electricity for Pyro, H1 & H2 and Electricity purchased from AVVNL). This has been taken as baseline year. Chanderiya Smelting Complex has taken target of reduction in emissions against its 2016-17 baseline (2078464 tCO<sub>2</sub>e) by 14% by 2026-27 (1787479 tCO<sub>2</sub>e) in terms of absolute emission. The year wise emission from power and fuel consumption has been given in section 3.4 of Energy Carbon Management Plan enclosed herewith this EIA/EMP Report as **Annexure 15**.

CLZS has implemented the following carbon emission reduction projects at site in FY 201-22.

**Table 10.4**  
**Activities and project undergoing or completed at CLZS complex for reduction of carbon emission**

Sr. No.	Projects	GHG Emission reduction (tCO <sub>2</sub> e)
1.	Power Rating improvement from 7.16(FY 20-21 YTD actual) to 7.32 (FY 21-22 YTD in BP) in Hydro1	6367.8
2.	Power Rating improvement from 7.34 (FY 20-21 YTD actual) to 7.38 (FY 21-22 YTD in BP) in Hydro2	8114.8
3.	Optimization of water flow in PGCT 1	116.2
4.	Replacement of existing compressor with new energy efficient compressor	122.5
5.	2 shift operation of RMH plant to be made for unloading the material	80.2
6.	Reduction in Zn dust power consumption from 470 Unit 450 Unit/MT of Zinc Dust	74.6
7.	Stopping Belt Conveyor (2.2 KW) and Bucket trolley (5.5 KW) in DTP Plant through manual charging.	50.8
8.	NL1 and 2 pumps flow to be maintained with one pump@ May'21	61.5
9.	Utilization of Dynamic classifier VFD in ETP	67.8

Source: Energy Carbon Management Plan of Chanderiya Smelting Complex, Section 4.2 enclosed herewith as Annexure 15 of final EIA / EMP Report.

#### 10.6.4.1 HZL Chanderiya Net Zero Strategy

- HZL net zero strategy is in line with reducing fossil fuel-based energy use in operations by using innovative energy efficiency technologies and process optimisation.
- 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 Utilisation capacity etc.
- Climate Change risk assessment based on TCFD guidelines.
- Turbine Revamping in FY22-23 will lead to increase in energy efficiency and contribute to reduction on 87000 tco2e.
- The introduction of 5% of biomass with coal, this has led to saving of approx. 12290 tCO<sub>2</sub>e GHG emission. Going ahead this will be increased to 7-8%. This will further contribute to emission reduction in the future.
- Increasing current efficiency of cell house lead to GHG emission saving of 12150 tCO<sub>2</sub>e per year.
- Plantation activities undertaken at CLZS plant will also contribute to carbon sequestration over a long run.
- Installed 582.24 kW capacity Solar Roof Top Project at different locations of CLZS plant, 319.59 KW capacity solar roof top project at different locations of Zinc Nagar Chittorgarh and 1000 LPD solar water Heater at Guest House have also contributed towards emission reduction.
- Electric Forklifts introduced in Business partner operations in Pyro, going ahead by FY23-24 more electric vehicles to be introduced this will lead to scope 3 emission reduction (i.e. indirect emission from transport of material, bus travel of employees & LPG consumption in colony).
- As a part of long-term Net zero strategy, additional 200 MW Renewable energy to be procured which will replace Chanderiya CPP by FY29.

HZL has formulated Corporate Energy and Climate Change Management Policy been formulated and adopted by the Board of Directors of Hindustan Zinc Ltd. in order to provide a framework to become an environmentally sustainable company. Copy of the same has been given as under:



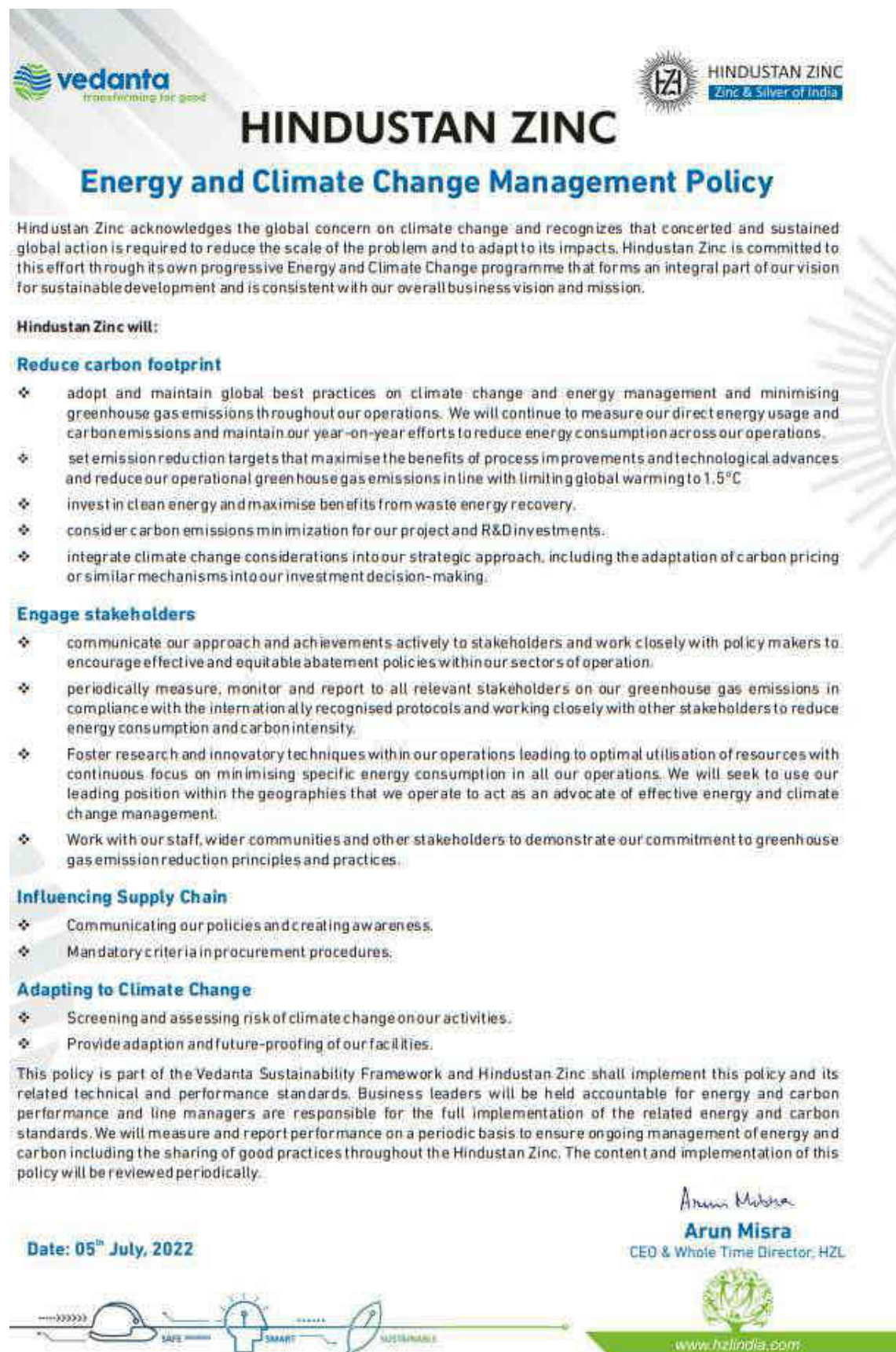


Figure 10.5 Energy and Climate Management Policy

#### 10.6.4.2 GHG Reduction measures

Chanderiya Smelting Complex has implemented new methods

Other measures that can be adopted to reduce GHG emissions are categorized under the following heads i.e., Behavioural Measure, Efficiency Measures, Fuel Replacement Measures and Long-Term Measures. Details have been given in section 5 of Energy Carbon Management Plan enclosed herewith this EIA/EMP Report as **Annexure 15**.

#### 10.6.4.3 Carbon Sequestration through Greenbelt development

Carbon sequestration is a process by which CO<sub>2</sub> is either removed from the atmosphere or diverted from emission sources and stored in the ocean, terrestrial environments (vegetation, soils, and sediments), and geologic formations.

Trees can act as excellent carbon pools that capture and store atmospheric CO<sub>2</sub> through a natural process known as photosynthesis. The ability of trees to capture and store carbon varies from species to species and a healthy habitat of mixed species is likely to store a greater volume of carbon over the long term as it also promotes soil health and thus increases the amount of carbon stored in the soil as well.

Out of the total plant area (335.89 ha), 37.21% (i.e. 125.02 ha) has already been developed under greenbelt / plantation. The same will be maintained and enhanced by doing gap plantation to achieve the plantation density @ 2500/ha.

As mentioned in the Section 4.2, a fully-grown tree can sequester about 25 kg of carbon per-year, which would result in the sequestration of 3,250,000 carbon kg/year with existing planation of 1,30,000 trees. The plantation will be further increased in CLZS complex to maintained and enhanced by doing gap plantation to achieve the plantation density @ 2500/ha. Which will be 3,12,550 trees by the end of year 2025. This will be capable of sequestering 78,13,750 carbon kg/year.

### 10.7 GREENBELT DEVELOPMENT & PLANTATION PROGRAMME

#### 10.7.1 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 ecological homeostasis;
- To prevent soil erosion and to protect the natural vegetation; and
- To utilize the treated effluents.

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.

#### 10.7.2 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 and the expected growth rate will be more than 90%.
- Trees growing to a height of 5m 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.

#### 10.7.3 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.

#### 10.7.4 Selection Criteria

Out of the total plant area 335.89 ha. Out of which 125.02 ha 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.

Native plant species have been planted in consultation with local horticulturist such as *Tamarindus Indica* (Imli), *Cassia fistula* (Amaltas), *Tectona grandis* (Teak/Sagvaan), *Azadirachta indica* (Neem), *Terminalia arjuna* (Arjun), *Somania saman* (Rain Tree), *Pipal* (*Ficus religiosa*), *Shisham* (*Dalbergia sissoo*), *Kachnar* (*Bauhinia variegata*), *Somania saman* (rain tree/ Siris), *Gulmohar* (*Delonix regia*), 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.

#### **10.7.5 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.

#### **10.7.6 Plantation Programme**

##### **A. Within the Plant Premises**

The Company has already developed 125.02 ha (37.21% of the total plant area) area under greenbelt / plantation. Native plant species have been planted in consultation with local horticulturist such as *Tamarindus Indica* (Imli), *Cassia fistula* (Amaltas), *Tectona grandis* (Teak/Sagvaan), *Azadirachta indica* (Neem), *Terminalia arjuna* (Arjun), *Somania saman* (Rain Tree), *Pipal* (*Ficus religiosa*), *Shisham* (*Dalbergia sissoo*), *Kachnar* (*Bauhinia variegata*), *Somania saman* (rain tree/ Siris), *Gulmohar* (*Delonix regia*), etc.

HZL have used mycorrhiza technology for development of Green area on Jarofix Waste dump with TERI as Pilot Project.

Mycorrhiza-based reclamation technology is used for expansion and improvement of cultivation processes used in greening, rejuvenation of previously fertile soils and reclamation of wasteland into productive land in a sustainable manner.

Germplasm of selected plant species were procured and tested on Jarofix. Based on performance, mass production of selected plant species was carried out using standard techniques developed by TERI in nursery and mother bed at site. After attaining required growth, the plant were transferred for field plantation.

The same will be maintained and enhanced via gap plantation to achieve the plantation density up to

2500 trees/ ha. Budget allocation for the same has been included in the EMP cost.

Details regarding the existing and proposed plantation have been incorporated below in Table No. 10.5:

**Table No. 10.5**  
**Details regarding existing and proposed Greenbelt Plantation**

Description	Existing	Proposed (Gap Plantation)			Total
		2022-23	2023-24	2024-25	
Total Area of Green Belt (sq. m)	125.02 ha.	NIL	NIL	NIL	125.02 ha.
No. of Plants	1,34,800	60,850	60,850	57750	312,550

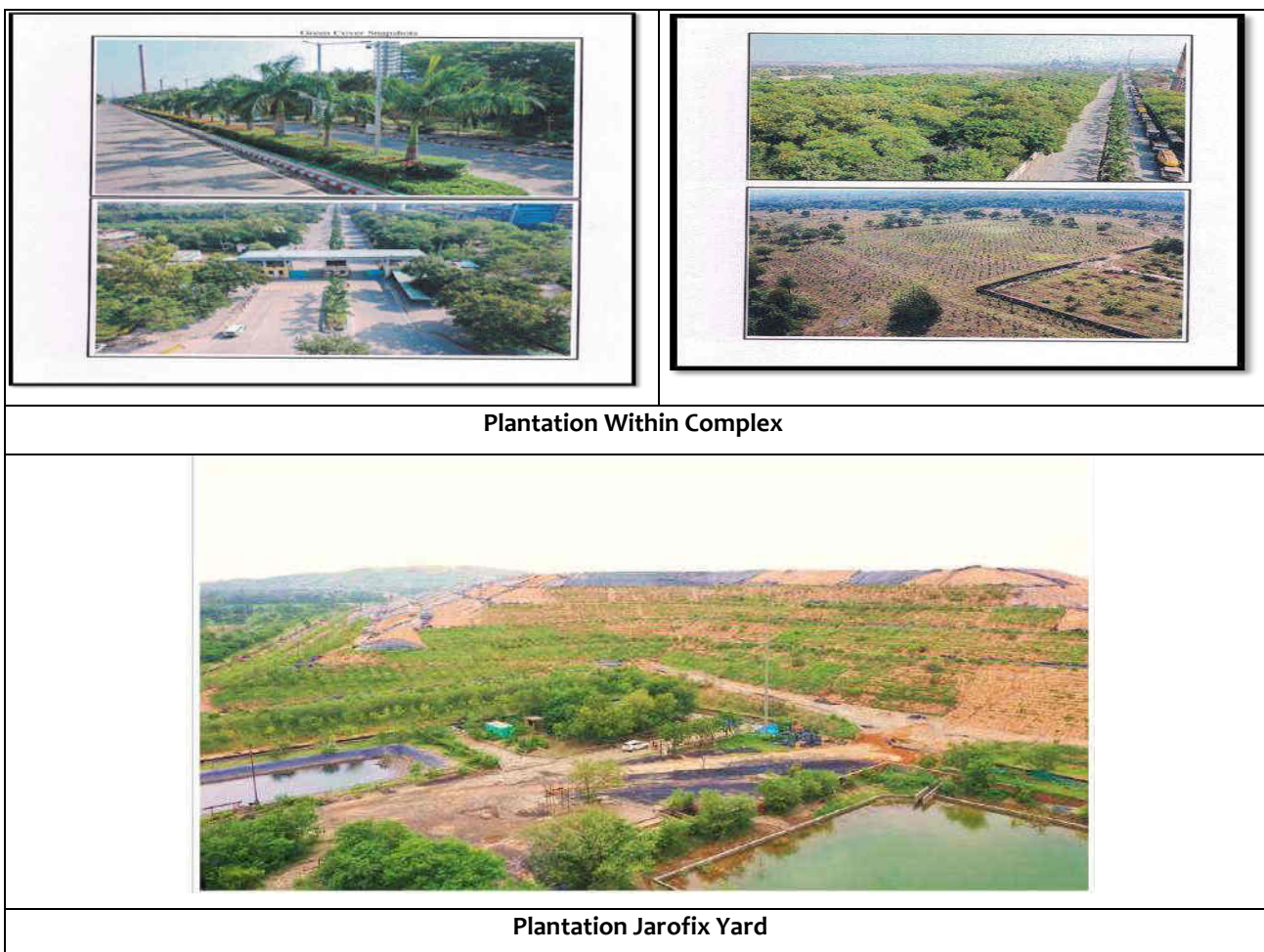
**Photographs showing Existing Green Belt Development**



**GREENBELT ALONG THE BOUNDARY WALL**



**GREENBELT NEAR CPP BOUNDARY WALL &  
PLANTATION WITHIN COMPLEX**



**Figure 10.6 Photographs showing Existing Green Belt Development**

#### **10.8 OCCUPATIONAL HEALTH AND SAFETY MEASURES**

To control and minimize the risks at workplace, Chanderiya Lead Zinc Smelter Complex 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.



#### 10.8.1 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.

#### 10.8.2 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 10.6**  
**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	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.	

LSR Details	Violation Type	Consequence, if LSR not followed		
		1st instance	2nd instance	3rd instance
Immediately report all incidents.	etc.	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	3. Leakage of undesirable gas from stack not reported on time, not informing area in-charge of any safety violation incident etc.	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.	4. Not fastening seat belt, etc. 5. Use of alcohol, drugs, etc. while entering plant premises or carrying such items inside plant etc.	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.	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

### 10.8.3 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

#### **10.8.4 PERSONAL PROTECTIVE EQUIPMENT**

##### **10.8.4.1 Definition:**

**Personal Protective Equipment:** 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.

##### **10.8.4.2 Typical PPEs include:**

- Foot Protection
- Hand Protection
- Eye Protection
- Head Protection
- Chemical suit
- Respiratory Protection
- Thermal Protective Clothing
- Job Specific PPEs

##### **10.8.4.3 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 accordance with the following criteria.

##### **10.8.4.4 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.

#### **10.8.5 Roles & Responsibility:**

##### **10.8.5.1 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.

##### **10.8.5.2 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.

##### **10.8.5.3 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 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.

#### **10.8.6 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

#### **10.8.7 Safety Requirements**

- The Business Partners shall ensure that all work undertaken by them will conform 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:
  - o Be fully responsible for safety of persons and
  - o 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:
  - o Hot work
  - o Confined space entry
  - o Working at height
  - o Electrical/Lockout / Tag out / isolation etc.
  - o Any Job based permit/protocol/work instructions etc.
  - o Any government related permit/ required statutory

#### **10.8.8 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

#### 10.8.9 Occupational Health Surveillance

In the CLZS Complex, 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 programme 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 – 11** 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, color 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
  - Lead prone area workers Lead PME is done on quarterly basis.

#### **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.

#### **10.8.10 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.

#### **10.8.11 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.

#### **10.8.12 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 2 beds at Plant Dispensary and 22 beds available at CLZS Hospital. 3-4 qualified doctors, observation and 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 CLZS Complex 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.

#### **10.8.13 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 Zinc 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
- Lead ECG
- Audiometer
- Spirometer
- Pathological Laboratory
- Oxygen Therapy Set

#### **10.8.14 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- 2 no.s at Plant dispensary
- b. General Carriage Ambulance – 1 no.s with Oxygen cylinders, first-aid boxes, emergency medications

#### **10.8.15 First Aid Boxes**

First aid boxes are/will be provided at prominent places with following items:

- 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 5<sup>th</sup> and 20<sup>th</sup> of every month. They conform to Class II of Factories Act and OHSAS 18001.

#### 10.8.16 Occupational Health Facility

- Monitoring health of all Regular and Contractual workers,
- Initial Medical Examination or Pre employment Medical examination is done mandatorily before issuance of Gate pass,
- 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.
- Anthropometry, 12 lead ECG, 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.
- All food handlers are vaccinated against Typhoid vaccination,
- Regular employees with Metabolic Syndrome and increased BMI are regularly followed up at Health Centre.
- 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.

#### 10.8.17 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 - 10.7.

**Table - 10.7**  
**Fund allocation for Occupational Health and Safety Hazards**

Health Expenses (Rs. In Lacs)				Details
Year	Capex	Revenue	Grand Total	Periodic Medical Examination ACLS ambulance Physiotherapy unit expansion
1 <sup>st</sup> Year	50	25	75	
2 <sup>nd</sup> Year	25	25	50	
3 <sup>rd</sup> Year	25	25	50	
Total			175	
Safety Expenses (Rs. In Lacs)				Details
Year	Capex	Revenue	Grand Total	Wash house and locker facility PPE's Fire hydrant and detection system
1 <sup>st</sup> Year	120	45	165	
2 <sup>nd</sup> Year	-	45	45	
3 <sup>rd</sup> Year	-	45	45	
			255	

## 10.9 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. 786 Crores
- **Cost for Environmental Protection Measures:**
  - ✓ Capital Cost: Rs. 120.05 Crores /-
  - ✓ Recurring Cost: Rs. 15.14 Crores /annum.
- EMP Cost Break-up is given in Table - 10.8 below:

**Table - 10.8**  
**Cost Break up of EMP (Rs. in Crores)**

Sr. No.	Project activity	Environment Improvement measures	Capital Cost	Annual Recurring Cost
<b>Pyro Plant</b>				
1.	Addition of 07 no. of kettles in lead refinery plant to handle additional lead metal production.	Mechanized De-drosser, Suction Hoods, Ducts, Bag Filter Systems, and Stacks.	2	0.3
2.	Usage of cleanest fuel PNG in place of LDO/HSD	PNG being the ECO Friendly Fuel will reduce carbon emission by 9260 t CO <sub>2</sub> e/year, additionally we will reduce 100% emission due to the transportation of LDO by road to CLZS Unit. Therefore this an environment friendly Project as PNG is one of the cleanest burning fuels, and helps improve the quality of air.	16	2.4
<b>CPP</b>				<b>0</b>
1.	Manufacturing and Supply of turbine internal parts	We are increasing the capacity of 2 X 77MW to 2 X 95 MW with overall increase of 36 MW without increasing the coal consumption by increasing the efficiency of the Turbine. If we put a separate power plant to meet the 36 MW of power requirement, we would have done extra emission of 3 Lakh CO <sub>2</sub> e/year, which was avoided by this Revamping modification.	42	5.04
2.	Erection and Commissioning of Turbine			
3.	Miscellaneous expenditure like various study			
4.	Boiler Expansion cost			
5.	BPTG Installation [Production of green power]		2	0.3
6.	Installation of DG set of 500KW at CPP for FGD	Stacks and acoustic enclosures.	0.2	0.03
	Installation of DG sets at Pyro and Hydro Unit	Stacks and acoustic enclosures.	0.2	0.03
	LRP 100 KT [Lead Refinery Plant]	Fully Automatic Crane For Anode Cathode Replacement, Mechanized De-drosser, Hoods, Ducting, Bag Filters, Stacks, Automated Anode Cathode Cleaning Machines	45	5.4

Sr. No.	Project activity	Environment Improvement measures	Capital Cost	Annual Recurring Cost
	Minor Metal Recovery	Scrubbers, Bag Filters, Stacks, Ducting systems, hoods, etc.	10	1.5
	Hydro Furnace and Casting Line	Hygiene Hoods, Ducting , Bag filters, Stacks	0.85	0.1250
	RZO Unit	PVC Lining with Acid Proof Brick Lining	0.1	0.015
	<b>Sub-Total EMP cost (Crores)</b>		<b>118.35</b>	<b>15.14</b>
<b>Additional activities</b>				
	Post Project Compliance Environment Monitoring	Compliance additional Sampling testing and report submission work	0.20	
	Greenbelt Development	Plantation as per Miyawaki Technique	1.00	
	Rain Water Harvesting Structures	Proposed Study	0.50	
		<b>Sub-Total EMP cost</b>	<b>1.70</b>	
		<b>Total EMP cost</b>	<b>120.05</b>	

Note:

1. As per OM dated 30<sup>th</sup> September, 2020 and 20<sup>th</sup> October, 2020 Company has proposed detailed action plan with budgetary allocation of Rs. 5.45 Crores earmarked for implementation of the commitments made during Public Hearing in next 5 years. Details of the same have been given in chapter-8, section 8.4, of this EIA/EMP Report.
2. 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 of this Chapter.

#### 10.10 CONCLUSION

As discussed, it is safe to say that the proposed expansion project 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 around the area 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 Chanderiya Lead Zinc Smelter Complex.



## 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. Hindustan Zinc Limited (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 and Sindesar Khurd, and smelting complexes in Chanderiya, Debari and Dariba, all in the state of Rajasthan.

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 403 MT as on 31<sup>st</sup> March 2020 enough 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 7,30,955 TPA of CO<sub>2</sub>. Total Exchequer to Government during 2019-20 was Rs. 9150 Crores, including royalty, taxes and dividend. 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.

Earlier, company has proposed expansion in its Chittorgarh Smelter Unit as “Expansion in Existing CLZS Complex [Expansion in Hydro Smelter Unit by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis and Installation of 1 Lead Refinery, Expansion of CPP through Modernization, Recovery of Minor Metals & Installation 4 DG Sets] at villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan)” for which application was submitted on portal on 5<sup>th</sup> March, 2021 [Proposal no. IA/RJ/IND/192897/2021 and File No. J-11011/279/2015- IA.II(I)].

Baseline monitoring & data collection for the project was carried out during Post Monsoon Season (October, 2020 to December, 2020).

The project was considered for approval of ToR in 32<sup>nd</sup> REAC (Industry 1) meeting held on 16.03.2021. As per MOM of 32nd meeting of REAC (Industry 1) displayed on Parivesh on 19.03.2021, the project was returned in the present form.

In furtherance to the above, A Show Cause Notice was issued to the Hindustan Zinc Ltd. by MOEFCC, New Delhi vide letter J-11011/279/2006-IA.II (I) dated 6<sup>th</sup> April, 2021 under Section 5 of Environment (Protection) Act, 1986 for violation of provisions of under EIA Notification, 2006. Reply of the same was submitted to MOEFCC, New Delhi vide letter HZL/CLZS/ENV/38/2021-22 dated 19<sup>th</sup> April, 2021. After detailed deliberation as per the personal hearing held on 05<sup>th</sup> August, 2021, the Show Cause Notice has been withdrawn by MOEFCC, New Delhi vide letter dated 31<sup>st</sup> August, 2021.

A fresh Application for obtaining TOR for the proposal “Expansion within the existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Set] at villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan)” by M/s. Hindustan Zinc Limited was submitted on Parivesh Portal dated 05.09.2021 and ToR letter issued by MoEFCC, New Delhi vide letter no. J-11011/279/2006-IA.II (I) dated 27.09.2021 for the preparation of EIA/EMP Report. Public Hearing has been conducted for the project on 20.07.2022.

Details of the existing Clearances & Consents are given in Chapter 1, table 1.1 of this EIA/EMP Report. As per EIA Notification dated 14<sup>th</sup> Sept., 2006, as amended from time to time; the project falls under S. No. 3 (Material Production), Category “A”, Project or Activity 3 (a) - {Metallurgy} as major activity and 1 (d) – {Thermal Power Projects} as minor activity.

A fresh Application (Form-1/ToR and Pre-Feasibility Report) for obtaining Environmental Clearance for this expansion project was uploaded on MoEF&CC Portal on 05.09.2021.

The project was considered in front of Rajasthan Expert Appraisal Committee (REAC) (Industry- 1) for its First Technical Presentation (for ToR approval) on 14.09.2021.

ToR Letter issued by MoEF&CC, New Delhi vide their letter no. J-11011/279/2006-IA.II(I) dated 27.09.2021. One month additional baseline study for AAQ carried out during October, 2021 as per Project specific TOR point no.1 issued for the project. Public Hearing has been conducted for the project on 20.07.2022.

## **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 CLZS Complex premises.
- ☞ Availability of reliable power & water supply.
- ☞ Nearness to NH - 79 & NH -76 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.

### 11.3 DETAILS ABOUT THE PROJECT

#### 11.3.1 Brief Description of the Project

Brief description about the proposed Project is given in Table - 11.1.

Table - 11.1

S. No.	Particulars	Details								
A.	Nature of the Project	Expansion Project								
B.	Size of the Project	Expansion in existing Chanderiya Lead- Zinc Smelter Complex adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II , Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 Back Pressure Turbine Generator, Recovery of Minor Metals & Installation of 5 DG Sets at villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan).								
C.	Category of the Project	Category “A”, Project or Activity 3 (a) - {Metallurgy} as major activity and 1 (d) – {Thermal Power Projects} as minor activity.								
D.	Location Details									
1.	Villages	Putholi, Ajoliya Ka Khera & Biliya								
2.	Tehsil	Gangrar & Chittorgarh								
3.	District	Chittorgarh								
4.	State	Rajasthan								
5.	Latitude& Longitude	Chanderiya Lead Zinc Smelter [all four corners] <table><tr><td>A</td><td>24°57'21.29"N, 74°38'34.39"E</td></tr><tr><td>B</td><td>24°58'21.03"N, 74°40'43.43"E</td></tr><tr><td>C</td><td>24°57'20.33"N, 74°38'37.46"E</td></tr><tr><td>D</td><td>24°58'35.69"N, 74°39'16.22"E</td></tr></table>	A	24°57'21.29"N, 74°38'34.39"E	B	24°58'21.03"N, 74°40'43.43"E	C	24°57'20.33"N, 74°38'37.46"E	D	24°58'35.69"N, 74°39'16.22"E
A	24°57'21.29"N, 74°38'34.39"E									
B	24°58'21.03"N, 74°40'43.43"E									
C	24°57'20.33"N, 74°38'37.46"E									
D	24°58'35.69"N, 74°39'16.22"E									
6.	Toposheet No.	GA3012, GA3016, GA3009, GA3013								
E.	Area Details									
1.	Total Plant Area	335.89 ha								
2.	Greenbelt/ Plantation Area	Out of the total plant area (335.89 ha), 37.21% (i.e. 125.02 ha) area has already been developed under greenbelt/ plantation. 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 Villages	<ul style="list-style-type: none"><li>• Putholi (~0.5 km in SW direction from plant site)</li><li>• Ajoliya Ka Khera (~ 1 km in West direction from plant site)</li><li>• Biliya (~ Adjacent in North direction from plant site)</li></ul>								
2.	Nearest Town/City/ District HQ	<ul style="list-style-type: none"><li>• Chittorgarh (~7.0 km in South direction from plant site)</li></ul>								
3.	Nearest Railway Station	Chanderiya Railway station (~2.5 km in SW direction from plant site) <ul style="list-style-type: none"><li>• Chittorgarh Railway Station (~9.25 km in SSW direction from plant site)</li><li>• Gangrar Railway Station (~9.5 km in NNW direction from plant site)</li></ul>								
4.	National Highway	<ul style="list-style-type: none"><li>• NH-79 (~0.5 km in West direction from plant site)</li><li>• NH-76 (~2.5 km in ESE direction from plant site)</li></ul>								



S. No.	Particulars	Details
5.	Nearest Airport	Maharana Pratap Airport – Udaipur (~85 km in SW direction from plant site)
6.	National Park, Wildlife Sanctuary, Biosphere Reserve, Tiger Reserve, Wildlife Corridors, Reserved / Protected Forest (PF) etc. within 10 km radius	<ul style="list-style-type: none"> <li>• 17 RF &amp; 1 PF present within 10 km radius of the project site.</li> </ul>
7.	Water Body within 10 km radius	<ul style="list-style-type: none"> <li>• Putholi Nala (Passing through the plant site)</li> <li>• Berach River (Adjacent in East direction from the Plant site)</li> <li>• Gambhir Nadi (~4.0 km in South direction from the Plant site)</li> <li>• Nagdi ka Nala (~8.5 km in NNE direction from the Plant site)</li> <li>• Canal (~8 km in WNW direction from the Plant site)</li> </ul>
8.	Archeological Sites within 10 km radius study area	Chittorgarh Fort (~6 km in South direction from the Plant site)
9.	Seismic Zone	Zone - II [as per IS 1893 (Part-I): 2002] i.e. Low Damage Risk Zone
<b>G.</b>	<b>Cost Details</b>	
	Total Cost for the Project	Rs 786 Crores
	Cost for Environmental Protection Measures	Capital Cost: Rs. 120.05 Crores/- Recurring Cost: Rs. 15.14 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 and Lead production is Zinc concentrate, Lead concentrate, Coal, Limestone 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– CLZS Complex**

S. No.	Particular	UNIT	Quantity			Probable transportation	
			Existing	Additional	Total After expansion	Source	Distance and mode
Zinc Lead Smelter Plant (Pyro Plant+ Ausmelt)							
1.	Zinc concentrate	TPA	199500	58000	257500	HZL mines-RA, SK & Zawar mines	~200 km Through Trucks
2.	Lead concentrate	TPA	138500	196500	335000	HZL mines-RA, SK & Zawar mines	~200 km Through Trucks
3.	Coke	TPA	100000	NIL	100000	Indigenous /imported	~1500 km Through Rail / Trucks
4.	Lime Stone	TPA	45000	NIL	45000	Nearby Mines	~250 km Through Trucks
5.	Iron ore /Iron Oxide	TPA	30000	NIL	30000	Mines India	~1000 km Through Trucks
6.	Zinc Oxide /Zinc Dust /Zinc Bearing material/ Zinc Dross	TPA	NIL	50000	50000	Market/ HZL Smelters / From authorised recyclers	~ 200 km Through Trucks

S. No.	Particular	UNIT	Quantity			Probable transportation	
			Existing	Additional	Total After expansion	Source	Distance and mode
7.	Lead Oxide / Lead Silver Cake / Low Grade Lead Material / Lead Bearing Outsourced Secondaries	TPA	NIL	50000	50000	Market/ HZL Smelters / From authorised recyclers	~ 200 km Through Trucks
8.	Silica	MT	3600	NIL	3600	Nearby Mines	~150 km Through Trucks
9.	Coal/ Coke	MT	1500	NIL	1500	Indigenous /imported	~1500 km Through Rail / Trucks
10.	Dolomite	MT	1700	NIL	1700	Nearby Mines	~150 km Through Trucks
<b>Hydro I &amp; Hydro-II (Incl. Fumer plant) and CPP</b>							
1.	Zinc concentrate	TPA	698458	NIL	698458	HZL mines-RA, SK &Zawar mines	~200 km Through Trucks
2.	Calcine (ZnO)	TPA	337990	8916	346906	HZL Smelters	~200 km Through Trucks
3.	Zinc Dross/ Ash/ Zinc bearing waste	TPA	15000	NIL	15000	Market/ HZL Smelters / From authorised recyclers	~200 km Through Trucks
4.	Aluminium Metal	TPA	4800	NIL	4800	Market	~200 km Through Trucks
5.	Magnesium Metal	TPA	60	NIL	60	Market	~200 km Through Trucks
6.	Copper Metal	TPA	600	NIL	600	Market	~200 km Through Trucks
7.	Limestone for FGD	TPA	NIL	131465	131465	Nearby Mines	~200 km Through Trucks
8.	Zinc Cathode	TPA	NIL	200000	200000	HZL Smelter	~200 km Through Trucks
9.	Raw Zinc Oxide(RZO) / ZnO Dust/ Zinc Oxide/Zinc Bearing Material	TPA	NIL	45000	45000	HZL Smelter	~200 km Through Trucks
10.	Limestone chips	TPA	NIL	25000	25000	Nearby Mines	~250 km Through Trucks
11.	De- Fluorinating Agent	TPA	NIL	550	550	Imported/Indigenous	~1500 km Through Rail / Trucks
<b>Minor Metal Unit</b>							
12.	PF Cake	TPA	NIL	8800	8800	HZL Smelter	Captive / 200 km, through Trucks
13.	Cadmium Sponge	TPA	NIL	4000	4000	HZL Smelter	Captive / 200 km, through Trucks

S. No.	Particular	UNIT	Quantity			Probable transportation	
			Existing	Additional	Total After expansion	Source	Distance and mode
14.	Copper Matte	TPA	NIL	3500	3500	HZL Smelter	Captive / 200 km, through Trucks
15.	Cobalt Cake	TPA	NIL	2000	2000	HZL Smelter	Captive / 200 km, through Trucks
16.	Copper Dross	TPA	NIL	12000	12000	HZL Smelter	Captive / 200 km, through Trucks
17.	Coal	TPA	NIL	1480	1480	HZL Smelter	Approx. 1500kms Through Trucks
18.	Zinc Dust	TPA	NIL	2210	2210	HZL Smelter	Captive / 200 km, through Trucks
19.	Sulphuric Acid	TPA	NIL	6500	6500	HZL Smelter	Captive through pipeline; 200 km, through Tankers

Source: Pre-feasibility Report

**11.3.2.1 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**  
**Unit-Wise Fuel Requirement– CLZS Complex**

S. No.	Particular	Unit	Quantity			Probable transportation	
			Existing	Additio nal	Total After expansion	Source	Distance and mode
Pyro Metallurgical Smelter and Ausmelt Lead Smelter Unit							
1.	Fuel HSD/LDO/Propane	KLA	24000	NIL	24000	IOCL / Reliance, Gujarat Based Refinery	~1000 km, through Tankers
2.	PNG	SCM/day	50000	6000	56000	GAIL, Adani Gas, other suppliers	~ 2 km, through Pipeline
Hydro Metallurgical Smelter Unit [I & Hydro-II]							
1.	LPG	Kg/day	221	NIL	221	IOCL / Reliance, Gujarat Based Refinery	~1000 km, through Tankers
2.	Oil	KLA	41.4	NIL	41.4	IOCL / Reliance, Gujarat Based Refinery	~1000 km, through Tankers
3.	HSD/LDO	KLA	956	2000	2956	IOCL / Reliance, Gujarat Based Refinery	~1000 km, through Tankers
4.	PNG	SCM/ day	3500	1500	5000	GAIL, Adani Gas, other suppliers	~ 2 km, through Pipeline
5.	Imported Coal (for Fumer)	TPA	132000	18000	150000	Australia/Indonesian/Russia /SA via Gujarat Port	~1000 km, through Rail / Trucks
Captive Power Plant [254 MW to 290 MW]							
6.	Imported Coal/ Indian Coal for CPP	TPA	1204500	688855	1893355	Australia/Indonesian/Russia /SA /WCL/ACCL/	~1000 km, through Rail /Trucks
7.	HSD/LDO	KLA	508	Nil	508	IOCL / Reliance, Gujarat Based Refinery	~1000 km, through Rail /Trucks

S. No.	Particular	Unit	Quantity			Probable transportation	
			Existing	Additio nal	Total After expansion	Source	Distance and mode
DG Sets [ Pyro +Hydro]							
1.	LDO /HSD /PROPANE	KLA	4800	1200	6000	IOCL / Reliance, Gujarat Based Refinery	~1000 km, through Trucks
Minor Metal Unit							
2.	LDO/HSD for Boiler (5 TPH)	KLA	NIL	1740	1740	IOCL / Reliance, Gujarat Based Refinery	~1000 km, through Trucks

Source: Pre-feasibility Report

**11.3.2.3 Other Basic Requirement**

Other basic requirements for the proposed expansion project are given in Table - 11.4.

**Table - 11.4**  
**Basic Requirements for the Project**

Particular	Requirement			Source
	Existing	Proposed	Total after expansion	
Water (KLD)	38570	500	39070	Gosunda Dam (Captive) / Proposed STP Chittorgarh / Udaipur/ other proposed STP's (Recycled Water)
Power (MW)	260	48	308	Captive Power Plant/WHRS/ Solar Panels /AVVNL/BPTG
Steam (TPH)	1210.4	5	1215.4	CPP 1, CPP 2, CPP 3 WHRB 1, WHRB 2, Roof Top Solar panels, Fumer/State Grid (AVVNL)/New Boiler
Manpower (No. of Persons)	2919	360	3279	Local/Outside

Source: Pre-feasibility Report

**11.4 PROCESS DESCRIPTION**

The plant consists of the various units as given under:

- Pyro Plant (based on Imperial smelting process enabling simultaneous production of Zinc & Lead metals through Pyro-metallurgical process route)
- Ausmelt Plant (based on Top Submerged Lance Technology)
- Hydro-I Unit & Hydro-II Unit with Fumer (metallurgical zinc extraction process is conventionally known as Roast-Leach-Electro win process)
- Captive Power Plant Unit (Coal based thermal power plant)
- Minor Metal Complex [Recovery of minor metals like Copper, Cadmium, Cobalt and Nickel. Cobalt and Antimony Slag (on metal basis) from various processes of the CLZS complex]

Detailed Process Description are given in chapter 2, Section 2.7 of final 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 9 monitoring locations within the 10 km radius of the study area on 24 hourly bases.
- The concentration of PM<sub>2.5</sub> ranges between 26.1 to 55.4 µg/m<sup>3</sup>, PM<sub>10</sub> ranges between 58.2 to 92.4 µg/m<sup>3</sup>, SO<sub>2</sub> ranges between 5.8 to 19.7 µg/m<sup>3</sup> and NO<sub>2</sub> ranges between 13.8 to 38.6 µg/m<sup>3</sup>. CO concentration was observed as BDL to 1.13 mg/m<sup>3</sup>. The concentration of Pb was found to be in range of BDL to 0.59 µg/m<sup>3</sup>. The concentration of Ni was found to be in range of BDL to 14.3 ng/m<sup>3</sup>. The concentration of O<sub>3</sub> was found to be in range of 9.8 to 29.4 µg/m<sup>3</sup>.
- Additional 1 Month Baseline Study (Oct., 2021) for AAQ monitoring has been carried out at 13 stations in the study area on Project Specific TOR point 1. The concentration of PM<sub>2.5</sub> ranges between 25.4 to 53.9 µg/m<sup>3</sup>, PM<sub>10</sub> ranges between 55.4 to 91.5 µg/m<sup>3</sup>, SO<sub>2</sub> ranges between 5.5 to 22.1 µg/m<sup>3</sup> and NO<sub>2</sub> ranges between 12.3 to 36.9 µg/m<sup>3</sup>. CO concentration was observed as BDL to 1.15 mg/m<sup>3</sup>. The concentration of Pb was found to be in range of BDL to 0.57 µg/m<sup>3</sup>. The concentration of Ni was found to be in range of BDL to 12.7 ng/m<sup>3</sup>.
- Ambient noise levels were monitored at 8 locations around the plant site. Noise levels vary from 53.1 to 68.9 Leq dB (A) during day time and from 43.3 to 62.3 Leq dB (A) during night time.
- The ground water quality analysis for all the 8 sampling stations shows that pH varies 7.34 to 8.02, Total dissolved solids found between (468.00 to 1923.00 mg/l) & total hardness (250.00 to 1005.00 mg/l).
- And Surface water quality analysis for 5 sampling locations shows that pH varies 7.52 to 7.76, Total dissolved solids varies from 371.0 to 629.0 mg/l, Total hardness 170.0 to 336.8 mg/l and conductivity (608 to 982.0 µS/cm). The COD (26.9 to 59.0 mg/l) and BOD (6.1 to 16.0 mg/l). The nutrients were also found low viz. sulphate (56.3 to 132.4 mg/l), nitrate (1.03 to 6.87 mg/l), calcium (30.1 to 87.5 mg/l), magnesium (23.09 to 36.94 mg/l). The Dissolved oxygen (5.9 to 7.4 mg/l) indicated that the water bodies are safe for aquatic biodiversity.
- Soil monitoring was carried out at 8 locations and the analysis results show that soil brown & Blackish Brown, Reddish Brown & the textures of the soil samples majorly was Silty Loam, Loam Clay, Silt Clay Loam & Sandy clay Loam. The samples have rich content of organic matter comprising of 0.84 % to 1.41 % for the plant growth, nitrogen (196.81 to 350.14 kg/ha) better to sufficient, phosphorus (39.74 to 58.64 kg/ha) less to average and potassium (186.61 to 329.86 kg/ha) medium to sufficient, Magnesium (362.95 to 499.32 mg/kg), and Calcium (1692.5 to 3096.5 mg/kg).
- Above baseline results shows the emission levels & water quality 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 IV & VII of this EIA/EMP report.

### 1.5.2 Biological Environment

**Flora:** Most common species found in the area are *Acacia nilotica* (Babul), *Azadirachta indica* (Neem), *Bombax ceiba* (Red Silk Cotton), *Acacia catechu* (Khair), *Psidium guajava* (Guava) etc.

**Fauna:** Commonly found species in the study area are *Funambulus spp.* (Five-striped Palm Squirrel), *Calotes versicolor* (Garden Lizard), *Rana hexadactyla* (Frog), *Bubulcus ibis* (Cattle egret) etc.

As per the authenticated list, total 6 schedule I species i.e., *Panthera pardus* (Leopard), *Prionailurus rubiginosus* (Rusty Spotted Cat), *Gyps bengalensis* (White-rumped Vulture), *Falco jugger* (Laggar Falcon), *Pavo cristatus* (Indian Peafowl), *Varanus bengalensis* (Bengal Monitor lizard) found within the study area during survey.

### 11.5.3 Socio-Economic Environment

The population of the study area as per 2011 Census records is 343256 (for 10 km radius). Total no. of households are 72325. Scheduled Caste fraction of the population of the study area is 49056 (14%) and Scheduled Tribe 16309 (5%). Literacy rate of the area is 63.3%. Total working population and non-working population is 39% and 61%, respectively in the study area.

### 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 2 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 - 11.6.

**Table - 11.5**  
**Post Project Monitoring**

S. No.	Description	Frequency of monitoring
1.	Meteorological data	Hourly
2.	Ambient Air Quality Monitoring	Monthly & Continuous Online Monitoring by using CAAQMS
3.	Fugitive emissions	Quarterly
4.	Stack Monitoring	Quarterly & Continuous Online Monitoring by using CEMS
5.	Water Quality & Level Monitoring	Quarterly
6.	Waste water	Quarterly & Continuous Online Monitoring by using CEQMS
7.	Noise Level Monitoring	Half yearly
8.	Soil Quality Monitoring	Half yearly
9.	Medical check-up of the employees	Yearly as per Factory Act
10.	Performance Guaranty Tests for Pollution Control Devise System	Once at the time of installation and at the time of repair / maintenance

### 11.8 ADDITIONAL STUDIES

Additional Studies conducted as per Terms of Reference (ToR) issued by MoEFCC, New Delhi vide letter no.J-11011/279/2006-IA.II(I) dated 27<sup>th</sup> September, 2021 are Public hearing, Hydro-geological



Study & Rain water Harvesting Plan and Risk Assessment & Disaster Management Plan. The detail information regarding additional studies are given in chapter 7 of this Final EIA report.

#### 11.9 PUBLIC HEARING

Public Hearing Notice for the expansion project was published in Newspaper “Patrika” and “Jannayak” dated 15<sup>th</sup> June, 2022. Public hearing was conducted on 20<sup>th</sup> July, 2022 at Govt., Secondary School, Ajoliya Ka Khera, Chittorgarh (Raj.). The major issues raised during the Public Hearing were regarding unemployment, basic infrastructure facilities, pollution and land related issues etc. Company has allocated Rs. 5.45 Crores for implementation of the commitments made during Public Hearing, as per OM dated 30<sup>th</sup> Sept. 2020 & 20<sup>th</sup> Oct. 2020. The Issues / Points / Opinions of Local Public raised during the Public Hearing are given in Chapter 7, section 7.2.3 of this EIA / EMP Report.

#### 11.10 PROJECT BENEFITS

The proposed expansion project will help in combating the growing demand of Lead and 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. As per OM dated 30<sup>th</sup> September 2020 and 20<sup>th</sup> October 2020, company will propose a detailed action plan along with budgetary allocation after Public Hearing is conducted for implementation of the commitments made during Public Hearing. The detail information regarding additional studies are given in chapter 8, Section 8.4 of this EIA report.

#### 11.11 ENVIRONMENT MANAGEMENT PLAN

This is a proposal for Expansion within the existing Chanderiya Lead Zinc Smelter Complex. The anticipated environmental impacts of the Plant will be mainly due to the 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-11.6

## Environment Management

Particulars	Details
Air Quality Management	<ul style="list-style-type: none"> <li>Emissions generated from production process as well as the prescribed limits from CPCB &amp; MOEFCC are as PM (Pyro: 150mg/Nm<sup>3</sup>, CPP: 50 mg/Nm<sup>3</sup>, Ausmelt: 50mg/Nm<sup>3</sup>, Hydro: 30 mg/Nm<sup>3</sup>, DG Sets: 75mg/Nm<sup>3</sup>), SO<sub>2</sub> (Pyro &amp; Ausmelt: 2kg/ton of 100% conc. Acid produced; Hydro: 1kg/ton of acid produced; CPP: 600mg/Nm<sup>3</sup>), Acid Mist (Pyro &amp; Ausmelt: 50mg/Nm<sup>3</sup>; Hydro: 30mg/Nm<sup>3</sup>); Lead (Sinter &amp; Ausmelt: 10m/Nm<sup>3</sup>); NO<sub>x</sub> (CPP: 300 mg/Nm<sup>3</sup>, DG Sets: 710mg/Nm<sup>3</sup>), Hg &amp; its compounds (CPP: 0.03mg/Nm<sup>3</sup>); NMHC (DG Sets: 100mg/Nm<sup>3</sup>) &amp; CO (DG Sets: 150mg/Nm<sup>3</sup>).</li> <li>The SO<sub>2</sub> emission from Acid Plant (At Pyro Plant) will be reduced upto 1.5 Kg/ton of Acid production. The same will be achieved by improving the acid plant converter (SO<sub>2</sub> conversion efficiency by using super cesium catalyst in 4th bed). The same will be achieved by December, 2023.</li> <li>In Pyro plant, HZL will reduce the PM emission by replacement of existing bag filter bags with upgraded/ PTFE coated bags, which will bring down PM emission from existing 150 mg/Nm<sup>3</sup> to 100 mg/Nm<sup>3</sup>. The same will be achieved by December, 2024.</li> <li>Extensive dust extraction network provided consisting of Venturi Scrubbers and Bag Filters.</li> <li>Gas wash tower and Thiessen Disintegrator provided to capture Furnace Gas</li> <li>Cansolv technology for Sulphur capture from Ausmelt Lead Furnace.</li> <li>State-of-The-Art DCDA Acid Plants &amp; Tail Gas Treatment Plant.</li> <li>Adequate stack height has been maintained for the existing DG set for better dispersion of the emissions, same will be followed for the proposed DG sets.</li> <li>Spraying of water is being continuously carried out at the various location viz., Lead concentrated bays, Belt conveyors, etc., to suppress the dust particles.</li> <li>Ventilation system followed by bag filters, are provided in the metal tapping area to control work zone emissions</li> <li>Concentrate shed, Coal yard and Ash handling unit disposal area, concentrate unloading point area are provided with water sprinklers to arrest the dust and fugitive sources of dust.</li> <li>In order to minimize fugitive emissions Zn concentrate containing 8-10% moisture is being handled;</li> <li>Mobile vacuum dust sweeping system on industrial roads and vacuum dust cleaning system for plant area</li> <li>All existing Stacks have been provided with CEMS and the same are connected to CPCB &amp; RSPCB Server.</li> <li>Greenbelt / plantation at site helps to restrict the emission within the premises.</li> </ul>
Water	<ul style="list-style-type: none"> <li>Total wastewater generated from CLZS complex is 7598 KLD (1500 KLD Pyro, 450 KLD</li> </ul>

Particulars	Details
Management	<p>Ausmelt, 3296 KLD H-I &amp; 2352 KLD H-II), which is being treated in two existing ETPs (8400 KLD and 4200 KLD, respectively).</p> <ul style="list-style-type: none"> <li>In ETP-1, 1037 (KLD) Reused in Lime Slurry preparation /slag cooling (Pyro), 1099 (KLD ) Reused in slag Granulation (Ausmelt), 2486 (KLD) Reused in process (H1) from RO-1 Permeate &amp; 550 KLD from RO-2 Permeate. In ETP-2, 72 (KLD) Reused in Lime slurry preparation, 1825 KLD Reused in process (H2) in RO-2 from Ro Permeate.</li> <li>All the Treated trade effluent is being used for Slag Granulation and Lime slurry preparation and remaining treated trade effluent will be further treated through three stage reverse osmosis (R.O.) plants and R.O. permeate will be recycled/ reused in the process within the premises.</li> <li>RO reject is being evaporated in solar evaporation pond and also used for spraying on waste disposal area; and</li> <li>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.</li> <li>Mist evaporators are already installed at site.</li> <li>Effluent treatment plant followed with Three stage RO Plant and Multiple Effect Evaporator (MEE/MVR) Plant is already Commissioned at site;</li> <li>Blow down water from CPP is being/will be treated in neutralization pit and further reused in dust suppression.</li> <li>Domestic Waste water (300 KLD) generated from the office toilets is being/will be treated in existing STP (1000 KLD) and treated water (290 KLD) is being /will be used in process/Plantation.</li> <li>No wastewater is being /will be discharged outside the plant. Hence, Zero Liquid discharge will be maintained.</li> <li>The rainwater harvesting is being and will be added in and around plant premises.</li> </ul>
Noise Management	<ul style="list-style-type: none"> <li>All the design/installation precautions as specified by the manufacturers with respect to noise control will be strictly adhered to for the expansion projects too;</li> <li>High noise generating sources are/will be insulated adequately by providing suitable enclosures;</li> <li>Design and layout of building to minimize transmission of noise, segregation of particular items of plant and to avoid reverberant areas;</li> <li>Buildings have been / will be acoustically designed</li> <li>Use of lagging with attenuation properties on plant components / installation of sound attenuation panels around the equipment.</li> <li>Other than the regular maintenance of the various equipment, ear plugs/muffs are recommended for the personnel working close to the noise generating units;</li> </ul>

Particulars	Details
	<ul style="list-style-type: none"> <li>All the openings like covers, partitions are designed properly.</li> <li>Provision of Inlet and outlet mufflers; easy to design and construct.</li> <li>Noise control system designed to form an integral part of the plant.</li> <li>The existing greenbelt with rich canopy helps to attenuate the noise emitted by the various sources in the plant.</li> </ul>
Solid & Hazardous Waste Management	<ul style="list-style-type: none"> <li>Recovery of minor metals like Nickel, Copper, Cadmium and Cobalt will result in reduction in waste generation;</li> <li>Used/Spent Oil &amp; Waste Oil will be sold to registered recycler.</li> <li>Spent catalyst, Cooler cake, Anode Mud, Cobalt Cake, Purification cake / Enrichment cake, Discarded containers/barrels/liners used for Haz. Waste/chemicals, Flue gas cleaning residue &amp; Non-ferrous Sludge from ETP and scrubbers etc. will be sold to registered recycler or sent for Co-processing/ disposal in Secured landfill site.</li> <li>Spent ion exchange resin containing toxic metal &amp; Water purification Resin will sold to registered recycler or will be disposed in Secured landfill site</li> <li>Filter and Filter material which contain organic compound &amp; Oil Soaked Jute/cotton waste/Used PPE's will be sold to registered recycler/disposed to secured landfill site/ sent to approved incinerator and MEE Salt will be used for recovery of Glauber Salt and De-florination Cake sent to Secured landfill site.</li> <li>Jarosite Cake from Hydro 1 Unit will be used in Cement Manufacturing/ Road/Rail embankment/Concrete construction/ disposal in Lined Jarofix yard while for Hydro 2 Unit Fumer unit is under commissioning at site.</li> <li>Fly ash is/ will be generated in Power plant which is being/will be sold to the nearby cement plant for utilization in cement manufacturing.</li> <li>Bottom ash is being/ will be generated in Power plant which is being/will be supplied for Bricks/ other useful manufacturer purpose.</li> <li>Municipal solid waste generated from the plant will be segregated and disposed off scientifically.</li> </ul>
Green Belt Development / Plantation	<ul style="list-style-type: none"> <li>Out of the total plant area i.e 335.89 ha of CLZS Complex, , 37.21% (i.e. 125.02 ha) has already been developed under greenbelt / plantation.</li> <li>The species planted are Neem, Neeli Gulmohar, Dhak, Sheesham, Gular, Amaltas, Imli, Peepal, Siris, Kachnar, Jhaoo, Kaner, Arjun, Kasod, Chural, Babool, Kikar, Bahera, Ratanjot, etc.</li> <li>The same will be maintained and enhanced by doing gap plantation to achieve the plantation density @2500/ha</li> </ul>

#### 11.12 OCCUPATIONAL HEALTH AND SAFETY

To control and minimize the risks at workplace, Chanderiya Lead Zinc Smelter Complex 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.

#### 11.13 CONCLUSION

It is concluded to say that the proposed expansion project is an environmentally friendly project, there will be no significant impact on the area, as adequate pollution control measures and preventive measures are being/will be adopted to maintain the 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 in the near-by villages. Development and 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.

Therefore, proposed expansion within the existing Chanderiya Lead Zinc Smelter Complex 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 Final 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' in 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, 4<sup>th</sup> Floor, Jaipur Centre, B2 Bye pass, Tonk Road, Jaipur - 302018 (Rajasthan). Its Delhi-NCR Corporate office is at Emmar 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/2023/SA0172 dated 17.12.2020. 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. "103" of the List of Accredited EIA Consultant Organization displayed on MoEFCC website ([http://eia.nabet.qci.org.in/Accredited\\_EIA\\_Consultant.aspx](http://eia.nabet.qci.org.in/Accredited_EIA_Consultant.aspx)) updated as of 10<sup>th</sup> Nov., 2022.

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, Govt. of India, New Delhi and by the National



Accreditation Board for Testing and Calibration Laboratories, Government of India (NABL) (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.


**QUALITY COUNCIL  
OF INDIA**  
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**National Accreditation Board  
for Education and Training**



**Certificate of Accreditation**

**JM EnviroNet Pvt. Ltd.**

**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 opencast/ underground mining	1	1 (a) (i)	A
2	Thermal power plants	4	1 (d)	A
3	Mineral beneficiation	7	2 (b)	A
4	Metallurgical industries (ferrous & nonferrous)- both primary & secondary	8	3 (a)	A
5	Cement Plants	9	3(b)	A
6	Coke oven plants	11	4 (b)	A
7	Chlor- Alkali Industry	13	4 (d)	A
8	Chemical fertilizers	16	5 (a)	A
9	Petro-chemical complexes	18	5 (c)	A
10	Manmade fibers manufacturing	19	5 (d)	A
11	Petrochemical based processing	20	5 (e)	A
12	Synthetic organic chemicals industry	21	5 (f)	A
13	Distilleries	22	5 (g)	A
14	Pulp & paper industry excluding manufacturing of paper from wastepaper and manufacture of paper from ready pulp without bleaching	24	5(i)	A
15	Sugar Industry	25	5 (j)	B
16	Industrial estates/ parks/ complexes/areas, export processing Zones (EPZs), Special Economic Zones (SEZs), Biotech Parks, Leather Complexes	31	7(c)	A
17	Building and construction projects	38	8 (a)	B
18	Townships and Area development projects	39	8 (b)	B

*Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in SAAC minutes dated May 13, 2022 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/22/2483 dated August.16, 2022. The accreditation needs to be renewed before the expiry date by JM EnviroNet Pvt. Ltd., Gurugram following due process of assessment.*



**Sr. Director, NABET**  
Dated: August. 16, 2022

**Certificate No.**  
NABET/EIA/2023/SA 0172

**Valid up to**  
Aug. 07, 2023

*For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.*

Figure no. 12.1 Copy of NABET Certificate



# FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT & ENVIRONMENTAL MANAGEMENT PLAN

FOR

## EXPANSION WITHIN THE EXISTING CHANDERIYA LEAD ZINC SMELTER COMPLEX

[Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II,  
Change in Product Mix in Pyro Unit on Total Metal Basis & Installation of 1 Lead Refinery,  
Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Sets]

At

Village : Putholi, Ajoliya Ka Khera & Biliya,  
Tehsil Gangrar & Chittorgarh,  
District Chittorgarh(Raj.).

Study Period: Post Monsoon season (Oct., to Dec., 2020) & October, 2021

Public Hearing Conducted on 20.07.2022

### PROJECT PROPONENT



**M/s. Hindustan Zinc Ltd.**  
**Chanderiya Lead Zinc Smelter**

Village: Putholi, Tehsil: Gangrar,  
District: Chittorgarh (Rajasthan) - 312 021  
Telephone No. 01472-254411/12, Mobile No. 9116134090  
E-Mail: manisha.bhati@vedanta.co.in  
Website: www.hzindia.com

### APPLICANT



**J.M. EnviroNet Pvt. Ltd.**

(Registered EIA Consultant Organization from NABET-QCI)  
Certificate No.: NABET/EIA/2023/SA 0172  
dated 16.08.2022, valid upto 07.08.2023  
Emaar Digital Greens, Tower – B, Unit No. 1517,  
Golf Course Ext. Road, Sector – 61, Gurugram (Haryana) – 122 011  
E-mail: jmenviro@hotmial.com  
NABL Approved Lab: JM EnviroLab Pvt. Ltd.  
(Certificate No.:TC-6821)

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**FINAL EIA / EMP REPORT (VOLUME II) – ANNEXURES**

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Pyro EC

ANNEX - 6

भारत सरकार

पर्यावरण विभाग

Government of India  
Department of Environment  
(Paryavarana Vibhag)No. J-11013/29/82-2.1.  
M. Parabrahmam  
Principal Scientific Officer

Telephone No.

Telegram: PARYAVARAN  
NEW DELHIBikaner House,  
Shahjahan Road,  
New Delhi-110011

03.6.1983

To

The Secretary,  
Department of Mines,  
Shastri Bhavan, New Delhi.

Sub:

Concurrence for the site proposed for locating  
a Lead-Zinc Smelter in Rajasthan.

Dear Sir,

I am directed to communicate the concurrence of the Department of Environment for location of a Lead-Zinc Smelter inclusive of captive power plant (90 MW capacity) at the proposed plant site at Chandoria near Chittorgarh (Rajasthan).

The concurrence to the above site is subject to the terms and conditions/recommendations made by the Environmental Appraisal Committee for Industries (a copy of which is enclosed herewith for information and necessary action).

Yours faithfully,

(M. Parabrahmam)  
PRINCIPAL SCIENTIFIC OFFICER

Copy to the Chairman, Hindustan Zinc Limited, 6, New Fatehpura, Udaipur-313001. (Rajasthan).

(M. Parabrahmam) 9/6/83  
PRINCIPAL SCIENTIFIC OFFICER

Encl: As Stated

CONDITIONS STIPULATED BY DEPARTMENT OF ENVIRONMENT  
WITH REGARD TO THE LOCATION OF LEAD-ZINC SMELTER  
INCLUDING A CAPTIVE POWER PLANT OF 90MW CAPACITY  
AT CHANDERIA, NEAR CHITTORGARH, RAJASTHAN.

---

1. Transportation of concentrates from mines to the smelter site should be done in containers or closed trucks to minimise/avoid the entry of metals into the environment through spillages, carry over, pilferage. The trucks used should be washed and cleaned at the centralised place. HZL should look into this aspect and make proper arrangements. The washing should be properly treated and disposed.
2. Spillages and fugitive dust emissions at loading and unloading points should be kept to minimum and for this purpose water spray should be adopted.
3. The levels of lead, zinc, Cd in the working environment should always be kept within stipulated/well below the standards laid down. If standards in our country are not available, standards laid down in US/Canada should be adopted.
4. The local ventilation in all workplaces should be designed in such a way to have a suitable draft circulations.
5. The height and design of the stacks should be such that Ground Level Concentrations of the gaseous pollutants should be within the stipulated standards of state/Central Board.
6. Location & height of the stacks on buildings should be such that the turbulence will be on beside of the buildings. The local meteorological conditions should be taken into consideration for this purpose.
7. The HZL authorities should make arrangements for regular monitoring of combustion gases, particulate matter and concentration of heavy metals in the particulates size, distribution and deposition of particles on similar type of plants (e.g. Visakhapatnam) in consultation with experts with in this field to have an idea and base information. Based on this suitable measures can be adopted and reports should be sent to State/Central Board/Dept. of Environment.
8. The liquid effluents emanating from various process operations should be recycled to the maximum possible extent. The effluents should be subjected to rigorous physico-chemical or other suitable treatment methods to bring down the pollutant concentrations well below the standards laid down by State/Central Board.
9. The waste treatment plant operation should be watched at Senior Management Level and regular reports on its performance and effluent quality should be submitted to State/Central authority.

10. The two sludge lagoons should be made impervious to avoid pollution of ground water.
11. Water quality of river and ground water should be collected at regular intervals to form as the base line data wells in the nearby areas should be monitored from now onwards and later also.
12. The effluent should be used on land to the maximum extent for social forestry purposes and should be a model for others in that area. HZL authorities should explore the possibility of adding treated wastes from township to factory wastes to enhance their utility.
13. State authorities be requested to plant trees in the vicinity and surrounding the monuments to enhance the protection and to reduce the pre wind/sand erosion of monuments.
14. Rigorous and stringent measures for maintaining the various processes and control equipment in the plant at the highest possible standards should be adopted by HZL. If there is failure of any control equipment those units should not be operated except in emergencies.
15. An Environmental Management Plan stipulating various conditions and requirements of operation, maintenance and monitoring should be drawn up. Various levels in the Organisation(s) should be trained to adopt the plans.
16. Contingency and disaster plans should be ~~dropped~~ <sup>drafted</sup> for adoption.
17. Suitable environmental management and Monitoring Cell should be created/with suitably qualified personnel of various disciplines to undertake the various functions. They should be directly reporting to the head of the Organisation.
18. Suitable programmes should be organised within the Organisation apprise workers, staff and people in the surroundings regarding value and necessity of good housekeeping and proper environmental management for the welfare of all. Concurrence for the site could be accorded with the above stipulations.

Def  
mental

No. J-11011/156/2003 - IA S (I)

Government of India

Ministry of Environment &amp; Forests

E mail: [planning@yahoo.co.in](mailto:planning@yahoo.co.in)

Paryavaran Bhawan,

C.O.O. Complex, Lodi Road,

New Delhi - 110 003

Dated the 31<sup>st</sup> March, 2004

To

The Managing Director,  
M/s Hindustan Zinc Ltd.,  
Yashod Bhawan,  
Udaipur- 313004, Rajasthan.

## Annexure 1a

**Subj:** Zinc smelter plant (1,70,000 TPA) and Captive Power plant (154 MW) project by M/s Hindustan Zinc Limited (HZL) at village Putholi in District Chitrakoot, Rajasthan - environmental clearance req.

Sir,

This has reference to your communication no. HZL/ENV/A(4)9/2172 dated 26.8.03 along with application, EIA /EMP and related project documents and subsequent clarifications furnished by you vide your letters dated 17<sup>th</sup> November, 2003 and 28<sup>th</sup> December, 2003 for environmental clearance of the above mentioned project.

The Ministry of Environment and Forests has examined your application. It is noted that the proposal involves setting up of a Zinc smelter plant of 1,70,000 MTPA capacity and Captive power plant of 154 MW capacity. The area required for the project is 114.05<sup>ha</sup>, which is already in the possession of M/s HZL. The project does not involve diversion of forestland and displacement of people. The Chitrakoot Fort is located at a distance of 8.5km from the plant. Zinc extraction will be through hydro metallurgical extraction route by the "Roast-Leach Electro Winning Technology". Water requirement of 21508 m<sup>3</sup>/d will be met from the Gounda dam. The solid waste shall be generated in the form of Jarosite (88700 TPA), Spent catalyst (16 KVA), Anode mud (5000TPA), Cooler cake (2000TPA), mercury sludge (20TP), ETP sludge (4800 TPA) and ash (1,07,100TPA). The jarosite, ETP sludge and cooler cake shall be stabilized into jarfix and disposed off into the land fill. The mercury sludge and spent catalyst shall be sold to authorized re-processors. Anode mud will be recycled and ash will be sold to cement manufacturers. The surplus ash will be disposed off in the ash disposal area by dry disposal route. NOC from the Rajasthan State Pollution Control Board has been obtained on 15<sup>th</sup> October, 2003. The public hearing panel has recommended the project in the meeting held on 6<sup>th</sup> June, 2003. Total cost of the project is Rs. 970 crores.

2.0 The Ministry of Environment and Forests hereby accords environmental clearance to the above project under the provisions of EIA Notification dated 27<sup>th</sup> January, 1984 as amended subsequently subject to strict compliance of the following specific and general conditions.

## A. SPECIFIC CONDITIONS:

The gaseous emissions from various process units should conform to the standards prescribed by the concerned authorities from time to time. The State Board 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 should go beyond the prescribed standards. In the event of failure of any pollution control system adopted by the unit, the respective unit should not be restarted until the control measures are rectified to achieve the desired efficiency.

For: Cm (1223)

(24)

-2-

- As reflected in the EIA /EMP, Double Contact Double Adsorption (DCDA) plant for sulphuric acid recovery from SO<sub>2</sub> should be set up. The stack from the sulphuric acid plant should be provided with on-line stack emission monitoring equipment for continuous monitoring of SO<sub>2</sub>. As per the recommendations made in Charter for Corporate Responsibility for Environment Protection, SO<sub>2</sub> emission limit should be controlled less than 2kg/tonne of H<sub>2</sub>SO<sub>4</sub> produced and acid mist limit of 50mg/m<sup>3</sup> should be achieved by December, 2008. Continuous monitoring of SO<sub>2</sub> should be carried out.
- ii. Fugitive emissions, acid mist vapours, fumes and SO<sub>2</sub> should be controlled and work environment monitored for prevailing contaminants regularly. Fugitive dust emissions in the zinc concentrate handling area and at various transfer points should be minimized by provision of water sprinkling system. The Company should improve overall house keeping by asphaltting the internal roads and to reduce the generation of fugitive dust from vehicle movements.
  - iv. The company should install fume extractors and bag filters to control the emissions from all melting and casting units. The emissions shall conform to the prescribed standards of 50mg/Nm<sup>3</sup>. The particulate emissions from the captive power plant should be controlled by installation of ESP and controlled within the stipulated limits of 50mg/Nm<sup>3</sup>. The low NO<sub>x</sub> burners should be installed to control the NO<sub>x</sub> emissions.
  - v. As reflected in the EIA /Environmental Management Plan, discharge of process effluent shall not exceed 139 m<sup>3</sup>/hr. The treated effluent should conform to the prescribed standards and recycled to maintain the zero discharge. Reverse Osmosis plant should be installed for treatment of surplus effluent for reuse in the process to achieve zero discharge. The rejects from the RO plant should be evaporated in a solar evaporation pond to be constructed within smaller premises.
  - vi. The solid/hazardous waste/sludge generated from the process units should be disposed off in a secured double lined landfill with leachate collection and leak detection system. As reflected in EIA /EMP report, the jarosite should be stabilized to jarosin by application of technology obtained from M/s Canadian Electrolytic Zinc Limited. The landfill should be constructed at a safe height from the highest water table. The design of the landfill should be approved by SPCB as per Hazardous Wastes (Management and Handling) Rules, 2003. Ground water quality in the vicinity of the landfill should be regularly monitored by construction of Piezometers. The efforts should be made to sell spent catalyst to the authorized reproducers. The anode mud should be recycled in the leaching plant. The ash generated from the captive power plant should be provided to the cement manufacturing units. The surplus quantity if any, should be disposed off in the ash disposal area by dry disposal method. The Piezometers should be constructed around the ash disposal area to monitor the ground water quality.
  - vii. Green belt of adequate width and density in and around the captive power plant should be developed in consultation with the DFO in 81.12 ha. of area in addition to the existing area already brought under green belt. Around the periphery of plant and township, canopy based green belt should be developed.

TOTAL P. 03

-3-

**GENERAL CONDITIONS:**

The project authorities must strictly adhere to the stipulations made by the Rajasthan State Pollution Control Board and the State Government.

No expansion or modifications in the plant should be carried out without prior approval of the Ministry of Environment and Forests.

Adequate number of ambient air quality monitoring stations should 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 should be regularly submitted to this Ministry including its Regional Office at Lucknow and the State Pollution Control Board/Central Pollution Control Board once in six months.

Industrial waste water should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19<sup>th</sup> May, 1993 and 31<sup>st</sup> December, 1993 or as amended from time to time. The treated wastewater should be recycled in the plant as well as utilization for plantation purposes.

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.

The overall noise levels in and around the plant area should 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).

Occupational Health Surveillance of the workers should be done on a regular basis and records maintained as per the Factories Act.

The project proponent shall also comply with all the environmental protection measures and safeguards recommended in the EIA / EMP / risk analysis and DMP report.

The project authorities will provide adequate funds both recurring and non-recurring to implement the conditions stipulated by the Ministry of Environment and Forests as well as the State Government along with the implementation schedule for all the conditions stipulated herein. The funds so provided should not be diverted for any other purposes.

The Regional Office of this Ministry at Lucknow/Central Pollution Control Board/State Pollution Control Board will monitor the stipulated conditions. A semi-monthly compliance report and the monitored data along with statistical interpretation should be submitted to them regularly.



www. envfor. nic. in

The Project Proponent should inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the State Pollution Control Board/Committee and may also be seen at Website of the Ministry of Environment and Forests at <http://envfor.nic.in>. This should 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 should be forwarded to the Regional office.

iii. The Project Authorities should 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.

3.0. The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.

4.0. The Ministry reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner will implement these conditions.

5.0. The above conditions will 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.

*P. L. Ahuja*  
(Dr. P. L. Ahuja)  
Addl. Director

Copy to:

- i) Secretary, Department of Environment and Forests, Government of Rajasthan, Jaipur.
- ii) Chief Conservator of Forests, Central Region, Ministry of Environment and Forests, B-1772, Sector-A, Aliganj, Lucknow-226020.
- iii) Chairman, Central Pollution Control Board, Parivartan Bhavan, CEID-cum-Office complex, East Arjun Nagar, New Delhi-1100032.
- iv) Chairman, Rajasthan State Pollution Control Board, 4, Institutional area, Jaolana, Deeg Rd, Jaipur.
- v) JS(CCI-I), Ministry of Environment and Forests
- vi) Director (Monitoring Cell), Ministry of Environment & Forests
- vii) Guard File.
- viii) Record File.

(Dr. P. L. Ahuja)  
Additional Director

Talked to Mr. J. K. Sharma, Joint Secretary, Environment and Forests, in this regard before about the project. He said that the concerned authorities (pollution control board) will have no objection.

Dr. G. M. (F. & E.)

3/10/2014

TOTAL P. 01

No J-11011/17/2005-IA-II(I)  
Government of India  
Ministry of Environment and Forests

Email: [plahuti@yaho.com](mailto:plahuti@yaho.com)

Telo no. 24363973

Paryavaran Bhavan, CGO Complex,

Lodi Road, New Delhi-110003

Dated the 3<sup>rd</sup> August, 2005

To

The General Manager (Environment)  
M/s Hindustan Zinc Limited  
Yashad Bhavan, Udaipur 313004  
Rajasthan India

**Sub: Expansion of Lead smelter at village Putholi, Tehsil Gangrar in district Chittorgarh in Rajasthan by M/s Hindustan Zinc Limited.**

Sir,

This has reference to your letter No. CLZS/GM/ENV/LEAD05 dated 21<sup>st</sup> January, 2005 along with application, EIA /EMP and related project documents and subsequent clarifications furnished by you vide your letters dated 28<sup>th</sup> February, 2005, 7<sup>th</sup> June, 2005 and letter no. EMU-01966 dated 20.06.2005 for environmental clearance of the above mentioned project.

The Ministry of Environment and Forests has examined your application. It is noted that the proposal involves expansion of lead smelter plant of 60,000 TPA capacity. The area required for the project is 0.8 ha. which is available within the premises of existing zinc smelter plant. The project does not involve diversion of forest land and displacement of people. The Chittaurgarh Fort is located at a distance of 6.5km from the plant. It is noted that company will adopt environmental friendly Lance seal smelting technology with all stages of smelting in a single, compact and totally closed furnace with high lead and by product recovery, flexibility to use variety of feed materials including secondaries and low water consumption. The heat evolved during oxidation of ore will be used in smelting operation. Water requirement of 2592 m3/d will be met from the Gosunda dam. Permission to draw 1500 MCFT of water has been obtained from the Energy Department, Govt. of Rajasthan on 19<sup>th</sup> November, 1994. The solid waste shall be generated in the form of slag from the lead smelter furnace (15000MTPA). The slag after granulation will be sold to the cement manufacturing companies and will be used for road construction. NOC from the Rajasthan State Pollution Control Board has been obtained on 26.2.2005. The public hearing panel has recommended the project in the meeting held on 17.11.04. Total cost of the project is Rs. 97.5 crores.

2.0. The Ministry of Environment and Forests hereby accords environmental clearance to the above project under the provisions of EIA Notification dated 27<sup>th</sup> January, 1994 as amended subsequently subject to strict compliance of the following specific and general conditions

## A. SPECIFIC CONDITIONS:

- i. The gaseous emissions from various process units shall conform to the standards prescribed by the concerned authorities from time to time. The State Board 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 should go beyond the prescribed standards. In the event of failure of any pollution control system adopted by the unit, the respective unit should not be restarted until the control measures are rectified to achieve the desired efficiency.
- ii. As reflected in the EIA /EMP, existing Double Contact Double Adsorption (DCDA) plant for sulphuric acid recovery from SO<sub>2</sub> shall be upgraded by use of high active catalyst and high efficiency plate heat exchangers. The company shall ensure that SO<sub>2</sub> emission from the lead smelter plant are taken to existing sulphuric acid plant properly and converted to sulphuric acid. The stack from the sulphuric acid plant shall be provided with on-line stack emission monitoring equipment for continuous monitoring of SO<sub>2</sub>. As per the recommendations made in Charter for Corporate Responsibility for Environment Protection, SO<sub>2</sub> emission limit shall be controlled less than 2kg/tonne of H<sub>2</sub>SO<sub>4</sub> produced and acid mist limit of 50mg/Nm<sup>3</sup> shall be achieved by December, 2006.
- iii. The company shall install continuous air quality monitoring stations. One continuous ambient air quality monitoring station shall be set up at Chittorgarh fort to assess the impact of the lead smelter on the fort. Data monitored shall be submitted to the Ministry and CPCB/SPCB once in six months.
- iv. Fugitive emissions, acid mist vapours, fumes and SO<sub>2</sub> shall be controlled and work environment monitored for prevailing contaminants regularly. Fugitive dust emissions in the lead concentrate handling area and at various transfer points shall be minimized by provision of dust suppression system. The trucks carrying concentrate shall be fully covered. The Company shall improve overall house keeping by asphaltting the internal roads and to reduce the generation of fugitive dust from vehicle movements.
- v. The company shall install fume extractors and bag filters to control the emissions from all melting and casting units. The emissions shall conform to the prescribed standards of 50mg/Nm<sup>3</sup>. The particulate emissions from the captive power plant should be controlled by installation of ESP and controlled within the stipulated limits of 50mg/Nm<sup>3</sup>. The low NO<sub>x</sub> burners shall be installed to control the NO<sub>x</sub> emissions.
- vi. As reflected in the EIA /Environmental Management Plan, discharge of process effluent shall not exceed 19 m<sup>3</sup>/hr. The treated effluent shall conform to the prescribed standards and recycled to maintain the zero discharge. Reverse Osmosis plant shall be installed for desalination and reuse of effluent to achieve zero discharge. The rejects from the RO plant shall be evaporated in a solar evaporation pond to be constructed within smelter premises.

3-  
vii. The solid waste generated in the form of slag shall be granulated and sold to cement manufacturing and also for use in road construction.

viii. Green belt of adequate width and density in and around the captive power plant shall be developed as per Central Pollution Control Board guidelines in 61.12 ha. of area in addition to 106 ha. of existing area already brought under green belt. Around the periphery of plant and township canopy based green belt should be developed.

**B. GENERAL CONDITIONS:**

i. The project authorities must strictly adhere to the stipulations made by the Rajasthan State Pollution Control Board 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. 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<sub>2</sub> and NO<sub>x</sub> are anticipated in consultation with the Rajasthan State Pollution Control Board. Data on ambient air quality and stack emission should be regularly submitted to this Ministry including its Regional Office at Lucknow and the State Pollution Control Board/Central Pollution Control Board once in six months.

iv. Industrial waste water should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19<sup>th</sup> May, 1993 and 31<sup>st</sup> December, 1993 or as amended from time to time. The treated wastewater should be recycled in the plant as well as utilization for plantation purposes.

v. The project authorities must strictly comply with the rules and regulations with regard to (Management and Handling) rules, 2003. Authorization from the Rajasthan State Pollution Control Board must be obtained for collection, storage, treatment and disposal of hazardous wastes.

vi. 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 enclosures, 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).

vii. Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.

viii. The project proponent shall also comply with all the environmental protection measures and safeguards recommended in the EIA / EMP / risk analysis and DMP report.

- ix The project authorities will provide adequate funds both recurring and non-recurring to implement the conditions stipulated by the Ministry of Environment and Forests as well as the State Government along with the implementation schedule for all the conditions stipulated herein. The funds so provided should not be diverted for any other purposes.
  - x The Regional Office of this Ministry at Lucknow/Central Pollution Control Board/State Pollution Control Board will monitor the stipulated conditions. A six monthly compliance report and the monitored data along with statistical interpretation should be submitted to them regularly.
  - xi 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 State Pollution Control Board/Committee and may also be seen at Website of the Ministry of Environment and Forests at <http://envfor.nic.in>. This should 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 should be forwarded to the Regional office.
  - xii 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.
- 3.0. The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.
- 4.0. The Ministry reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner will implement these conditions.
- 5.0. The above conditions will 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, 1981 along with their amendments and rules.

*P. N. Singh*  
(Dr. P. L. Anjara)  
Director

-5-

Copy to:

- i) Secretary, Department of Environment and Forests, Government of Rajasthan, Jaipur.
- ii) Chief Conservator of Forests, Central Region, Ministry of Environment and Forests, B-1/72, Sector-A, Aliganj, Lucknow-226020.
- iii) Chairman, Central Pollution Control Board, Parvash Bhavan, CBD-cum-Office complex, East Arjun Nagar, New Delhi-1100032.
- iv) Chairman, Rajasthan State Pollution Control Board, 4, Institutional area, Uhalana, Doongri, Jaipur.
- v) JS(CCI-I), Ministry of Environment and Forests
- vi) Director (Monitoring Cell), Ministry of Environment & Forests.
- vii) Guard File
- viii) Record File

(Dr. P. L. Ahujara)  
Director



F. No. J-11011/279/2006-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

Talefax : 011-24367668

Dated 6<sup>th</sup> December, 2006

To, ✓  
Shri Jayakumar Janakaraj  
Sr. Vice President  
M/s Vedanta/ Hindustan Zinc Ltd.  
Chanderya Led – Zinc Smelter  
P.O. Putholi, Gangrar, Chittorggarh – 312021  
Rajasthan

Fax : 01472-255816 / 0294-527386 / 011-29837954

E-mail : csr.mehta@vedanta.co.in

**Subject : Expansion of Zinc smelter (2,50,000 TPA) and Captive Power Plant (100 MW) at Putholi, Gangrar, Chittorggarh Rajasthan by M/s Vedanta / Hindustan Zinc Ltd. – Environmental clearance reg.**

Sir,

This has reference to your letter No. HZL/CLZS/ENV/MoEF/06/9586 dated 24<sup>th</sup> July, 2006 alongwith application, EIA/EMP and related project documents and subsequent clarifications furnished by you vide your letters dated 7<sup>th</sup> August, 2006 and 4<sup>th</sup> September, 2006 for seeking environmental clearance of the above mentioned project under the EIA Notification, 1994.

2.0 The Ministry of Environment and Forests has examined your application. It is noted that the proposal involves expansion of Zinc Smelter 2,50,000 TPA (2,10,000 TPA and Zinc smelter and 40,000 TPA by de-bottlenecking of existing 1,70,000 TPA zinc smelter) and Captive Power Plant (100 MW) at Putholi, Gangrar, Chittorggarh, Rajasthan. No additional land will be required since the expansion project will be set up in 26.5 ha out of existing 335.85 ha. land available. Zinc concentrates will be sourced from the captive mines of HZL viz. Rampur Agucha Mines, Rajpura Dariba Mines, Zawar Mine, Sindesar Khurd Mines. Calcine will be sourced from other zinc smelters (captive/imported).

3.0 Bag filters and ESP will be installed to control dust and air emissions. Total water requirement from Gosunda Dam will be 11,000 m<sup>3</sup>/d and permission accorded by the Govt. of Rajasthan. The effluent will be treated in the ETP followed by Reverse Osmosis. The wastewater generated from CPP will be recycled and used for dust suppression in coal and ash handling areas. The RO rejects, ETP sludge, Cobalt cake, cooler cake, anode mud, enrichment cake, and spent catalyst etc. will be sent to existing secured landfill. Waste / used oil will be sold to registered recyclers. Ash will be given to cement / brick manufacturers.

4.0 Public hearing panel has recommended the project in the meeting held on 29<sup>th</sup> June, 2006. 'No Objection Certificate' has been accorded by the Rajasthan State Pollution Control

Board vide letter No. 12 (CII-78)RPCB/G.III/1432 dated 3<sup>rd</sup> August, 2006. Total cost of the project is Rs. 970.00 Crores.

5.0. The Ministry of Environment and Forests hereby accords environmental clearance to the above project under the provisions of EIA Notification dated 14<sup>th</sup> September, 2006 subject to strict compliance of the following specific and general conditions.

**A. SPECIFIC CONDITIONS:**

- i. 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.
- ii. The company shall install on-line stack emission monitoring equipments for continuous monitoring of SO<sub>2</sub>, NO<sub>x</sub>, SPM and O<sub>2</sub> 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 & casting units. Electrostatic precipitators (ESP) in Captive Power Plant (CPP), Gas Cleaning Plant (GCP) and Sulphuric acid plant shall be installed to control dust and SO<sub>2</sub> emissions within the stipulated limits of 50 mg/Nm<sup>3</sup>. The low NO<sub>x</sub> burners shall be installed to control the NO<sub>x</sub> emissions.
- iii. Impact of SO<sub>2</sub> emissions from H<sub>2</sub>SO<sub>4</sub> plant and CPP in ambient air shall be assessed by the project proponent and a detailed report submitted to the Ministry including its Regional Office at Lucknow, CPCB and RSPCB.
- iv. All the recommendations made in Charter for Corporate Responsibility for Environment Protection (CREP) shall be strictly followed and SO<sub>2</sub> emission limit shall be controlled less than 2 kg/ton of H<sub>2</sub>SO<sub>4</sub> produced and acid mist limit of 50 mg/Nm<sup>3</sup> shall be achieved by December, 2006.
- v. Fugitive emissions, acid mist vapours, fumes and SO<sub>2</sub> 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 asphaltting the internal roads and to reduce the generation of fugitive dust from vehicle movements.
- vi. Total water requirement from Gosunda dam shall not exceed 34,000 m<sup>3</sup>/d as allocated by the Energy Department, Govt. of Rajasthan and water shall also be released from the Gosunda Dam for the use by the public as per the agreement signed. It shall be ensured that irrigation in the surrounding areas is not affected due to non-release of water by HZL. No ground water will be used. As reflected in the EIA/EEMP, all the effluent generated shall be treated in the ETP followed by feeding to Reverse Osmosis (RO) plant. The water treated in RO Plant shall be recycled in the process and rejects of RO plant shall be evaporated in solar evaporation pond. The RO rejects and ETP sludge shall be sent to existing secured landfill. The wastewater generated from CPP shall be recycled and used for dust suppression in coal and ash handling areas. The treated effluent shall conform to the prescribed standards and recycled to maintain the zero discharge.

- vii. The solid waste generated in the form Jarosite shall be stabilized as Jarofix and disposed off in Jarofix disposal yard inside the plant premises. Cobalt cake, cooler cake, anode mud, enrichment cake, ETP sludge and spent catalyst etc. shall be disposed off in secured landfill (SLF). Waste/used oil shall be sold to registered recyclers. Ash shall be given to cement / brick manufacturing units.
- viii. Canopy based green belt of adequate width and density in and around the around the periphery of plant, township and captive power plant in 142 ha. shall be developed as per CPCB guidelines.

**B. GENERAL CONDITIONS:**

- i. The project authorities must strictly adhere to the stipulations made by the Rajasthan State Pollution Control Board 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. 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<sub>2</sub> and NO<sub>x</sub> 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.
- iv. Industrial wastewater shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19<sup>th</sup> May, 1993 and 31<sup>st</sup> December, 1993 or as amended from time to time. The treated wastewater shall be recycled in the plant as well as utilization for plantation purposes.
- v. 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.
- vi. 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).
- vii. Occupational Health Surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.
- viii. The project proponent shall also comply with all the environmental protection measures and safeguards recommended in the EIA / EMP /risk analysis and DMP report.
- ix. The project authorities shall provide Rs. 111.50 Crores and Rs. 12.00 Crores towards capital cost and recurring cost/annum for 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

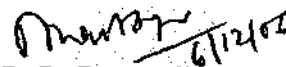
stipulated herein to this Ministry and its Regional Office at Lucknow. The funds so provided shall not be diverted for any other purposes.

- x. 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.
- xi. 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 State Pollution Control Board/ Committee 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.
- xii. 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.

6.0. The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.

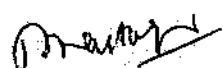
7.0. The Ministry reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner will implement these conditions.

8.0. The above conditions will 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)  
Additional 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. Joint Secretary (CCI-I), 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)  
Additional Director

**F. No. J-11011/279/2006-IA II (I)**  
 Government of India  
 Ministry of Environment, Forest and Climate Change  
 (I.A. Division)

Indira Paryavaran Bhawan  
 Jor Bagh Road, Ali Ganj,  
 New Delhi - 110003  
**E-mail: satish.garkoti@nic.in**  
**Tele ph.: 011: 24695316**

Dated: 1<sup>st</sup> October, 2015  
 5<sup>th</sup>

✓ To

**M/s Vedanta/Hindustan Zinc Ltd.**  
 Chanderiya Lead Zinc Smelter,  
 P.O.-Putholi, District-Chittorgarh,  
 Rajasthan-312021

**Fax No. – 01472-253016**

**Subject: Inclusion of Fumer Plant (Pyrometallurgical Process) within the existing Zinc Smelter (2,50,000TPA) and CPP (100MW) plant to convert Jarosite to slag by M/s Hindustan Zinc Ltd. at Village- Putholi, District- Chittorgarh, Rajasthan Environmental Clearance –regarding.**

Sir,

This has reference to your letter No. HZL/CLZS/Env/2014-2015/025 dated 24<sup>th</sup> September, 2014 on the subject mentioned above. The project proponent had applied to the Ministry for seeing amendment in the Environment Clearance granted to Zinc Smelter (2,50,000TPA) plant and CPP (100MW) vide letter No. J-11011/279/2006-IA.II(I) dated 06.12.2006. The matter was considered during the 25<sup>th</sup> meeting of the Expert Appraisal Committee held on 13<sup>th</sup> – 14<sup>th</sup> October, 2014. The Committee decided that the establishment of the Fumer Plant, although an environmentally friendly technology; however, cannot be treated as an amendment to the environment clearance dated 6<sup>th</sup> December, 2006. The Committee therefore decided that an EIA/EMP report is required on the project and recommended to prescribe ToRs to the proposal. The ToRs were awarded by MoEFCC vide letter No. J-11011/279/2006-IA.II(I) dated 20<sup>th</sup> November, 2014 for preparation of EIA/EMP report. The application based on ToRs was received in the Ministry vide letter No. HZL/CLZS/Env/2015-16/027 dated 13.06.2015 along with EIA/EMP report. The proposed project activity is listed at S.No. 3(a) in Metallurgical industries (ferrous & non ferrous) under Category 'A' of the Schedule of EIA Notification 2006 and appraised by the Expert Appraisal Committee (Industry) of MoEFCC.

2.0 The Ministry of Environment Forest and Climate Change examined the application in consultation with the Expert Appraisal Committee. It has been noted that M/s Hindustan Zinc Ltd. has proposed to establish Fumer plant (pyro-metallurgical process) within the existing leaching circuit of Hydro-II Zinc Smelter at Chanderiya Lead Zinc Smelter, Hindustan Zinc Limited. The project was earlier granted Environmental Clearance by the Ministry for 2,50,000 TPA Zinc smelter and CPP of 100 MW vide letter No. J-11011 /279/2006-IA.II(I) dated 6<sup>th</sup> December 2006.

3.0 The proponent has envisaged that the proposed project will eliminate the generation of Jarosite, which is presently stabilized with lime and cement to convert into stabilized Jarofix and is stored in secured Jarofix disposal yard. The modified process of Hydro-II Zinc smelter will produce clean slag instead of Jarosite, which will be used by cement manufacturers. The proposal will be executed within the existing plant premises only. The project site is situated in the village Putholi, at about 8.5 km North of Chittorgarh city in Rajasthan. The site is located at the intersection of latitude 24°57'21" N to 24°58'00" N and longitude 74°38'34" E to 74°40'22" E. The elevation of the site is about 400 m above mean sea level. The Chittorgarh-Ajmer highway (NH-79) passes at a distance of 5.0 km from plant boundary. The nearest railway station is at Chanderiya (2.5 km, SW) under Western Railway situated on Chittorgarh - Ajmer railway line. The estimated cost for conversion of unusable solid waste to usable slag is about Rs.500 Crores and cost on EMP is about Rs.80 Crores. There will not be any additional land acquisition for this project.

4.0 It has also been mentioned that with this process, generation of Jarosite and recurring land requirement for disposal will be eliminated, wherein clean Fumer slag will be generated to be utilized further in cement industries. Existing Hydro-I smelter having capacity of 2,10,000 TPA of Zinc metal will continue to operate through Jarosite process route.

5.0 The water requirement for the proposed Fumer plant is about 2400 m<sup>3</sup>/day, which would be within the stipulated water requirement of the existing Hydro-II plant water requirement including 100MW CPP (of 11000 m<sup>3</sup>/day). The proposed environment improvement project mainly aims at waste reduction, better utilization of available land for alternative use and conservation of natural resources. The following are the advantages of this project:

- i. Current Jarosite process requires land for storage of Jarofix. Proposed Fumer plant will generate usable clean slag, which can be sold to cement plants and hence it eliminates the need of land for storage of hazardous waste in future.
- ii. Off-gases from Fumer will be passed through waste heat recovery boiler, which will produce -21MWH of electrical power as Green Energy. Out of ~ 21MW production, - 11MW will be used in running Fumer. Therefore Fumer is self-sufficient in energy requirement and will produce additional power of ~ 10MW, which will be either utilized for other plants or will be available to the State grid.
- iii. Fumer Slag contains -7.6% Lime and -43% Fe<sub>2</sub>O<sub>3</sub>. This will reduce consumption of - 17000 metric tons CaCO<sub>3</sub> in cement industry and will reduce carbon footprint by ~7700 tons. Hence it will conserve natural resources.

6.0 The matter was considered in the 43<sup>rd</sup> meeting of the Expert Appraisal Committee held on 2<sup>nd</sup> -3<sup>rd</sup> July, 2015. After detailed deliberations, the EAC (I) recommended the project for Environmental Clearance and stipulated Specific Conditions along with other environmental conditions while considering for accord of Environmental Clearance.

7.0 The Ministry of Environment, Forest and Climate Change (MoEFCC) on the basis of the aforesaid recommendations of the EAC (I), hereby decided to grant Environmental Clearance to Include Fumer Plant to convert Jarosite to slag under provisions of EIA Notification dated 14<sup>th</sup> September 2006, subject to strict compliance of the following Specific and General conditions:



**A. SPECIFIC CONDITION:**

- i. The project proponent should install 24x7 air monitoring devices to monitor air emission as provided by CPCB and submit report to Ministry and its Regional Office.
- ii. The Committee observed that the piezometer samples have shown very high sulphate content upto 3158 mg/l. This indicates seepage of leachate from the jarofix in the landfill. This needs to be investigated and an action plan for remedial action needs to be submitted to the Ministry within 6 months.
- iii. All the slag from the Fumer plant should be utilized in the cement plant.
- iv. All the existing jarofix landfill site should be scientifically capped as per CPCB guideline.
- v. The PP should install piezometer on the northern side of the new landfill site.

**B. GENERAL CONDITIONS:**

- i. The project authorities must strictly adhere to the stipulations made by the Rajasthan Pollution Control Board and the State Government.
- ii. No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment, Forests and Climate Change (MoEFCC).
- iii. At least four ambient air quality monitoring stations should be established in the downward direction as well as where maximum ground level concentration of PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub> and NO<sub>x</sub> are anticipated in consultation with the SPCB. Data on ambient air quality and stack emission shall be regularly submitted to this Ministry including its Regional Office at Lucknow and the SPCB/CPCB once in six months.
- iv. Industrial wastewater shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19<sup>th</sup> May, 1993 and 31<sup>st</sup> December, 1993 or as amended from time to time. The treated wastewater shall be utilized for plantation purpose.
- v. 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).
- vi. Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.

- vii. The company shall develop rain water harvesting structures to harvest the rain water for utilization in the lean season besides recharging the ground water table.
- viii. The project proponent shall also comply with all the environmental protection measures and safeguards recommended in the EIA/EMP report. Further, the company must undertake socio-economic development activities in the surrounding villages like community development programmes, educational programmes, drinking water supply and health care etc.
- ix. Requisite funds shall be earmarked towards capital cost and recurring cost/annum for environment pollution control measures to implement the conditions stipulated by the Ministry of Environment, Forest and Climate Change (MoEFCC) as well as the State Government. An implementation schedule for implementing all the conditions stipulated herein shall be submitted to the Regional Office of the Ministry at Lucknow. The funds so provided shall not be diverted for any other purpose.
- x. A copy of clearance letter shall be sent by the proponent to concerned Panchayat, Zila Parishad/Municipal Corporation, Urban Local Body and the local NGO, if any, from whom suggestions/representations, if any, were received while processing the proposal. The clearance letter shall also be put on the web site of the company by the proponent.
- xi. The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of the MOEFCC at Lucknow. The respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely; PM<sub>10</sub>, SO<sub>2</sub>, NO<sub>x</sub> (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the projects shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.
- xii. The project proponent shall also submit six monthly reports on the status of the compliance of the stipulated environmental conditions including results of monitored data (both in hard copies as well as by e-mail) to the Regional Office of MOEFCC, the respective Zonal Office of CPCB and the SPCB. The Regional Office of this Ministry at Lucknow / CPCB / SPCB shall monitor the stipulated conditions.
- xiii. The environmental statement for each financial year ending 31<sup>st</sup> March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental conditions and shall also be sent to the respective Regional Office of the MOEFCC at Lucknow by e-mail.
- xiv. 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 SPCB and may also be seen at Website of the Ministry of

Environment, Forests and Climate Change (MoEFCC) 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 should be forwarded to the Regional office at Lucknow.

- xv. 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.

8.0 The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.

9.0 The Ministry reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner shall implement these conditions.

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, Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008 and the Public (Insurance) Liability Act, 1991 along with their amendments and rules.

  
(Dr. Satish C. Garkoti)  
Scientist 'F'

**Copy to:-**

1. The Secretary, Department of Environment, Govt. of Rajasthan, Jaipur.
2. The Chairman, Central Pollution Control Board, Parivesh Bhavan, CBD-cum-Office Complex, East Arjun Nagar, New Delhi, 110 032.
3. The Chairman, Rajasthan State Pollution Control Board, 4, Jhalana Institutional Area, Jhalana Doongri, Jaipur, Rajasthan 302004
4. The Additional Principal Chief Conservator of Forests (C) Ministry of Env. And Forests Regional Office (CZ) Kendriya Bhawan, 5<sup>th</sup> Floor, Sector "H" Aliganj, Lucknow-226020 (Uttar Pradesh)
5. Guard File / Record File/Monitoring file.

  
(Dr. Satish C. Garkoti)  
Scientist 'F'



**F. No. J-11011/279/2006-IA. II(I)**  
 Government of India  
 Ministry of Environment, Forest and Climate Change  
 (Impact Assessment Division)

Indira Paryavaran Bhawan  
 JorBagh Road, Aliganj,  
 New Delhi - 110003  
 E-mail: [dirind-moefcc@gov.in](mailto:dirind-moefcc@gov.in)  
 Tel: 011-24695368  
 Dated: 14.10.2020

To,

**M/s Hindustan Zinc Ltd.,**  
 Chanderiya Lead Zinc Smelter, P.O: Putholi,  
 District Chittorgarh, **Rajasthan**  
 Email: [tarun.meghwal@vedanta.co.in](mailto:tarun.meghwal@vedanta.co.in)

**Subject:** Capacity expansion from 4,20,000 to 5,04,000 TPA in Hydro-I and Hydro-II Zinc Smelter through debottlenecking of **M/s Hindustan Zinc Ltd.**, located at Chanderiya Lead Zinc Smelter, P.O: Putholi, **District Chittorgarh, Rajasthan –Environment Clearance under Para 7(ii) of EIA Notification, 2006– regarding.**

Sir,

This is reference to your online application vide proposal no. IA/RJ/IND/124999/2019 dated 12/12/2019 along with the application in prescribed format (Form-I) seeking Environmental Clearance under para 7(ii) of EIA Notification, 2006 for the project mentioned above. The proposed project activity is listed at S. No. 3(a) Metallurgical industries (ferrous & non-ferrous) under Category “A” of the schedule of the EIA Notification, 2006 and appraised at Central Level.

2. Existing EC obtained is vide F. No: J - 11011/158/2003/IA-II (I) dated 31<sup>st</sup> March 2004 for Hydro Plant - I (from 1,70,000 TPA to 2,10,000 TPA) & F. No: J-11011/279/2003/IA-II (I) dated 6<sup>th</sup> December 2006 for Hydro- II (2,10,000 TPA).

**Details submitted by the project proponent**

3. Total area existing of both Hydro Plants – I & II: 20 ha + 26.5 ha = 46.5 ha out of total area of CLZS complex: 335.89 ha. No additional area is required for proposed enhancement of zinc production capacity for both Hydro Plants–I & II. The status of production details in accordance with consent is as below:
  - i. Hydro-I Zinc Production: 2,10,000 TPA as per CTO vide letter no: F F(CPM)/Chittorgarh(Gangrar)/2(1)/2016- 2017/6058-6060 Dated 25th August 2016; CTO Renewal is under process at RSPCB; application was submitted vide Application ID: 213271 dated 27/04/2018 to RSPCB.
  - ii. Hydro-II Zinc Production: 2,10,000 TPA as per CTO vide letter no: F (CPM)/Chittorgarh (Gangrar)/2(1)/2016-2017/3302-3305 dated 18<sup>th</sup> December 2019 valid upto 31<sup>st</sup> January 2024.
4. Certified compliance report of existing ECs [J-11011/158/2003-IA II(I) dt. 31.03.2004; J-11011/279/2006-IA II(I) dt. 06.12.2006] from the Regional Office of the MoEF&CC, Lucknow was obtained vide letter File No: IV/ENV/R/Ind- 29/285/2004(285-371)/395 dated



15.11.2019 and vide letter No. HZL/CLZS/ENV./51/2020 dated 15.06.2020. No non-compliances were reported by Regional Officer.

5. The Proposed Enhancement of Zinc Production Capacity (from 4,20,000 TPA to 5,04,000 TPA) of both Hydro Plants – I & II under 7 (ii) clause of EIA notification, 2006 (20% onetime capacity expansion). Existing Unit is based on roast leach electro-winning technology. Now, it is proposed to increase the capacity from 4,20,000 TPA to 5,04,000 TPA (20%) in its Zinc Smelter I & II on combined basis by improving the current efficiency in cell house from 89% to 93%, increasing current input in cell house from 190 Ka to 200 kA, Debottlenecking and increasing the number of cells from 124 to 132 in Hydro-I cell house.
6. Proposed resources requirement (Land/raw materials/water/power) vis-à-vis with granted Environmental Clearance:

Unit	As per EC (Dec'2006)	Existing Status	Additional Proposed Capacity	Total Capacity After Proposed Enhancement
Hydro Smelter	420000 TPA	420000 TPA	84000 TPA	504000 TPA (20% Expansion)
Land Requirement	335.89 ha	335.89 ha	-	No Change
Water Requirement	30670 cum/day	30670 cum/day	-	No Change
Source of Water	Gosunda Dam (Captive)/STP Udaipur/Proposed STP of Chittorgarh/Bhilwara/Other Proposed STPs			
Power Requirement	220 MW	220 MW	20 MW	240 MW
Power Source	Captive Thermal Power Plant / WHRB (18.8 MW)/ Captive Solar Power Plant/ Rooftop Solar Panels/Floating Solar Panels/ AVVNL (4.59 MW DG Sets for Emergency Purpose)			
Raw Material Concentrate:	677177 TPA	677177 TPA	21282 TPA	698458 TPA
Calcine	206000 TPA	206000 TPA	131990 TPA	337990 TPA
Employment	5141	5141	-	No Change
Project Cost (Rs in Cr)	2647	2647	138.5	2785.5
Environment Protection cost (Rs in Cr)	190.1	190.1	48.5	238.6
<ul style="list-style-type: none"> <li>No Change in existing Process Technology (roast leach electro-winning Technology).</li> <li>No Change in land &amp; Water requirement.</li> <li>20% Expansion in Hydro Plant by improving the current efficiency, 8 new cells installation &amp; Debottle necking project.</li> </ul>				

7. Environmental baseline studies have been carried for a month from 1<sup>st</sup> October to 31<sup>st</sup> October 2019. The ambient air quality levels were monitored at ten locations. The monitored

parameters in the range; PM<sub>10</sub>- 65-95 µg/m<sup>3</sup>; PM<sub>2.5</sub>- 25-58µg/m<sup>3</sup>; SO<sub>2</sub>- 10.2-22.3µg/m<sup>3</sup> and NO<sub>2</sub>- 15.3-32.2µg/m<sup>3</sup>.

8. Pollution load quantification (Air/Water/Solid & hazardous waste/traffic) after enhancement of hydro plants – I & II.

Parameter	Pre-expansion (420000 TPA)	Post-expansion (504000 TPA)	Remarks
<b>Air Environment</b>			
SO <sub>2</sub>	2 kg/ton of Sulphuric Acid Produced	1 kg/ton of Sulphuric Acid Produced	<b>To increase</b> <ul style="list-style-type: none"> <li>FAT pump circulation from 570 M3 /Hr to 620 M3 /Hr (Including crossing) to improve absorption efficiency.</li> <li>IAT pump circulation from 982 M3 /Hr to 1032 M3 /Hr (Including crossing) to improve absorption efficiency.</li> </ul> <b>To Replace</b> <ul style="list-style-type: none"> <li>FAT &amp; IAT irrigation system with improved design to improve adsorption efficiency.</li> <li>IAT &amp; FAT candle filters with collection efficiency of &gt;1 micron to 100% and &gt;0.5 micron to 96%</li> </ul>
SO <sub>3</sub> /Acid Mist	50 mg/Nm <sup>3</sup>	30 mg/Nm <sup>3</sup>	
PM	50 mg/Nm <sup>3</sup>	30 mg/Nm <sup>3</sup>	<ul style="list-style-type: none"> <li>Upgradation of Bag House</li> <li>Bag Fabric: - Polypropylene will replace by PTFE.</li> </ul>
<b>Water Environment</b>			
Water Requirement	30,670 (26 KL/Ton)	30,670 (22KL/Ton)	<ul style="list-style-type: none"> <li>No additional water required. Further, planning to reuse the treated sewage from Proposed STP of Chittorgarh/Bhilwara City to reduce freshwater requirement.</li> <li>Strengthening of Recycling System with recovery of additional 580 m<sup>3</sup>/day water from MEE/MVR.</li> <li>Zero Liquid discharge being maintained.</li> </ul>
<b>Resource Requirements</b>			



Land	335.89 ha	335.89 ha	No additional land required
Power Requirement	220 MW (4588.6 KWH/Ton)	240 MW (4171.4 KWH/Ton)	Additional 20 MW power will be sourced from Renewable Energy.
GHG Emission Reduction in tCO2e/T	1792296 (4.27 tCO2e/T)	1792296 (3.55 tCO2e/T)	No Change.

9. Details of Solid Waste Generation & Management for Hydro Plants -I & II is given as below:

Sr. No.	Type of Waste Quantity (Units)	Granted Quantity (Units)	Additional Quantity (Units)	Total (After Enhancement) Quantity (Units)	Method of Treatment and Disposal
1	Cooler cake (MTPA)	5,000	1000	6000	Reuse/Recycle/Sale to registered recycler/Co-processing/ Disposal in SLF
2	Anode mud (MTPA)	2,200	0	2200	Reuse/Recycle/Sale to registered recycler /Disposed in SLF
3	Used/Spent oil (KLPA)	80	16	96	Reuse/ Sale to registered recycler
4	Waste oil (KLPA)	270	0	270	Reuse/Sale to registered recycler
5	Cobalt cake (MTPA)	1,000	0	1000	Reuse/Recycle/Sale to registered recycler /Disposed in SLF
6	Purification cake / Enrichment cake (MTPA)	12,520	0	12520	Reuse/Recycle/Sale to registered recycler /Disposed in SLF
7	Mercury and Mercury compounds	22 MTPA	-22 MTPA	0	Reuse/Recycle/Sale to registered recycler /Disposed in SLF
8	Spent catalyst in KL	60	0	60	Sale to registered recycler/dispensed in SLF
9	Non-ferrous Sludge from ETP and scrubbers	9,600 MTPA	4,000	13,600	Reuse/Recycle/Sale to registered recycler /Disposed in SLF/Co processing in Cement industries

Sr. No.	Type of Waste Quantity (Units)	Granted Quantity (Units)	Additional Quantity (Units)	Total (After Enhancement) Quantity (Units)	Method of Treatment and Disposal
10	Discarded containers/barrels/liners used for Haz. Waste/chemicals	1,400 No's/Y	0	1,400 No's/Y	Reuse/Recycle/Sale to registered recycler /Disposed in SLF
11	Flue gas cleaning residue	2.0 MTPA	0	2.0	Reuse/Recycle/Sale to registered recycler /Disposed in SLF
12	Spent ion exchange resin containing toxic metal	1.0 MTPA	0	1.0	Sale to registered recycler/disposed in secure land fill
13	Water purification Resin	2.0 MTA	0	2.0	Sale to registered recycler/disposed in secure land fill
14	Filter and Filter material which contain organic compound	100 MTA	0	100	Sale to registered recycler/disposed to secure land fill/approved Incinerator
15	Oil Soaked Jute/cotton waste/Used PPE's	-	10.0	10.0	Sale to registered recycler/disposed to secure land fill/approved incinerator
16	Jarosite cake*	3,00,000	-1,00,000 (after Fumer)	2,00,000	Utilization in Cement Manufacturing/ Road/Rail embankment/Concrete construction/ disposal in Lined Jarofix yard
17	MEE Salt	-	5000	5000	Recovery of Glauber Salt/ Disposal in SLF

\*Jarosite has been excluded from the schedule I of the Hazardous Waste Management Rules 2016 as the high volume low effect waste.

\*\* As per latest CPCB Guideline Calomel is now been reclassified as by product.



10. The estimated cost of the proposed enhancement of zinc production capacity will be Rs. 138.5 Cr including the proposed Environmental budget of Rs. 48.5 Cr.
11. The details of proposed CER activities are as given below:

Area of Intervention	Expenditure Rs. in Lakhs
Microenterprise development	50
Skilling of local youths	40
Drinking water and pipeline	30
Plantation of saplings in villages and community land	10
<b>Total</b>	<b>130</b>

12. No litigation is pending in any court related to project or activity. No show cause notices/direction has been issued under Air Act, Water Act and Environment (Protection) Act, 1986.
13. Name of the consultant: M/s. Vimta Labs [S.No.162, List of Accredited Consultant Organizations (Alphabetically) Rev. 82, Dec. 05, 2019].
14. The proposal was considered in Reconstituted Expert Appraisal Committee (REAC) (Industry-1) meetings held during 24-25<sup>th</sup> December 2019 and 25-26<sup>th</sup> June 2020.

**Observations of the committee (EAC meeting held during 25-26<sup>th</sup> June 2020)**

15. During discussions, the committee made the following observations in the up-gradation of the plant.
- CTO for existing operations of both Hydra I and II have been obtained. CTOs are valid till 31.8.23 for Hydra I and 31.1.24 for Hydra II.
  - Treated sewage water from STPs of Chittorgarh and Bhilwara is proposed to bring to Chanderia for use in the plant processes.
  - Project proponent proposed to reduce SO<sub>2</sub> emissions from H<sub>2</sub>SO<sub>4</sub> plant from 2 kg/t of acid to 1 kg/t of acid, that of acid mist from 50mg/Nm<sup>3</sup> to 30mg/Nm<sup>3</sup> and that of particulate matter (PM) from 50mg/Nm<sup>3</sup> to 30mg/Nm<sup>3</sup> in the upgradation of the plant.
  - It is proposed to strengthen the ETP to recycle additional 580 Cum/day of effluents by installing MEE for RO rejects.
  - Additional 20 MW power required for the additional load shall be procured from Renewable resources.
16. Further, the committee asked the project proponent to furnish the details of process optimization and addition of eight nos. of cells. Project proponent submitted the details through email on 26.06.2020 and the details are as given below:

**I. Upgradation of Rectifier Rating from Existing 192 kA to 200 kA:**

- Presently there are four rectifier units (Two in each hydro) having 96 thyristors in each rectifier
- 1 KA running Current in each thyristor
- Design capacity in each thyristor: 3KA
- To enhance current input from 192 KA to 200 KA, study conducted by OEM (M/s ABB) and following actions will be done as per recommendation
- To Increase each thyristor current from 1 KA to 1.04 KA



- vi. Increase number of plates in PHE to compensate extra heat load in thyristors
- vii. Installation of addition Oil cooler to compensate extra heat load in transformer winding
- viii. Existing busbar system is capable to operate cellhouse at 212 KA pas per design. The following are the design details and operability of Thyristor.

Thyristor Rating as per design	Load / thyristor @ 192 kA	Load / thyristor @ 200 kA
3 kA	1 kA	1.04A

## II. Upgradation of Purification & Cell House to operate Cell house from 190 to 200 KA

- i. **Spent Cooling Tower:** There are 26 Cooling towers in Plant. 14 No's in Hydro-1 and 12 No's in Hydro-2. Installation of two additional spent cooler in each cell to maintain the spent temperature less than 42 Degree Celsius in both cell house.
- ii. **Spent Circulation Pump:** Installation of two addition pumps along with cooling tower in both hydro to increase the spent flow according to current
- iii. **Cathode Stripping Machine:** Upgradation of stripping conveyor, receiving conveyor, returning conveyor, wagon hoist motor, hydraulic pump flow and machine encoders is required for cathode stripping machine to increase speed from 300 cathode/hr to 400 cathode/hr.
- iv. **Intermediate Bus Bar cooling system:** Upgradation of PHE and its pumps to increase the surface area and DM water flow to bus bar to maintain the temperature owing to increase in current flow through bus bar. Replacement of all the piping header to sustain the increased flow rate of DM water.
- v. **Cell Area:** Increase the electrolyte feed pipe size from 125 NB to 200 NB to accommodate the increased flow of electrolyte flowing to the cells.
- vi. **Purification area:** Installation of three new automatic filter press in Purification plant to improve supply solution flow. Installation of one addition supply pump with discharge line up to cell house.

## III. Current Efficiency Improvement Plan for Hydro Plant

To improve production capability with change in concentrate quality, a study was conducted by Technical Experts to freeze optimal process parameters and to evaluate the impact of current in Leaching-Electrolysis process. Effect of process parameters at Leaching-Electrolysis for the electrode position of zinc has been carried out & Influence of current density on the deposition process was also investigated. As per study, efficiency of zinc deposition was affected by calcine quality, zinc concentration in electrolyte, condition of electrodes, neutral leaching parameters & Purification operation etc. Following actions are proposed based on technical study to Improve current efficiency from 89 to 93%.

- i. **Sulphur Sulphide less than 0.4%:** To maintain ferrous in desire range in leaching plant, sulphur Sulphide value in calcine must be less than 0.4%. Excess ferrous generation in



leaching circuit will increase Iron impurities in supply solution and have high impact on the current efficiency in cell house.

Following actionable to control Sulphide sulphur in Roaster:

- a) Preparation of two blend mixture for controlling the s/s.
- b) Increase the cooling tower fan blade angle.
- c) Throughout cleaning of system to reduce the pressure drop during the shutdown
- d) Schedule repair/replacement of all equipment during the shutdown.
- e) Oxygen Enrichment in roasting process
- f) Micro palletization in Roaster

**ii. Leaching process Optimization:** Leaching operating parameters to be controlled as below:

- a) Neutral leaching head tank T/Fe at 1.3 +/- 0.2 gpl
- b) Neutral Leaching First reactor pH 3.0 +/- 0.05 by feed forward control
- c) Neutral Leaching Second Reactor pH 4.7 +/- 0.1
- d) Pre-Neutralization Overflow pH at 4.8 to 5.0 with Fe++ 50 - 100 PPM
- e) Use of low pressure compressed air (1.7 Kg) in neutral Leaching & Pre-Neutralization for oxidation
- f) Magnesium removal section overall efficiency at > 80% to reduce magnesium impurities in supply solution.

**iii. Purification Operational Excellence**

- a) Efficient Zinc Dust dosing
  - Automation of Zinc Dust dosage & solution flow
  - Online calibration of Loss in weight
  - lining of bins to ensure continuous & free flow
- b) Installation of High RPM agitator
- c) Installation of online monitoring of PAT Dosage & automation with flow
- d) Introduced acid dilution tower to get uniform temperature and acidity for cloth regeneration
- e) Filter press Operation at < 2Kg feed pressure
- f) Process capability monitoring & control in HOT Purification stage
- g) Improvement in supply solution quality
  - Installation of Fully automatic filter press in place of current manual filter press.
  - Replacement of filter cloth from polyester cloth to polypropylene cloth.
  - Fully automatic cloth cleaning system to avoid manual intervention.
  - Installation of low retention reaction tank in Leaching.
- h) Reduction of Magnesium impurities from supply solution
  - Installation of addition lime storage silo to avoid stoppage due to low bin level.
  - Installation of addition filter press to improve capacity from 6.5 m<sup>3</sup>/hr to 8.0 m<sup>3</sup>/hr.
  - Replacement of fresh water with MR overflow for lime slurry preparation unit.

**iv. Cogent Headers Replacement:** The cathode header quality with respect to resistance is some most important criteria to ensure the healthiness of the header bars. At present the



cathode header bars are rejected on physical damages, assumption basis or according to the number of years of use. We are planning to use a megger Instrument for testing of the headers, the standard testing procedure will be developed which depend on the Millivolts drop at 400Amp.

***Headers having voltage drop > 1.5 mV are being rejected***

**v. Electrode Management:**

*Electrode Alignment:* The electrodes in the cell house are supposed to be in a face to face exposure to each other, any deviation in the position called misalignment of the electrode leads to generation of the dendrites on the edges of the cathode, it has impact on quality of the product, higher chances of short circuit. Electrode alignment to be monitored regularly

*Anode Grading:* The physical condition of anode along with its dimension to be classified in three categories A, B & C grade.

A grade anode - 100 % physical dimension as compared to new one

B grade anode - 95 % physical dimension as compared to new one

C grade anode - 90 % physical dimension as compared to new one

A grade anode is to be maintained >95% % by replacing C grade anode on schedule basis.

*Improvement in Anode Wash Quality:* During study, it was appraised, anode wash had significant effect on zinc deposit rate. To improve the anode wash quality instead of washing pressure from 90-125 bar, high pressure system need to be upgrade by constant pressure washing of anode at 180 bar. pump model 400 ARP (2 no's) is to be replaced by Model 250 ARP (4 no's).

**vi. Electrolyte Management:**

*Zinc in Electrolyte:* The Zn deposit on the cathode varies under different Zn concentrations. Generally, the current densities have a strong effect on the Zn deposit on the cathode and at higher current density, high zinc concentration is favourable for current efficiency. Based on higher input current, spent zinc to be increased from 48-52 gpl to 52-55 gpl

**IV. Addition of Eight nos. of Cells in Hydro-I:**

CLZS has proposed to enhance the Zinc production capacity of CLZS Hydro Plant from 420 to 504 KTPA by Cell Operation from 190 KA to 200 KA Power Load & Current Efficiency from 89% to 93% with addition of eight nos. of cells in Hydro-I without addition of transformers and rectifiers

**Recommendations of the committee (EAC meeting held during 25-26<sup>th</sup> June 2020)**

17. In view of foregoing, after deliberations, the committee recommended the proposal for expansion of the project by upgradation of plant and addition of eight nos. of cells under the provisions of para 7(ii) of EIA Notification, 2006 with the following specific conditions along with sector specific general conditions pertaining to smelters.
- i. SO<sub>2</sub> emissions from H<sub>2</sub>SO<sub>4</sub> plant shall be less than 1 kg/t of acid.
  - ii. Acid mist from H<sub>2</sub>SO<sub>4</sub> plant shall be less than 30 mg/Nm<sup>3</sup>.
  - iii. Particulate matter levels from the stacks shall be less than 30 mg/Nm<sup>3</sup>.



- iv. Treated sewage from STP of Chittorgarh and Bhilwara shall be used in the plant processes.
- v. Existing ETP shall be strengthened to recycle additional 580 Cum/day of effluent by installing MEE for RO rejects.
- vi. Additional 20 MW power required for the additional load shall be procured from renewable energy sources to reduce GHG emissions. Records of renewable energy purchased shall be maintained and submitted to RO along with EC Compliance report.
- vii. Plant shall be operated on Zero Liquid Discharge (ZLD).
- viii. Additional 100000 trees shall be planted to improve greenery in the plant premises.
- ix. Solar energy shall be generated at the roof tops of the plant and office buildings.
- x. RWH and Recharge shall be done to recharge 200 % of the water consumed annually.
- xi. All CER projects should be completed within 3 years.

#### **Decision of MoEF&CC**

18. The Ministry considered the EAC recommendation and hereby decide to accord EC to M/s Hindustan Zinc Ltd for expansion of the project mentioned in the subject under provisions of para 7(ii) of EIA Notification 2006 with the following specific and general conditions:

#### **A. Specific Conditions**

- i. The Environment Clearance (EC) granted to the project/ activity is strictly under the provisions of the EIA Notification, 2006 and its amendments issued from time to time. It does not tantamount/ construe to approvals/ consent/ permissions etc., required to be obtained or standards/conditions to be followed under any other Acts/Rules/Subordinate legislations, etc., as may be applicable to the project.
- ii. SO<sub>2</sub> emissions from H<sub>2</sub>SO<sub>4</sub> plant shall be less than 1 kg/t of acid.
- iii. Acid mist from H<sub>2</sub>SO<sub>4</sub> plant shall be less than 30 mg/Nm<sup>3</sup>.
- iv. Particulate matter levels from the stacks shall be less than 30 mg/Nm<sup>3</sup>.
- v. Treated sewage from STP of Chittorgarh and Bhilwara shall be used in the plant processes.
- vi. Existing ETP shall be strengthened to recycle additional 580 Cum/day of effluent by installing MEE for RO rejects.
- vii. Additional 20 MW power required for the additional load shall be procured from renewable energy sources to reduce GHG emissions. Records of renewable energy purchased shall be maintained and submitted to RO along with EC Compliance report.
- viii. Plant shall be operated on Zero Liquid Discharge (ZLD).
- ix. Additional 100000 trees shall be planted to improve greenery in the plant premises.
- x. Solar energy shall be generated at the roof tops of the plant and office buildings.
- xi. RWH and Recharge shall be done to recharge 200 % of the water consumed annually.
- xii. All CER projects should be completed within 3 years.



## **B. General Conditions**

### **I. Statutory compliance:**

- i. The project proponent shall obtain the necessary permission from the competent authority concerned in case of drawl of surface water required for the project.
- ii. The project proponent shall obtain authorization under the Hazardous and other Waste Management Rules, 2016 as amended from time to time.

### **II. Air quality monitoring and preservation**

- i. The project proponent shall install 24x7 continuous emission monitoring system at process stacks to monitor stack emission with respect to standards prescribed in Environment (Protection) Rules 1986 as amended from time to time and connected to SPCB and CPCB online servers and calibrate these systems from time to time according to equipment supplier specification through labs recognised under Environment (Protection) Act, 1986 or NABL accredited laboratories.
- ii. The project proponent shall monitor fugitive emissions in the plant premises at least once in every quarter through labs recognised under Environment (Protection) Act, 1986.
- iii. The project proponent shall install system to carryout Continuous Ambient Air Quality monitoring for common/criterion parameters relevant to the main pollutants released (e.g. PM<sub>10</sub> and PM<sub>2.5</sub> in reference to PM emission, and SO<sub>2</sub> and NO<sub>x</sub> in reference to SO<sub>2</sub> and NO<sub>x</sub> emissions) within and outside the plant area at least at four locations (one within and three outside the plant area at an angle of 120° each), covering upwind and downwind directions.
- iv. The project proponent shall submit monthly summary report of continuous stack emission and air quality monitoring and results of manual stack monitoring and manual monitoring of air quality /fugitive emissions to Regional Office of MoEF&CC, Zonal office of CPCB and Regional Office of SPCB along with six-monthly monitoring report.
- v. Appropriate Air Pollution Control (APC) system shall be provided for all the dust generating points including fugitive dust from all vulnerable sources, so as to comply prescribed stack emission and fugitive emission standards.
- vi. The project proponent shall provide leakage detection and mechanised bag cleaning facilities for better maintenance of bags.
- vii. Pollution control system in the plant shall be provided as per the CREP Guidelines of CPCB.
- viii. Sufficient number of mobile or stationery vacuum cleaners shall be provided to clean plant roads, shop floors, roofs, regularly.
- ix. Ensure covered transportation and conveying of ore, coal and other raw material to prevent spillage and dust generation.
- x. Provide covered sheds for raw materials like coal, etc.

- xi. Practice use of low-sulphur tars for baking anodes.
- xii. Ventilation system shall be designed for adequate air changes as per ACGIH document for all tunnels, motor houses

### **III. Water quality monitoring and preservation**

- i. The project proponent shall install 24x7 continuous effluent monitoring system with respect to standards prescribed in Environment (Protection) Rules 1986 as amended from time to time and connected to SPCB and CPCB online servers and calibrate these system from time to time according to equipment supplier specification through labs recognised under Environment (Protection) Act, 1986 or NABL accredited laboratories.
- ii. The project proponent shall monitor regularly ground water quality at least twice a year (pre and post monsoon) at sufficient numbers of piezometers/sampling wells in the plant and adjacent areas through labs recognised under Environment (Protection) Act, 1986 and NABL accredited laboratories.
- iii. The project proponent shall submit monthly summary report of continuous effluent monitoring and results of manual effluent testing and manual monitoring of ground water quality to Regional Office of MoEF&CC, Zonal office of CPCB and Regional Office of SPCB along with six-monthly monitoring report.
- iv. Sewage Treatment Plant shall be provided for treatment of domestic wastewater to meet the prescribed standards.
- v. Garland drains and collection pits shall be provided for each stockpile to arrest the run-off in the event of heavy rains and to check the water pollution due to surface run off.
- vi. The project proponent shall make efforts to minimise water consumption in the plant complex by segregation of used water, practicing cascade use and by recycling treated water.

### **IV. Noise monitoring and prevention**

- i. Noise level survey shall be carried as per the prescribed guidelines and report in this regard shall be submitted to Regional Officer of the Ministry as a part of six-monthly compliance report.
- ii. The ambient noise levels should conform to the standards prescribed under E(P)A Rules, 1986 viz. 75 dB(A) during day time and 70 dB(A) during night time

### **V. Energy Conservation measures**

- i. The project proponent shall provide waste heat recovery system (pre-heating of combustion air) at the flue gases.
- ii. Provide LED lights in their offices and residential areas.



## **VI. Waste management**

- i. 100% utilization of fly ash shall be ensured. All the fly ash shall be provided to cement and brick manufacturers for further utilization and Memorandum of Understanding in this regard shall be submitted to the Ministry's Regional Office.
- ii. Oily scum and metallic sludge recovered from ETP shall be mixed, dried, and briquetted and reused.
- iii. The waste oil, grease and other hazardous waste shall be disposed of as per the Hazardous & Other waste (Management & Transboundary Movement) Rules, 2016
- iv. Kitchen waste shall be composted or converted to biogas for further use.

## **VII. Green Belt**

- i. The project proponent shall prepare GHG emissions inventory for the plant and shall submit the programme for reduction of the same including carbon sequestration including plantation.

## **VIII. Public hearing and Human health issues**

- i. Emergency preparedness plan based on the Hazard identification and Risk Assessment (HIRA) and Disaster Management Plan shall be implemented.
- ii. The project proponent shall carry out heat stress analysis for the workmen who work in high temperature work zone and provide Personal Protection Equipment (PPE).
- iii. Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.
- iv. Occupational health surveillance of the workers shall be done on a regular basis and records maintained.

## **IX. Corporate Environment Responsibility**

- i. The company shall have a well laid down environmental policy duly approve by the Board of Directors. The environmental policy should prescribe for standard operating procedures to have proper checks and balances and to bring into focus any infringements/deviation/violation of the environmental / forest /wildlife norms/ conditions. The company shall have defined system of reporting infringements / deviation / violation of the environmental / forest / wildlife norms / conditions and / or shareholders / stake holders. The copy of the board resolution in this regard shall be submitted to the MoEF&CC as a part of six-monthly report.
- ii. A separate Environmental Cell both at the project and company head quarter level, with qualified personnel shall be set up under the control of senior Executive, who will directly to the head of the organization

- iii. All the recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Aluminium Industry shall be implemented.


#### **X. Miscellaneous**

- i. The project proponent shall make public the environmental clearance granted for their project along with the environmental conditions and safeguards at their cost by prominently advertising it at least in two local newspapers of the District or State, of which one shall be in the vernacular language within seven days and in addition this shall also be displayed in the project proponent's website permanently.
- ii. The copies of the environmental clearance shall be submitted by the project proponents to the Heads of local bodies, Panchayats and Municipal Bodies in addition to the relevant offices of the Government who in turn has to display the same for 30 days from the date of receipt.
- iii. The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and update the same on half-yearly basis.
- iv. The project proponent shall monitor the criteria pollutants level namely; PM<sub>10</sub>, SO<sub>2</sub>, NO<sub>x</sub> (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the projects and display the same at a convenient location for disclosure to the public and put on the website of the company.
- v. The project proponent shall submit six-monthly reports on the status of the compliance of the stipulated environmental conditions on the website of the ministry of Environment, Forest and Climate Change at environment clearance portal.
- vi. The project proponent shall submit the environmental statement for each financial year in Form-V to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently and put on the website of the company.
- vii. The project proponent 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, commencing the land development work and start of production operation by the project.
- AGI  
i. The project authorities must strictly adhere to the stipulations made by the State Pollution Control Board and the State Government.
- ii. The project proponent shall abide by all the commitments and recommendations made in the EIA/EMP report, commitment made during Public Hearing and also that during their presentation to the Expert Appraisal Committee.
- viii. No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment, Forests and Climate Change (MoEF&CC).



- ix. Concealing factual data or submission of false/fabricated data may result in revocation of this environmental clearance and attract action under the provisions of Environment (Protection) Act, 1986.
- x. The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.
- xi. The Ministry reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner shall implement these conditions.
- xii. The Regional Office of this Ministry shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information/monitoring reports.
- xiii. Any appeal against this EC shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

This issues with the approval of competent authority

  
(A.K. Agrawal)  
Director

**Copy to:-**

1. **Secretary**, Department of Environment, Government of Rajasthan, Secretariat Jaipur.
2. **Deputy Director General of Forests(C)**, Ministry of Environment, Forest and Climate Change, Regional Office (CZ), Kendriya Bhawan, 5<sup>th</sup> Floor, Sector "H", Aliganj, Lucknow – 226020.
3. **Chairman**, Central Pollution Control Board, Parivesh Bhavan, CBD-cum-Office complex, East Arjun Nagar, New Delhi-1100032.
4. **Member Secretary**, Central Ground Water Authority, 18/11, Jamnagar House, Man Singh Road, New Delhi-110011.
5. **Chairman**, Rajasthan State Pollution Control Board, 4, Institutional area, Jhalana, Doongri, Jaipur.
6. **District Collector, Chittorgarh District**, State Rajasthan.
7. Guard File/Record File/Monitoring File.
8. MoEF&CC Website.

  
(A.K. Agrawal)  
Director





भारतसरकार  
GOVERNMENT OF INDIA  
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय  
MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE  
एकीकृत क्षेत्रीय कार्यालय, जयपुर / Integrated Regional Office, Jaipur

By Speed Post/e-Mail



ए-218 "अरण्यभवन", झालाना संस्थानिक 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: 27<sup>th</sup> August, 2022

To  
The Additional Director/Scientist-'E',  
Monitoring Cell, Ministry of Environment, Forest & Climate Change,  
3rd Floor, Vayu Wing, Indira Paryavaran Bhawan,  
Jor Bagh, New Delhi – 110003  
Sub: Certified Compliance Reports of the Environment Clearances accorded to the projects at  
"Chaderiya Lead- Zinc Smelter Complex" by M/s Hindustan Zinc Ltd at village Putholi,  
Tehsil Gangrar in district Chittorgarh in Rajasthan : Reg.

Ref: Environmental Clearance issued vide letter no. F.No. J-11013\29\92 Dated: 03-06-1983,  
F. No. J-11011/17/ 2005-IAII(I) Dated: - 03.08.2005, J- 11011/279/ 2006 -IA.II(I) Dated: -  
14.10.2020, J-11011/279/ 2006-IA II (I) Dated: - 05.10.2015 and J-11011/350/ 2016-IA. II (I)  
Dated: - 05.01.2021.

Sir,

In reference to the cited subject, it is bring to your kind notice that the aforesaid projects were Inspected/Monitored by the undersigned on 27.07.2022 for the purpose of issuing certified compliance report of the previous environment clearance issued to the unit vide letters no. J-11013\29\92 Dated: 03-06-1983, F. No. J-11011/17/ 2005-IAII(I) Dated: - 03.08.2005, J- 11011/279/ 2006 -IA.II(I) Dated: - 14.10.2020, J-11011/279/ 2006-IA II (I) Dated: - 05.10.2015 and J-11011/350/ 2016-IA. II (I) Dated: - 05.01.2021.

2. Accordingly, a detailed monitoring report along with key observations is being attached herewith for perusal and further appropriate action.

Sincerely,

(Mahesh Dutt Purohit)  
Deputy Director (S)/Scientist-C

Copy to: -

1. C Chandru, Chief Executive Officer -Smelters HZL, Chanderiya Lead Zinc Smelter, Hindustan Zinc Limited, Putholi, Chittorgarh- Rajasthan- 312021 With directions to submit clarification of partially complied/not complied conditions directly to the Ministry under intimation to this office.

**Ministry of Environment, Forest & Climate Change**  
**Regional Office, Jaipur**  
**MONITORING REPORT**  
**PART – I**  
**DATA SHEET**

1.	Project Type: River Valley/Mining/Industry/Thermal/Nuclear/Other (Specify)	Industry
2.	Name of the Projects	<ol style="list-style-type: none"> <li>1. Environment Clearance for Expansion of Lead smelter at village Putholi, Tehsil Gangrar in district Chittorgarh in Rajasthan by M/s Hindustan Zinc Limited.</li> <li>2. Environment Clearance for Zinc Smelter Plant (1,70,000 TPA) and Captive Power Plant (154 MW) project by M/s. Hindustan Zinc Limited (HZL) at village Putholi in District Chittorgarh, Rajasthan</li> <li>3. Environment Clearance for Expansion of Zinc smelter (2,50,000 TPA) and Captive Power Plant (100 MW) at Putholi, Gangrar, Chittorgarh Rajasthan by M/s Vedanta/Hindustan Zinc Ltd.</li> <li>4. Environment Clearance for Capacity expansion from 4,20,000 to 5,04,000 TPA in Hydro-I and Hydro-II Zinc Smelter through debottlenecking of M/s Hindustan Zinc Ltd., located at Chanderiya Lead Zinc Smelter, P.O: Putholi, District Chittorgarh, Rajasthan.</li> <li>5. Environment Clearance for Inclusion of Fumer Plant (Pyrometallurgical Process) within the existing Zinc Smelter (2,50,000TPA) and CPP (100MW) plant to convert Jarosite to slag by M/s Hindustan Zinc Ltd. at Village- Putholi, District- Chittorgarh, Rajasthan.</li> <li>6. Environment Clearance for Setting up Ammonium Phosphate Fertilizer Complex of 1.02 MTPA (2 x 0.51 MTPA) at Village Biliya, Tehsil &amp; District Chittorgarh, Rajasthan by M/s Hindustan Zinc Limited</li> </ol>
3.	Clearance letter / O.M No. & date	<p>Environment Clearances accorded to Chanderiya Lead Zinc Smelter Complex are as below;</p> <ol style="list-style-type: none"> <li>1. Gosunda Dam - EC Letter No. 3/29/79//HCT/ENV. Dated 25.08.1980</li> <li>2. Pyro Metallurgical Smelter - EC Letter No. J-11013/29/92-EI, Dated 03.06.1983</li> <li>3. Hydro Metallurgical Smelter I &amp; 100 MW CPP- EC Letter No. J-11011/155/2003-IAII(I) Dated, 31.03.2004</li> <li>4. Ausmelt Lead Smelter- EC Letter No. J-11011/17//2005-IAII(I) Dated, 03.05.2005</li> <li>5. Hydro Metallurgical Smelter II &amp; 154 MW CPP Letter No. J-11011/279//2006-IA. II(I) Dated,</li> </ol>

		<p>06.12.2006</p> <p>6. Inclusion Of Fumer with Hydro Unit – EC Letter No. J-11011/279//2006-IA. II(I) Dated, 05.10.2015</p> <p>7. Hydro Metallurgical Smelter [Expansion on Combined Basis] - Letter No. J-11011/279//2006-IA.II(I) Dated, 14.10.2020.</p> <p>8. Ammonium Phosphate Fertilizer complex Letter No. J-11011/350//2016-IA.II(I) Dated, 05.01.2021</p>
4.	<b>Location</b> a) Tehsil b) District (s) c) State (s) d) Latitudes/Longitudes	Gangrar & Chittorgarh Chittorgarh Rajasthan Lat 24 – 50 Long 74 – 40 E
5.	<b>Address for correspondence</b>  <b>a)</b> Address of Concerned Project Chief Engineer (with Pin Code/ Tel No./ Telex/Fax No./E-mail address)  <b>b)</b> Address of Executive Project Engineer/Manager (with Pin Code/ Tel No./ Telex/Fax No./E-mail address)	C Chandru Chief Executive Officer -Smelters HZL Chanderiya Lead Zinc Smelter Hindustan Zinc Limited, Putholi CHITTORGARH  Tarun Kr Meghwal Sr Manager Environment Chanderiya Lead Zinc Smelter Hindustan Zinc Limited, Putholi CHITTORGARH
6.	<b>Salient features</b>  a) of the project  b) of the environmental management plans	Integrated Lead and Zinc Smelter unit having Pyro Metallurgical Smelter, Hydro Metallurgical Smelter and Ausmelt Lead Smelter. An Ammonium Phosphate Fertilizer complex has also been proposed.  Adequate provisions of APCDs and Hazardous waste management have been provided.
7.	Product/Process/Activity Details	a) Pyro Metallurgical Smelter (1, 05,000 TPA Zinc b) and 35,000 TPA Lead), c) Ausmelt Lead Smelter (60,000 TPA) d) Hydro Metallurgical Zinc Smelter (5,04,000 TPA) e) Three units Captive Power Plant with 254 MW capacity (154 MW + 100 MW)
8.	Production Capacity	
9.	Break-up of project affected population	Not applicable as the total project will setup within premises existing plant.
10.	<b>Financial details: (as reported by the PP)</b> a) Project cost as originally planned and subsequent revised estimates and the year of price reference b) Allocations made for environmental management	a) Project cost : Rs 786 Crores b) Rs 120.05 allocated for environmental control measures c) Details not Provided d) Details not Provided

	<p>plans with item wise and year wise break up</p> <p>c) Benefit cost ratio/internal rate of return and the year of assessment</p> <p>d) Whether (c) includes the cost of environmental management as shown in b) above</p> <p>e) Actual expenditure incurred on the project so far</p> <p>f) Actual expenditure incurred on the environmental management plans so far</p>	<p>e) Details not Provided</p> <p>f) Details not Provided</p>
11.	Forest land requirement:	Nil
12.	The status of clear felling in non-forest areas	NA
13.	<p>Status of construction:</p> <p>a) Date of commencement (<i>actual and/or planned</i>)</p> <p>b) Date of completion (<i>actual and/or planned</i>)</p>	<p>Planned Commencement after EC: December 2022</p> <p>Planned Completion: March 2023</p>
14.	Reasons for the delay, if the project is yet to start	NA
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**

### **1. DESCRIPTIVE REPORT ON STATUS OF COMPLIANCE TO CONDITIONS OF ENVIRONMENTAL CLEARANCE issued vide letter no. F.No.J-11013\29\92 Dated: 03-06-1983.**

<b>S.N.</b>	<b>CONDITION</b>	<b>COMPLIANCE</b>
1	Transportation of concentrates from mine to the Smelter site should be done in containers or closed trucks to minimize/avoid the entry of metal into environment through spillage, carry over, pilferage etc. trucks used should be washed & cleaned at the centralized place HZL should look in this aspect make proper arrangements. This washing should be properly treated & disposed.	<b>Being Complied.</b> It was observed during inspection that care has been taken during transportation. Transportation of concentrate from mine is done in covered dampers to minimize spillage. The concentrate contains about 8% to 10% moisture
2	Spillage & fugitive dust emission at loading and unloading points should be kept to minimum & for this purpose water spray should be adopted.	<b>Being complied.</b> It was observed during inspection that water sprinkler and vacuum road sweeper has been used at site to reduce & mitigate fugitive dust emission.
3	The levels of lead, zinc, and cadmium in the working environment should always be kept within stipulated/well below the standards laid down. If the standards in our country are not available. Standards laid down in US/Canada should be adopted.	<b>Being Complied.</b> It has been reported that Levels of lead and Zinc in the working Environment are within the stipulated limits. Further Cadmium levels in the working environment have also been reported as below detection limits as per the records available on the site during the inspection.
4	The local ventilation in all workplaces should be designed in such a way to have a suitable draft circulation.	<b>Complied.</b> It was observed during inspection that adequate ventilation system has been provided in work place.
5	The height & design of the stacks should be such that ground level concentration of the gaseous pollutant should be within the stipulated standards of state board.	<b>Being Complied.</b> (1) The height & design of the stacks are adequate. (2) Ground level concentration of the gaseous pollutant is being maintained within the standards issued by State Pollution Control Board.
6	Location & height of the stack on buildings should be such that the turbulence will be on beside of the building. The total meteorological condition should be taken into consideration for this purpose.	<b>Complied.</b> In designing the location & height of stack, CPCB guidelines have been followed.
7	The HZL authorities should make arrangement for regular monitoring of combustion gases, particulate matter & concentration of heavy metals in the particulate size, distribution & deposition of particles on similar type of plants (e.g. Visakhapatnam) in	<b>Being Complied.</b> The unit has submitted analysis reports from the accredited laboratory along with six monthly compliance report.

	consultation with expert in this field to have an idea & base information. Based on this suitable measure can be adopted & reports should be sent to State/Central Board/ Deptt Of Environment.	
8	The liquid effluent emanating from various process operations should be recycled to the maximum possible extent. The effluent should be subjected to rigorous physico-chemical or other suitable treatment method to bring down the pollutant concentration below the standards laid down by State/Central Board.	<b>Being Complied.</b> The daily Average water consumption is approx. 5000 M <sup>3</sup> ./day as per the records maintained on site by the PP. Process effluent is being treated in ETP followed by RO and MEE. No discharge of effluent outside the project premises was observed during the inspection.
9	The waste treatment plant operation should be watched at Senior Management level & regular reports on its performance and effluents quality should be submitted to state/central authorities.	<b>Being Complied.</b>
10	The two sludge lagoon should be made imperious to avoid pollution of ground water.	<b>Complied.</b> Three nos. of concrete lagoons with lining have been constructed as per condition.
11	Water quality of river and ground water should be collected at regular intervals to form as the base line data wells in the near by area should be monitored from now onwards & later also.	<b>Being Complied.</b> Water quality of upstream & down stream of Berach river & the sample of wells water from nearby village area is been regularly monitored by the PP.
12	The effluent should be used on land to the maximum extent for social forestry purpose & should be a model for others in that area. HZL authorities should explore the possibility of adding treated wastes from town ship to factory wastes to enhance their utility.	<b>Being Complied.</b> Treated water is being recycled in the process and for secondary gainful purposes.
13	State authorities be requested to plant trees in the vicinity & surrounding the monuments to enhance the protection & to reduce the wind / sand erosion of monuments.	<b>Complied.</b> Free plant saplings are being distributed in nearby villages every year and also being planted under CSR activity like Panchayat scheme.
14	Rigorous & stringent measure for maintaining the various process & control equipment in the plant at highest possible standards should be adopted by HZL. If there is a failure of any control equipment these units should not be operated except emergencies.	<b>Complied.</b> During the inspection it was observed that adequate pollution control equipment has been installed by the PP in accordance to the latest consent conditions and modern technology. The unit has also submitted analysis reports from the accredited which confirms that PCDs are working efficiently.
15	An Environmental Management plan stipulating various condition & requirement of operation, maintenance	<b>Complied.</b> EIA study & EMP for CLZS have been prepared. An Environment Lab has



	& monitoring should be drawn up. Various levels in the Organisation(s) should be trained to adopt the plans.	been established on the site to meet the process and statutory norms. Qualified persons have been deployed in the environment management cell under a senior executive.
16	Contingency & disaster plans should be drafted for adoption.	<b>Partially Complied.</b> It was appraised by the unit representative that Disaster management plan is being updated suitably in consultation with Inspector of Factories & Boilers, Jaipur, for the entire location. Site level ERCP was also available at site. However, it is noteworthy that an accident has taken place just after the inspection which involves multiple casualties and enquiry of the same is being done by the State Factories and Boiler Department.
17	Suitable Environmental management & monitoring cell should be created a Sr. Environmental Manager with suitably qualified personnel of various disciplines to undertake the various functions. They should be directly reporting to the head of the Organization.	<b>Complied.</b> A separate Environmental Cell both at the project and company head quarter level, with qualified personnel has been set up.
18	Suitable programs should be organized within the Organization to apprise workers, staff and people in the surroundings regarding value and necessity of good housekeeping and proper environmental management for the welfare of all.	<b>Complied.</b>

**DESCRIPTIVE REPORT ON STATUS OF COMPLIANCE TO CONDITIONS OF ENVIRONMENTAL CLEARANCE issued vide letter no. - F. No. J-11011/17/2005-IAII(I) Dated: - 03.08.2005**

CONDITION		STATUS
<b>A. SPECIFIC CONDITIONS</b>		
i.	The gaseous emission from various process units shall conform to the standard prescribed by the concerned authority from time to time .The state Board 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 emission level should go beyond the prescribed standard in the event of failure of any pollution control system adopted by the unit, the respective unit should not be	<b>Being Complied.</b> The unit has submitted analysis reports from the accredited laboratory along with six monthly compliance report.

	restarted until the control measures are rectified to achieve the desired efficiency,	
ii.	As reflected in the EIA /EMP, exiting DCDA plant for sulphuric acid plant recovery from SO <sub>2</sub> shall be upgraded by use of high active catalyst and high efficiency plate heat exchangers. The company shall ensure that SO <sub>2</sub> emission from the lead smelter plant are taken to existing Sulphuric acid plant properly and converted to H <sub>2</sub> SO <sub>4</sub> . The stack from the sulphuric acid plant shall be provided with online stack emission monitoring equipment for continuous monitoring of SO <sub>2</sub> . As per recommendation made in CREP for environment protection SO <sub>2</sub> emission limit shall be controlled less than 2 kg/t of H <sub>2</sub> SO <sub>4</sub> produced and Acid mist limit of 50 mg/NM <sup>3</sup> shall be achieved by 31 Dec.2006.	<b>Being Complied.</b> <ol style="list-style-type: none"> <li>1. The SO<sub>2</sub> from Ausmelt is going to pyro acid plant mainly and sometimes it is being fed to hydro acid plant</li> <li>2. In Pyro Plant, the unit has installed tail gas treatment plant.</li> <li>3. Online Monitoring System has been installed and connected to SPCB/CPCB Servers.</li> <li>4. The unit is using Very high-power catalyst for increase efficiency of conversion (cesium based V<sub>2</sub>O<sub>5</sub> catalyst)</li> </ol>
iii.	The company shall install continuous air quality monitoring station. one CAAQM shall be set up at Chittorgarh Fort to assess the impact of the lead smelter on the Fort .Data monitored shall be submitted to MOEF and CPCB/RPCB once in six month.	<b>Complied</b> <ol style="list-style-type: none"> <li>(1) The PP has installed continuous air quality monitoring stations within the project premises.</li> <li>(2) One CAAQM has been set up at Chittorgarh Fort to assess the impact of the lead smelter on the Fort.</li> <li>(3) Data monitored is being submitted to MOEF and CPCB/RPCB once in six month.</li> </ol>
iv.	Fugitive emissions, acid mist vapours, fumes and SO <sub>2</sub> shall be controlled and work environment monitored for prevailing contaminants regularly. Fugitive dust emissions in the lead concentrate handling area and at various transfer points shall be minimized by provision of dust suppression system. The trucks carrying concentrate shall be fully covered. The Company shall improve overall house keeping by asphaltting the internal roads and to reduce the generation of fugitive dust from vehicle movements.	<b>Being Complied.</b> <ol style="list-style-type: none"> <li>(1) In order to minimize fugitive emissions Lead Concentrate containing 8-10% moisture is being handled.</li> <li>(2) Provision of water sprinkling at Pb concentrate stock yard has been provided.</li> <li>(3) Dust control system has been provided at material transfer points.</li> <li>(4) Mobile Vacuum dust sweeping system on roads and vacuum dust cleaning system for plant area have been provided.</li> <li>(5) All roads are made with cement concrete.</li> </ol>
v.	The company shall install fume extractors and bag filters to control the emission from all melting and casting units. The emission shall confirm to the prescribed standards of 50 mg/Nm <sup>3</sup> . The particulate	<b>Complied.</b> <p>Adequate APCDs have been provided by the PP and analysis report from the accredited laboratory has been submitted by the unit.</p>

	emission from captive power plant should be controlled by installation of ESP and controlled within the stipulated limits of 50 mg/NM3. The low NOX burners shall be installed to control the NOX emission	
vi.	As reflected in the EIA /Environment Management Plan, discharge of process effluent shall not exceed 19 m3/hr. The treated effluent shall conform to the prescribed standard and recycled to maintain zero discharge. Reverse Osmosis plant shall be installed for desalination and reuse of effluent to achieve zero discharge. The rejects from RO Plant shall be evaporated in a solar evaporation pond to be constructed within smelter premises.	<b>Being Complied.</b> During the inspection, no effluent discharge outside the project premises was observed. Existing RO plant is being operated in order to maximize recycling of treated effluents. RO reject is being treated through MVR-MEE / Foggers.
vii.	The solid waste generated in the form of Slag shall be granulated and sold to cement manufacturing and also for use in road construction.	<b>Being Complied.</b> The slag generated is granulated and disposed at the specific location in the slag storage yard. Slag is also being used by Cement Plants & road construction.
viii.	Green belt of adequate width and density in and around the captive power plant shall be developed as per Central Pollution Control Board guidelines in 61.12 ha of area in addition to 106ha of existing area already brought under green belt. Around the periphery of plant and township canopy based green belt should be developed.	<b>Complied.</b> The unit has done decent efforts for plantation and a GIS based study has also been done to ascertain the exact area under plantation. As per the report total area under plantation is more than 30 %.
<b>B. GENERAL CONDITIONS:</b>		
i.	The project authorities must strictly adhere to the stipulations made by the Rajasthan State Pollution Control Board and the State Government.	<b>Agreed for compliance by the unit.</b> The pp has obtained Consent from the State Pollution Control Board.
ii.	No expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment and Forests.	<b>Agreed for compliance by the unit.</b>
iii.	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, SO2 and NOx are anticipated in consultation with the Rajasthan State Pollution Control Board. Data on ambient air quality and stack emission should be regularly	<b>Complied.</b> The PP has established Ambient Air Quality Station and also installed CAAQMS. PP has also submitted the ambient air quality monitoring reports by an accredited laboratory.

	submitted to this Ministry including its Regional Office at Lucknow and the State Pollution Control Board/Central Pollution Control Board once in six months.	
iv.	Industrial waste water should be properly collected treated so as to conform to the standards prescribed under GSR 422 (E) dated 19 <sup>th</sup> May 1993 and 31 <sup>st</sup> December, 1993 or as amended from time to time. The treated wastewater should be recycled in the plant as well as utilization for plantation purposes.	<b>Complied.</b> During the inspection, no effluent discharge outside the project premises was observed. Existing RO plant is being operated in order to maximize recycling of treated effluents. RO reject is being treated through MVR-MEE / Foggers.
v.	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.	<b>Complied.</b> PP has submitted the copy of authorization for collection, storage, treatment and disposal of hazardous wastes, issued by State Pollution Control Board.
vi.	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 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 (day time) and 70 dBA (nighttime).	<b>Complied.</b> PP has submitted the noise level monitoring reports by an accredited laboratory.
vii.	Occupational Health Surveillance of the workers Shall be done on a regular basis and records maintained as per the Factories Act.	<b>Being Complied.</b> Records pertaining to Occupational Health Surveillance of the workers are being maintained on the site.
viii.	The project proponent shall also comply with all the environmental protection measures and safeguards recommended in the EIA/EMP/risk analysis and DMP report.	<b>Being Complied.</b>
ix.	The project authorities will provide adequate funds both recurring and non-recurring to implement the conditions stipulated by the Ministry of Environment and Forests as well as the State Government along with the implementation schedule for all the conditions stipulated herein. The funds so provided should not be directed for any other purposes.	<b>Being Complied.</b> It was appraised by the unit representative that adequate funds have been earmarked for implementation of EMP and overall compliance status of the unit confirms the same.
x.	The Regional Office of this Ministry	<b>Being Complied.</b>

	at Lucknow/Central Pollution Control Board/State Pollution control Board will monitor the stipulated conditions. A six monthly compliance report and the monitored data along with statistical interpretation should be submitted to them regularly.	
xi.	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 State Pollution Control Board/Committee and may also be seen at Website of the Ministry of Environment and Forests at <a href="http://envfor.nic.in">http://envfor.nic.in</a> . This should 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 should be forwarded to the Regional Office.	<b>Complied.</b> PP has submitted the copy of advertisement published in the newspaper.
xii.	The project Authority shall inform the RO as well as MOEF the date of financial closures and final approval of the project by the concerned authority and the date of commencing and land development work.	<b>Agreed for compliance by the unit.</b>

**DESCRIPTIVE REPORT ON STATUS OF COMPLIANCE TO CONDITIONS OF ENVIRONMENTAL CLEARANCE issued vide letter no. - F. No.J- 11011/279/ 2006 -IA.II(I) Dated: - 14.10.2020**

<b>A</b>	<b>Specific General Conditions</b>	<b>Status</b>
<b>i</b>	The Environment Clearance (EC) granted to the project/activity is strictly under the provisions of the EIA Notification, 2006 and its amendments issued from time to time. It does not tantamount/construe to approval/consent to approvals/ Permissions etc. required to be obtained or standards/conditions to be followed under any other Acts/Rules/Subordinate legislations etc. as may be applicable to the project.	<b>Agreed for compliance by the unit.</b>
<b>ii</b>	SO <sub>2</sub> emission from H <sub>2</sub> SO <sub>4</sub> plant shall be less than 1 kg/t of Acid production.	<b>Being Complied.</b>

<b>iii</b>	Acid mist from H <sub>2</sub> SO <sub>4</sub> plant shall be less than 30 mg/Nm <sup>3</sup> .	As per the analysis records maintained on the site, the SO <sub>2</sub> emission from acid plant has been kept within 1 kg/ton of H <sub>2</sub> SO <sub>4</sub> produced and acid mist 30 mg/Nm <sup>3</sup> , following steps have reportedly been taken regarding the same-- 1.FAT pump circulation from 570 m <sup>3</sup> /hr to 620 m <sup>3</sup> /hr(including crossing) to improve absorption efficiency. 2.IAT pump circulation from 982 m <sup>3</sup> /hr to 1032 m <sup>3</sup> /hr(including crossing) to improve absorption efficiency. 3.FAT & IAT irrigation system with improved design to improve adsorption efficiency. 4.IAT & FAT candle filters with collection efficiency of > 1 micron to 100 % and > 0.5 micron to 96% The unit has also proposed installation of TGT.
<b>iv</b>	Particulate matter levels from the stacks shall be less than 30 mg/Nm <sup>3</sup> .	<b>Being Complied.</b> The unit has submitted analysis reports from the accredited laboratory along with six monthly compliance report.
<b>v</b>	Treated sewage from STP of Chittorgarh/ Bhilwara shall be used in the plant processes.	<b>Being complied.</b> As appraised by unit representative, STP water is being utilized in plant from Chittorgarh city.
<b>vi</b>	Existing ETP shall be strengthened to recycled additional 580 m <sup>3</sup> /d of effluent by installing MEE for RO rejects.	<b>Complied.</b> PP has installed Multi Effect Evaporator and treated water is being used for plant operation and secondary gainful purposes.
<b>vii</b>	Additional 20 MW power required for the additional load shall be procured from renewable energy sources to reduce GHG emissions. Records of renewable energy purchased shall be maintained and submitted to RO along with EC compliance report	<b>Complied.</b> The unit has installed about 20MW Solar power generating units at DSC & ZM Locations to meet the requirement.
<b>viii</b>	Plant shall be operated on Zero Liquid Discharge (ZLD)	<b>Complied.</b> No effluent discharge outside the unit premises was observed during the inspection.
<b>ix</b>	Additional 100000 trees shall be planted to improve greenery in the plant premises	<b>Complied.</b> The unit has done decent efforts for plantation and a GIS based study has also been done to ascertain the exact area under plantation. As per the report total area under plantation is more than 30 %.



<b>x</b>	Solar energy shall be generated at the roof tops of the plant and office buildings	<b>Being Complied.</b> Solar Power system implemented at Hydro 2 CDSS /Lab building, Hydro 1 leaching office, Switchyard control room building, Zinc School & Boy's Hostel/Utility Building at Zinc Nagar, Pyro Offices.										
<b>xi</b>	RWH and recharge shall be done to recharge 200% of the water consumed annually	<b>Being Complied.</b> For the purpose of rain water recharge the unit has constructed Ponds/Anicuts. The PP was advised to submit a detailed report on the existing as well as proposed RWH mea										
<b>xii</b>	All CSR projects should be completed within 3 years	<b>Complied.</b> As per the details submitted by the the unit, total Expenditures planned and implemented through CSR Total=Rs130Lacs  For First Yr=50Lacs [31.12.21] For Second Yr=50Lacs [31.12.22] For Third Year =30Lacs [31.12.23] <table><tr><td>Area of Intervention</td><td>Expenditure Rs. In Lakhs</td></tr><tr><td>Microenterprise development</td><td>50</td></tr><tr><td>Skilling of local youths</td><td>40</td></tr><tr><td>Drinking water and pipeline</td><td>30</td></tr><tr><td>Plantation of saplings in villages and community land</td><td>10</td></tr></table>	Area of Intervention	Expenditure Rs. In Lakhs	Microenterprise development	50	Skilling of local youths	40	Drinking water and pipeline	30	Plantation of saplings in villages and community land	10
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<b>B</b>	<b>General Conditions</b>											
<b>I</b>	<b>Statutory compliance</b>											
<b>i.</b>	The project proponent shall obtain the necessary permission from the competent authority concerned in case of drawl of surface water required for the project.	<b>Complied.</b> The source of water if captive Gosunda dam and clearance for the same has been obtained.										
<b>ii.</b>	The project proponent shall obtain authorization under the Hazardous and Other Waste Management Rules 2016 as amended from time to time.	<b>Complied.</b>										
<b>II</b>	<b>Air quality monitoring and preservation</b>											
<b>i.</b>	The project proponent shall install 24X7 continuous emission monitoring system at process stacks to monitor stack emission with respect to standards prescribed in Environment (Protection) Rules 1986 as amended from time to time and connected to SPCB and CPCB online servers and calibrate these systems from time to time according to	<b>Complied.</b> 24X7 continuous emission monitoring system at process stacks to monitor stack emission has been installed.										

	equipment supplier specification through labs recognized under Environment (Protection) Act, 1986 or NABL accredited laboratories.	
<b>ii</b>	The project proponent shall monitor fugitive emissions in the plant premises at least once in every quarter through labs recognized under Environment (Protection) Act, 1986.	<b>Complied.</b> The unit has submitted analysis report from the accredited laboratory.
<b>iii</b>	The Project proponent shall install system to carryout continuous Ambient Air Quality monitoring for common/criterion parameters relevant to the main pollutants released (e.g. PM10 and PM 2.5 in reference to PM emission and SO2 and NOx in reference to SO2 and NOx emissions) within and outside the plant area at least at four locations (one within and three outside the plant area at an angle of 120 degree each), covering upwind and downwind directions	<b>Complied.</b> Adequate number of ambient air quality monitoring stations have established in the upward and downward direction as well as where maximum ground level concentration of eg. PM10 and PM2.5 in reference to PM emission and SO2 and NOx in reference to SO2 and NOx emissions. The unit has submitted also analysis report from the accredited laboratory.
<b>iv</b>	The project proponent shall submit monthly summary report of continuous stack emission and air quality monitoring and result of manual stacks monitoring and manual monitoring of air quality/fugitive emissions to Regional Office of MoEF & CC, Zonal office of CPCB and Regional Office of SPCB along with six monthly monitoring report.	<b>Being Complied.</b> Report of continuous stack emission, air quality monitoring, manual stack monitoring and manual air quality emission has been submitted by the unit.
<b>v</b>	Appropriate Air Pollution Control (APC) system shall be provided for all the dust generating points including fugitive dust from all vulnerable sources, so as to comply prescribed stack emission and fugitive emission standards.	<b>Complied.</b> Bag filter alongwith differential pressure monitoring system has been provided.
<b>vi</b>	The project proponent shall provide leakage detection and mechanized bag cleaning facilities for better maintenance of bags	<b>Complied.</b>
<b>vii</b>	Pollution control system in the plant shall be provided as per the CREP guidelines of CPCB	<b>Being Complied.</b>
<b>viii</b>	Sufficient number of mobile or stationary vacuum cleaners shall be provided to clean plan roads, shop floors, roofs, regularly	<b>Complied.</b>
<b>ix</b>	Ensure covered transportation and conveying of ore, coal and other raw material to prevent spillage and dust generation.	<b>Being Complied.</b> During the inspection it was observed that material transportation is being done in covered trucks.
<b>x</b>	Provide covered sheds for raw materials like coal, etc.	<b>Being Complied.</b> Covered shed has been provided for raw material storage.

<b>xi</b>	Practice use of low Sulphur tars for baking anodes.	<b>Complied.</b> The unit is not using sulphur tars for baking anodes.
<b>xii</b>	Ventilation system shall be designed for adequate air changes as per ACGIH document for all tunnels, motors house	<b>Complied.</b> Working section are well ventilated. No tunnel present in smelter.
<b>III</b>	<b>Water quality monitoring and preservation</b>	
<b>i.</b>	The project proponent shall install 24X7 continuous effluent monitoring system with respect to standards prescribed in Environment (Protection) Rules 1986 as amended from time to time and connected to SPCB and CPCB online servers and calibrate these systems from time to time according to equipment supplier specification through labs recognized under Environment (Protection) Act, 1986 or NABL accredited laboratories.	<b>Complied.</b> The unit is maintaining ZLD and treated effluent is being utilized in secondary gainful purposes. There is no discharge allowed outside the project premises.
<b>ii.</b>	Project proponent shall monitor regularly ground water quality at least twice a year (pre and post monsoon) at sufficient numbers of piezometers/sampling wells in the plant and adjacent area through labs recognized under Environment (Protection) Act, 1986 or NABL accredited laboratories.	<b>Being Complied.</b> The ground water quality is being monitored and record is being maintained.
<b>iii.</b>	The project proponent shall submit monthly summary report of continuous effluent monitoring and results of manual effluent testing and manual monitoring of ground water quality to Regional Office of MoEF&CC, Zonal office of CPCB and Regional Office of SPCB along with six monthly monitoring report.	<b>Complied.</b> The unit is maintaining ZLD and treated effluent is being utilized in secondary gainful purposes. There is no discharge allowed outside the project premises.
<b>iv.</b>	Sewage treatment Plant shall be provided for treatment of domestic wastewater to meet the prescribed standards	<b>Being Complied.</b> A STP has been provided for treatment of Sewage and treated effluent is being utilized in secondary gainful purposes.
<b>v.</b>	Garland drains and collection pits shall be provided for each stockpile to arrest the run-off in the event of heavy rains and to check the water pollution due to surface run off	<b>Being Complied.</b> Garland drains around the stock piles of jarofix has been provided.
<b>vi.</b>	The project proponent shall make efforts to minimize water consumption in the plant complex by segregation of used water, practicing cascade use and by recycling treated water	<b>Being Complied.</b> The unit is maintaining ZLD and treated effluent is being utilized in secondary gainful purposes.
<b>IV</b>	<b>Noise monitoring and prevention</b>	
<b>i</b>	Noise level survey shall be carried as per the prescribed guidelines and report in this regard shall be submitted to Regional Officer of the Ministry as a part of six monthly compliance report	<b>Complied.</b> The unit has submitted ambient noise monitoring reports from the accredited laboratory.

ii	The ambient noise levels should conform to the standards prescribed under E(P) A rules, 1986 viz. 75 dB(A) during day time and 70 dB(A) during night time.	<b>Complied.</b> The unit has submitted ambient noise monitoring reports from the accredited laboratory.
<b>V</b>	Energy Conservation measures	
i	The Project proponent shall provide waste heat recovery system (Pre heating of combustion air) at the flue gases.	<b>Complied.</b>
ii	Provision of LED Lights	<b>Being Complied.</b> In Offices and residential area LED lights have been provided. the PP was advised to ensure the replacement of conventional lights to LED lights in all common areas.
<b>VI</b>	<b>Waste management</b>	
<b>i</b>	100% utilization of fly ash shall be ensured. All the fly ash shall be provided to cement and brick manufactures for further utilization and Memorandum of Understanding in this regards shall be submitted to the Ministry's Regional Office.	<b>Being Complied.</b> Presently 100 % utilization is being done and bottom ash is being sold brick manufactures
<b>ii</b>	Oily scum and metallic sludge recovered from ETP shall be mixed, rid, and briquetted and reused	<b>Being Complied.</b> The oily scum, inorganic ETP sludge is being disposed in SLF in scientific manner after stabilization
iii	The waste oil, grease and other hazardous shall be disposed of as per the Hazardous and Other waste (Management & Transboundary Movement) Rule's 2016	<b>Being Complied.</b> Waste and Used oil are being sold to registered recyclers.
Iv	Kitchen waste shall be composited or converted to biogas for further use	<b>Being Complied.</b> Kitchen waste is being composted through OWC
<b>VII</b>	<b>Green Belt</b>	
<b>i.</b>	The project proponent shall prepare GHG emissions inventory for the plant and shall submit the program for reduction of the same including carbon sequestration including plantation.	<b>Being Complied.</b> It was apprised by the unit representative that GHG emissions inventory for the plant is being prepared and reduction plan under implementation.
<b>VIII</b>	<b>Public Hearing and Human health issues</b>	
<b>i.</b>	Emergency preparedness plan based on the Hazard identification and Risk Assessment (HIRA) and Disaster Management Plan shall be implemented	<b>Partially Complied.</b> It was appraised by the unit representative that Disaster management plan is being updated suitably in consultation with Inspector of Factories & Boilers, Jaipur, for the entire location. Site level ERCP was also available at site. However, it is noteworthy that an accident has taken place just after the inspection which involves multiple casualties and enquiry of

		the same is being done by the State Factories and Boiler Department.
<b>ii.</b>	The project proponent shall carry out heat stress analysis for the workmen who work in high temperature work zone and provide Personal Protection Equipment (PPE)	<b>Being Complied.</b> Although no separate report has been submitted by the unit regarding Heat Stress analysis report of the workmen working in high heat areas, however, no Heat stress analysis for the workmen is carried out and PPE'S given to workers as per site condition, SOP & nature of work.
<b>iii.</b>	Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking mobile toilets, STP, safe drinking water, medical health care, Creche etc. the housing may be in the form of temporary structures to be removed after the completion of the project.	<b>Being Complied.</b> It was appraised by the unit representative that All project related labours are local & from nearby area hence no onsite stay arrangements are required. The unit has provided facilities like medical, safe drinking water, rest house etc.
<b>iv.</b>	Occupational health surveillance of the workers shall be done on a regular basis and records maintained.	<b>Being Complied.</b>
<b>IX</b>	<b>Corporate Environment Responsibility</b>	
<b>i.</b>	The company shall have a well laid down environmental policy dully approve by the Board of Directors. The environmental policy should prescribe for standard operating procedures to have proper check and balances and to bring into focus any infringements/deviation/ violation of the environmental/ forest/ wildlife norms/ conditions. The company shall have defined system of reporting infringements /deviation/violation of the environmental/ forest/wildlife norms/conditions and/ or shareholders/stake holders. The copy of the board resolution in this regard shall be submitted to the MoEF&CC as a part of six mothly report	<b>Complied.</b> The Company has environment policy duly approved by Board of Director.
<b>ii.</b>	A separate Environmental Cell both at the project and company head quarter level, with qualified personnel shall be set up under the control of Senior Executive, who will directly to the head of the organization	<b>Complied.</b> PP has setup a separate Environmental Cell both at the project and company head quarter level, with qualified personnel under the control of Sr Manager.
<b>iii.</b>	All the recommendations made in the Charter on Corporate Responsibility for Environment Protection CREP for the	<b>Being Complied.</b>

	Aluminium Industry shall be implemented.	
<b>X</b>	<b>Miscellaneous</b>	
<b>i.</b>	The project proponent shall make public the environmental clearance granted for their project along with the environmental conditions and safeguards at their cost by prominently advertising it at least in two local newspapers of the District or State, of which one shall be in the vernacular language within seven days and in addition this shall also be displayed in the project proponents' website permanently.	<b>Complied.</b> PP has submitted the copies of advertisement published in the newspaper.
<b>ii.</b>	The copies of the environmental clearance shall be submitted by the project proponents to the Heads of local bodies, Panchayats and Municipal Bodies in addition to the relevant offices of the Government who in turn has to display the same for 30 days from the date of receipt	<b>Reported to be complied.</b>
<b>iii.</b>	The project proponent shall upload the status of compliance of the stipulated environment clearance conditions including results of monitored data on their website and update the same on half yearly basis .	<b>Complied.</b>
<b>iv.</b>	The project proponent shall monitor the criteria pollutants level namely PM10,SO2,NOx(ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the projects and display the same at a convenient location for disclosure to the public and put on the website of the company.	<b>Complied.</b> PP has submitted the monitoring reports by an accredited laboratory.
<b>v.</b>	The project proponent shall submit six monthly report on the status of the compliance of the stipulated environmental conditions on the website of the ministry of Environment Forest and Climate Change at environment clearance portal.	<b>Complied.</b>
<b>vi.</b>	The project proponent shall submit the environmental statement for each financial year in Form V to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules,1986, as amended subsequently and put on the website of the company	<b>Pertains to state pollution control board.</b>
<b>vii.</b>	The project proponent shall inform the Regional Office as well as the Ministry the date of financial closure and final approval of the project by the concerned	<b>Agreed for compliance by the unit.</b>



	authorities commencing the land development work and start of production operation by the project	
<b>viii.</b>	The project authorities must strictly adhere to the stipulations made by the State Pollution Control Board and the State Government	<b>Pertains to state pollution control board.</b>
<b>ix.</b>	The project proponent shall abide by all the commitments and recommendations made in the EIA/EMP report commitment made during Public Hearing and also that during their presentation to the Expert Appraisal Committee.	<b>Agreed for compliance by the unit.</b>
<b>x.</b>	No further expansion or modification in the plant shall be carried out without prior approval of Ministry of Environment Forests and Climate Change (MoEF&CC)	<b>Agreed for compliance by the unit.</b>
<b>xi.</b>	Concealing factual data or submission of false/fabricated data may result in revocation of this environmental clearance and attract action under the provisions of environment (Protection) Act,1986.	<b>Agreed for compliance by the unit.</b>
<b>xii.</b>	The Ministry may revoke or suspend the clearance, if implementation of any of the above Condition is not satisfactory.	<b>Agreed for compliance by the unit.</b>
<b>xiii.</b>	The Ministry reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner shall implement these conditions.	<b>Agreed for compliance by the unit.</b>
<b>xiv.</b>	The Regional Office of this Ministry shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation of the officer (S) of the Regional Office by furnishing the requisite data/information/monitoring reports.	<b>Agreed for compliance by the unit.</b>
<b>xv.</b>	Any appeal against this EC shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under section 16 of the National Green Tribunal Act, 2010.	<b>Agreed for compliance by the unit.</b>

**STATUS OF COMPLIANCE TO CONDITIONS OF ENVIRONMENTAL CLEARANCE  
issued vide letter no. - F. No. J-11011/279/ 2006-IA II (I) Dated: - 05.10.2015.**

**The project has been established but non operational.**

**STATUS OF COMPLIANCE TO CONDITIONS OF ENVIRONMENTAL CLEARANCE issued  
vide letter no. - F. No. J-11011/350/ 2016-IA. II (I) Dated: - 05.01.2021**

**As the project is not established yet.**

**Concluding Remarks:**

The Industry under reference named as “Chaderiya Lead- Zinc Smelter Complex” by M/s Hindustan Zinc Ltd at village Putholi, Tehsil Gangrar in district Chittorgarh in Rajasthan was inspected on dated 27/07/2022 for the purpose of issuing Certified Compliance Reports. The industry is having multiple Environment Clearances and monitoring of the conditions of ECs were done of all the operational Projects as narrated above.



**(Mahesh Dutt Purohit)  
Deputy Director/Scientist ‘C’**

By Speed Post/Online



F. No. IA-J-11014/96/2022-IA-I  
Government of India  
Ministry of Environment, Forest and Climate Change  
(I.A. Division)

\*\*\*\*\*

Indira Paryavaran Bhavan  
Jor Bagh Road, Aliganj  
New Delhi-110 003  
Email: [shruti.rai@nic.in](mailto:shruti.rai@nic.in)  
Dated: 07<sup>th</sup> October, 2022

To,

Chief Executive Officer -Smelters,  
Chanderiya Lead Zinc Smelter,  
Hindustan Zinc Limited,  
Putholi, Chittorgarh- Rajasthan- 312021.

Sub: Non compliances observed with respect to the project on 'Chaderiya Lead- Zinc Smelter Complex' by M/s Hindustan Zinc Ltd at village Putholi, Tehsil Gangrar in District Chittorgarh in Rajasthan'.

Ref: (i). IRO Jaipur Monitoring Report No. IV/ENV/R/IND-29/285/04 dated 27.08.2022.  
(ii). Ministry's EC letter No. J-11013\29\92 Dated: 03-06-1983, F. No. J-11011/17/2005-IAII(I) Dated: - 03.08.2005, J- 11011/279/ 2006 -IA II(I) Dated: -14.10.2020, J-11011/279/ 2006-IA II (I) Dated: - 05.10.2015 and J-11011/350/ 2016-IA. II (I) Dated: - 05.01.2021.

Whereas, Multiple Environmental Clearances (EC) have been granted to M/s Hindustan Zinc Ltd at village Putholi, Tehsil Gangrar in District Chittorgarh in Rajasthan vide letter No. J-11013\29\92 Dated: 03-06-1983, No. J-11011/17/ 2005-IAII(I) Dated: 03.08.2005, No. J- 11011/279/ 2006 -IA II(I) Dated: -14.10.2020, No. J-11011/279/ 2006-IA II (I) Dated: 05.10.2015, and No. J-11011/350/ 2016-IA. II (I) Dated: 05.01.2021 subject to implementation of the various conditions and environmental safeguards contained therein, and

2. Whereas, the project was monitored by the Regional Office of this Ministry at Jaipur on 27.07.2022, which has submitted their reports to Ministry vide letter No. IV/ENV/R/IND-29/285/04 dated 27.08.2022 (copy enclosed) which is self-explanatory.

3. Whereas, the inspection report has been examined by the Ministry and following are observed non- compliance:

"Contingency & disaster plans has not been adopted properly by PP as there was an accident at the premises involving multiple casualties (Specific Condition- 16 of EC No. J-11013\29\92 Dated: 03-06-1983: and General Condition- i of EC No. J-11011/279/2006 -IA II(I) Dated: -14.10.2020)".

4. In view of the foregoing, the Project proponent (PP) is hereby directed to submit the (i) clarification for non-compliance observed during the site visit, (ii) Action Taken Report (ATR) and (iii) Action plan with respect to the above non-complied

conditions within next 30 days from the date of issuance of this letter. It may be noted that, if no satisfactory reply is received within the prescribed time frame, the Ministry will be constrained to take necessary action as deemed fit and appropriate in the circumstances of the case which inter-alia include issuance of Show-Cause Notice under the provision of section (5) of the Environment (Protection) Act, 1986.

This issues with the approval of the Competent Authority.



**(Dr. Shruti Rai Bhardwaj)**  
**Addl. Director/Scientist 'E'**

**Copy to:**

1. Deputy Inspector General of Forests (C), Ministry of Env., Forest and Climate Change, Integrated Regional Office, Jaipur, A-209&218, Aranya Bhawan, Mahatma Gandhi Road, Jhalana Institutional Area, Jaipur - 304002, Rajasthan
2. The Chairman, Rajasthan Pollution Control Board, 4, Institutional area, Jhalana, Doongri, Jaipur
3. The Chairman, Central Pollution Control Board, Parivesh Bhawan, East Arjun Nagar, Delhi-110032.
4. Member Secretary, Industry-I, Ministry of Env., Forest and Climate Change, Indira Paryavaran Bhavan, Jor Bagh Road, Aliganj, New Delhi-110 003



**(Dr. Shruti Rai Bhardwaj)**  
**Addl. Director/Scientist 'E'**



22614



Ref. HZL/CLZS/ENV/38/2022-23

Date: 4<sup>th</sup> November 2022

To,

→ The Addl. Director /Scientist 'E',  
Ministry of Environment, Forest & Climate Change  
Indira Paryavaran Bhavan,  
Jor Bagh Road, Aliganj, New Delhi – 110003

**Subject:-** Reply to Letter dated 7<sup>th</sup> October 2022 as received from the Ministry of Environment, Forest and Climate Change (I.A. Division).

**Reference:-** 1. Letter F. No. IA-J-11014/96/2022-IA-I

dated: 7<sup>th</sup> October 2022

2. IRO Jaipur Monitoring Report No. IV/ENV/R/IND-29/285/04 dated: 27.08.2022.

Ministry's EC Letter No. J-11013\29\92 dated: 03-06-1983, F. No. J-11011/17/2005-  
IAII(I) dated: 03.08.2005, J-11011/279/2006-IA II(I) dated: 14.10.2020, J-11011/ 279  
/2006-IA II(I) dated: 05.10.2015 and J-11011/350/2016-IA. II(I) dated: 05.01.2021.

Dear Sir/Madam,

We at Chanderiya Lead Zinc Smelter, Hindustan Zinc Limited ('CLZS-HZL'), are in receipt of the above-referred Letter from your good office. In this regard, please find below our point-wise response to the queries raised in the Letter, stemming from the observed non-compliance, i.e.:-

**"Contingency & disaster plans has not been adopted properly by PP as there was an accident at the premises involving multiple casualties (Specific Condition-16 of EC No. J-11013\29\92 dated: 03-06-1983; and General Condition- i of EC No. J-11011/279/2006-IAII(I) dated: 14.10.2020).**

1. Clarification for non-compliance observed during site visit:-

We submit that there has been no non-compliance against any of the conditions stipulated in the referred Environment Clearances. Robust contingency and disaster plans are in place at CLZS-HZL, and they are routinely reviewed and updated, as maybe required. These contingency and disaster plans



Hindustan Zinc Limited, Registered Office: Yashad Bhawan, Udaipur-313 004, Rajasthan, INDIA.  
T. +91 294-6604000-02 www.hzindia.com CIN: L27204RJ1966PLC001208

Sensitivity: Internal (C3)





are adopted in letter and spirit and strictly adhered to at the time of any contingency or disaster, and no deviation from the existing plans took place at the time of accident at our premises.

The plans reviewed & updated time to time & submitted to concern authority, The plan having more than four hundred pages in size and available in our portal. We are submitting as Annexure-I for reference.

Furthermore, CLZS-HZL has comprehensive safety rules and regulations in place, and these are diligently followed at our sites to maintain the safety of and safe working conditions for our employees and contract workers.

#### 1. Action Taken Report (ATR):

The incident in question was regarded and acted upon with high importance, and established protocols were followed after the same.

There was no delay from our end with respect to communicating details of the incident, and its severity to the concerned internal teams and government departments. All adequate measures were taken internally to mitigate the damage and the initial action was to rescue those affected by the incident immediately. Please find below a table highlighting the relevant steps taken leading up to and subsequent to the incident:-

S.No	Action Taken on 12 <sup>th</sup> August 2022	Time of Reporting	Time of Arrival at the Site/Plant
1.	Informed to Control Room (Fire & Rescue Team)	17:57	17:59
2.	Informed to Ambulance & Security Team	17:59	18:01
3.	Communication with District Collector	18:32	18:59
4.	Communication with Superintendent of Police	18:33	19:52
5.	Communication with Police Station (Gangrar)	18:36	18:45
7.	Communication with SHO Gangrar	18:37	18:55

S.No	Precautions taken/Resources made available
1.	<ul style="list-style-type: none"><li>Minor leakage was observed from Acid Storage Tank-02.</li><li>All the maintenance and process crew had been verbally instructed to not go to the dyke area.</li></ul>
2.	<p>The acid loading area is equipped with adequate PPEs and fail-safe mechanisms, including:</p> <ul style="list-style-type: none"><li>Hooded acid suits</li></ul>

*Dsefr*



	<ul style="list-style-type: none"> <li>• Safety shower, and</li> <li>• Diphoterine kit.</li> </ul>
3.	As a part of our emergency and safety mechanism there are dyke walls around the acid tanks, to store acid which may spill out during any emergency or in case of failure of acid tanks.
4.	The dyke around the Acid Storage Tank has a holding capacity of 9000 MT. Majority of the acid which spilled from Acid Storage Tank-02 was contained within the dyke wall. A small amount of acid spilled over the dyke wall, and was immediately arrested and the same was treated through the effluent treatment plant.
5.	All the acid contained within the dyke wall was transferred to other locations to fill in another acid tank through tankers & pipe line, with proper care and without any spillage.

We have ensured to undertake regular monitoring both in and around areas nearby to our operations, and at the incident site as well.

2. Action plan with respect to the above non-complied conditions:

As above stated, there has been no non-compliance against any of the conditions stipulated in the referred Environment Clearances. Robust contingency and disaster plans are in place at CLZS-HZL, and they are adopted in letter and spirit and strictly adhered to at the time of any contingency or disaster. Apart from the above mentioned, we undertake routine mock drills at our site, in accordance with our internal standards and in association with the District administration.

Further, we are in process of undertaking a detailed structural safety study, through Bureau Veritas. This will assist us, in revising our contingency and disaster plan, if need be.

We, at CLZS-HZL, have continuously prioritized and emphasized on the need to ensure compliance with all statutory provisions and standards, and will continue to work towards improving our environmental, safety and social performance, and keep up with our target of Zero Harm, Zero Waste and Zero Discharge. We will strive to ensure that incidents of a similar nature are not repeated at any of our locations through efficient technologies and preventive corrective actions.

Regards,

For Hindustan Zinc Limited

  
Deepak Sopori

SBU Director & Location Head

Chanderiya Lead Zinc Smelter

Hindustan Zinc Limited

c.c: 1. Deputy IG of Forest, MOEF & CC / 22615  
IRO-office, A-209 & 218, M.G. Road.  
Jhalana Institutional Area - Jaipur  
2. The Chairman - RPCB / 22616  
4. Institutional Area, Jhalana Dinga  
Jaipur - Raj.





# राजस्थान प्रदूषण निवारण एवं नियंत्रण मण्डल

Rajasthan Board for Prevention and Control of Pollution

No.F.12(723)RPCB/NOC/ 15.35

दिनांक.....  
Date 7th APRIL, 1991

The Director(Projects),  
M/s.Hindustan Zinc Ltd.,  
Integrated Project Division,  
UDAIPUR - 313001.

SUB : N.O.C.FOR THE ADEQUACY OF POLLUTION CONTROL MEASURES FOR YOUR PROPOSED LEAD-ZINC SMELTER PLANT AT VILLAGE CHANDERIA, DIST.CHITTORGARH (RAJASTHAN).

REF: YOUR LETTER NO.HZL/CLZS/ENV/13 DATED 22ND JULY, 1989 AND SUBSEQUENT CORRESPONDENCE.

Dear Sir,

Having appraised the Feasibility Report submitted by you through your Consultant M/S.DAVY MCKEE U.K. & M/S.MECON, DORANDA,RANCHI and undertaking given by you vide your letter No.HZL/IPD/ENV/13 dated 8th April, 1991, on pollution control measures, NOC for adequacy of pollution control measures is being issued without prejudice to the powers of the State Board under the provisions of Water(Prevention & Control of Pollution)Act, 1974; Air(Prevention & Control of Pollution)Act, 1981; Hazardous Waste(Handling & Management) Rules, 1989 and Manufacture, Storage & Import of Hazardous Chemical Rules, 1989 and without reducing your responsibility under the aforesaid Acts for control of Pollution with following terms & conditions:-

1. That the responsibility for Satisfactory performance evaluation of the pollution control measures shall be of the industry and it will not commence production unless the satisfactory operation of the pollution control measures suggested by the industry in their feasibility report is demonstrated in presence of authorised Board Officer. The performance evaluation shall also be got done through independent competent authorised consultant and the results reported to this office.

Contd.2





# राजस्थान प्रदूषण निवारण एवं नियंत्रण मण्डल

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2. That the industry shall limit its trade effluent to their commitment of Zero discharge and in no case shall discharge the effluent either on land, stream, sewer, or for irrigation without achieving the specified standards for trade effluent as laid down under IS:2490(Part-I)1981 for different mode of disposals.

3. That the industry shall instal continuous flow measuring devices for different streams and quantity in no case shall exceed the quantities of effluents mentioned in feasibility report as below:

Stream-I : Cadmium Precipitation	19 m <sup>3</sup> /hr.
Stream-II : Cyanide Removal	107 m <sup>3</sup> /hr.
Stream-III : Flouride Removal	15 m <sup>3</sup> /hr.
Stream-IV : Heavy Metal Removal	75 m <sup>3</sup> /hr.

4. That the industry shall collect regular samples from various streams and also from the final treated effluent and shall analyse different parameters of relevance including trace metals like Zinc, Lead, Cadmium, Arsenic, Bismuth etc. and should send the monthly analysis reports to the Board Office and Regional Officer, Kota.

5. That the industry shall make all-out-efforts to recycle the entire treated effluent either back into the process or for other uses as specified by the industry in their feasibility report. The additional treated effluent of 89 m<sup>3</sup> per hour should be recycled for different use in order to make the concept of recycling as fully compatible. In case the effluent cannot be recycled fully the same

Contd. 3

जे-2/35, महावीर मार्ग, सी-स्कीम, जयपुर

J-2/35, Mahaveer Marg, C-Scheme, JAIPUR

Phone : 66037, 62066, 69957 & 64092





# राजस्थान प्रदूषण निवारण एवं नियंत्रण मण्डल

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will be discharged after treatment conforming to IS2490 before application on land used for social forestry. Also hydraulic loading and BOD loading shall not exceed as below:

Soil Texture Class	Dosage of settled industrial waste applied m <sup>3</sup> /hec/day BOD upto 100mg/l.
Sandy	160 to 226
Sandy Loam	134 to 180
Loam	90 to 134
Clay Loam	45 to 90
Clayey	28 to 44

6. That the industry shall undertake comprehensive environmental impact assessment studies, wherein environmental activities, existing within a radius of 20 KM shall be identified, impact evaluated and assessed through a well defined methodology. The study should be based on generation of field data. The report shall include the likely negative impacts on various receiptneous systems for which mitigating measures are required to be spelt out. The EIA report should be supported with environmental management plan which shall be prepared after considering various aspects of EIA study. The study will be got prepared through a competent agency.

7. That for the domestic waste water effluent, the treatment adopted should be based on suitable aerobic treatments like aerated lagoon, oxidation ditch, etc. because the septic tanks followed by soakpit will not be effective in this type of area. The treated waste water should conform to IS:2490 (on land for irrigation). The BOD loading & Hydraulic loading will not exceed as follows:

Soil Textures Class	Dosage of settled industrial waste applied m <sup>3</sup> /hec/day BOD upto 100mg/l.
---------------------	--

जे-2/35, महावीर मार्ग, सी-स्कीम, जयपुर

Contd.4

J-2/35, Mahaveer Marg, C-Scheme, JAIPUR  
Phones : 66037, 62066, 69957 & 64092





# राजस्थान प्रदूषण निवारण एवं नियंत्रण मण्डल

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Sandy	160 to 226
Sandy Loam	134 to 180
Loam	90 to 134
Clay Loam	45 to 90
Clayey	28 to 44

The treated effluent should be utilised for development of green belt in most scientific manner.

8. That the industry shall keep the air emission from the following stacks as per the norms laid down hereunder:-

(a). All Dust Generating Stacks	100mg/NM <sup>3</sup> of SPH
(b). Sulphur Dioxide (H <sub>2</sub> SO <sub>4</sub> Plant Stack)	4 KG/TON of 100% Acid produced (H <sub>2</sub> SO <sub>4</sub> )
(c). Acid Mist (H <sub>2</sub> SO <sub>4</sub> Plant Stack)	50mg/NM <sup>3</sup> of SPH
(d). Total Flouride(as F) (Sinter Plant Stack)	25mg/NM <sup>3</sup>

9. That all the air pollution control equipments and unit operations of water treatment plant proposed to be provided as per the feasibility report should be made functional all the time and interlocking arrangement shall be provided with the production of the plant to ensure that the control equipments are operative all the time.

10. That the industry shall provide continuous on line stack monitoring equipments at all the stacks back up with computerised systems in order to have continuous recording facilities of the emissions being caused by the unit.

11. That the unit shall provide necessary infrastructure facilities for the monitoring of stack as well as ambient air well before the commencement of production.

Contd.5





# राजस्थान प्रदूषण निवारण एवं नियंत्रण मण्डल

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12. That the industry shall instal continuous ambient air quality monitoring stations at least seven locations, in the plant area on 4 sites and three outside plant area back-up with computerised system to monitor conventional parameters like  $SPM, SO_2, NO_x, CO$  and specialised parameters like  $Cd, Pb, As, Zn, etc.$  The location of ambient air quality monitoring stations shall be determined in consultation with the Board.

13. That the industry shall prepare a well defined and scientifically validated air diffusal model for the release of pollutants like  $SPM, SO_2$  &  $NO_x$  while considering the micro meteorology of the area coupled with topographical features. The model input shall be based on field data which is to be generated at the site over a period of time and space and shall consider mixing depth, decay, rates, turbulence flux, incoming and out going solar radiations, chemical transformations and interactions of other release from the nearby areas etc.

14. That the industry shall provide a safe height of the stacks as per their feasibility report and in accordance with emission regulation Part-IV issued by the Central Pollution Control Board. If subsequent to detailed EIA study the stack heights are required to be increased the industry shall modify the same. Also since this is a sensitive area, the ambient air quality in the factory area should conform as follows:

$SPM$	$100 \mu g/m^3$
$SO_2$	$30 \mu g/m^3$
$CO$	$1000 \mu g/m^3$
$NO_x$	$30 \mu g/m^3$

15. That the industry shall comply with Hazardous Waste (Management & Handling) Rules, 1989 and Manufacture, Storage & Import of Hazardous Chemical Rules, 1989 and shall submit

जे-2/35, महावीर मार्ग, सी-स्कीम, जयपुर

Contd.6

J-2/35, Mahaveer Marg, C-Scheme, JAIPUR

Phones : 66037, 62066, 69957 & 64092





# राजस्थान प्रदूषण निवारण एवं नियंत्रण मण्डल

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the details in the prescribed forms under these rules to the Board and take necessary safety measures as envisaged in above rules. The industry will also get prepared on site and off site plan and approved from Competent Authority. The necessary authorisation for disposal of hazardous waste and its site shall be got approved from the Board.

16. That the industry shall ensure adequately safe and scientific disposal of the sludge in order to avoid ground water contamination due to seepage from sludge drying beds. The industry shall have the drying beds impervious. For detecting the seepage the industry shall provide peizometers all along the sludge drying beds.

17. That the industry shall comply with the provisions of water cess (Prevention & Control of Pollution) Act, 1977 and shall submit the monthly returns of water consumption in the prescribed form as specified under section 3 of the said Act. The cess so levied shall be paid by the industry well in time.

18. That 33% area of the total area of the industry premises shall be covered by tree plantation in an organised and scientific manner.

19. That the industry shall take prior consent under Water Act, 1974 and Air Act, 1981 and shall not commence their production without obtaining prior consent of the Board under the said Acts.

20. That this NOC is being issued to manufacture the quantity of products as mentioned below against each item. In case any increase in capacity or any addition/modifications/alteration or change in process or even in raw material the industry shall obtain fresh NOC from the Board.





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GOB Zinc	:	115 TPD ✓
SHG Zinc	:	105 TPD ✓
Refined Lead	:	110 TPD ✓
Silver	:	230 Kg/day ✓
Cadmium	:	1170 Kg/day ✓
Sulphuric Acid	:	550 TPD ✓

21. That the industry shall submit monthly progress report to the Board about the individual compliance of above conditions and progress of installation of pollution control measures alongwith provision of infrastructure development of stack as well as ambient air monitoring quality report.

22. That the industry shall develop a highly scientific environmental cell supported by proper laboratory with all type of equipments capable of analysing all the relevant polluting parameters.

23. That the industry shall undertake monthly ground water monitoring within a radius of 10 Kms and the samples should be analysed with respect to relevant parameters like Zn, Cd, As, Flouride and other trace metals. The location of sampling points shall be determined in ~~mut~~ consultation with Board Officials.

24. That transportations of concentrates from mines to the smelter site shall be done in containers or closed trucks to minimise/avoid the entry of metals into the environment through spillages, carry over or pilferage. The trucks used should be washed and cleaned at a centralised place. For this proper arrangement should be made. The washing should be properly treated to conform Board's standard, i.e. IS:2490.

25. That the waste treatment plant operation shall have to be watched at Senior Management Level and regular reports on its performance and effluent quality should be



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Rajasthan Board for Prevention and Control of Pollution

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submitted to Board.

26. That spillages and fugitive dust emissions at loading and unloading points should be kept minimum and for this purpose water spray shall have to be adopted.

27. That the industry shall keep the noise levels within the permissible limits which are 75 dB(A) in Day Time and 70 dB(A) in Night Time. The unit should have arrangements for the monitoring of noise levels at various locations & should develop a computerised programme.

Non compliance of any of the above conditions would tantamount to withdrawal of this NOC and action under the provisions of concerned Acts will be initiated against you.

Yours faithfully,

*Shiv K. Singh*  
MEMBER SECRETARY.  
26/4/71





**Rajasthan State Pollution Control Board**  
 4, Institutional Area, Jhalana Doongri Jaipur-302 004  
 Ph: 2711263, 2711631 Fax: 2710647

REGISTERED A.D.

F.12.(Chittor-60) RPCB/Gr.III/ 15418

Date: 5-3-04

General Manager,  
 M/s. Hindustan Zinc Ltd.,  
 Chanderiya Lead Zinc Smelter,  
 Chittorgarh.

Sub:- Consent to establish under the provisions of Air (Prevention & Control of Pollution) Act-1981 & Water (Prevention & Control of Pollution) Act-1974 for proposed enhancement of production Zinc from 70,000 TPA to 1,05,000 TPA at zinc Smelter, Chanderiya.

Ref:- The application and other documents submitted by the unit vide letter dt.8.8.2003 and subsequent correspondence.

In view of the scheme submitted by the industry on pollution control measures for the propose of Air/Water Pollution Control, Consent to Establish under Air Act, 1981 and Water Act, 1974 is hereby granted under the provisions of Air Act, 1981 and Water Act, 1974 without prejudice to the powers of the State Board under the provisions of Water (Prevention & Control of Pollution) Act, 1974 and Air (Prevention & Control of Pollution) Act, 1981, with following terms and conditions:-

1. That this Consent to establish shall be for three year from the date of issue.

2. That this Consent to establish is for enhancement of capacity as follows:-

Metal	Consent existing capacity	Enhanced production proposed enhancement
Zinc	70,000 TPA	1,05,000 TPA

3. That air emissions shall conform to Emission Regulation Part-I, II & IV issued by the Central Board and as adopted by State Board.

4. That waste water generated from the industry shall be treated so as to conform with standards laid down by the Board viz the general standards for discharge of effluent as notified under Environment (Protection) Act, 1986 for inland surface water. The entire treated waste water shall be reused in the process, plantation, utilities and zero discharge from the premises shall be maintained.

5. That the domestic waste water generated from the industry shall be treated as per IS:2470 (Part I & II).

6. That all the Pollution Control Measures as proposed shall be implemented before taking enhanced production for which unit will have to obtain Consent to Operate from the Board as contemplated under the relevant provisions of the Water Act, 1974 and Air Act, 1981 respectively. This Consent to Establish shall in no way be treated as Consent to Operate on enhanced capacity.

7. That it shall be ensured that all Pollution Control Measures implemented are capable of achieving prescribed norms at each source of pollution.

8. That Corporate Responsibility Plan for Environment Protection in zinc Industry issued by the CPCB in March 2003 shall implemented in all its respect before the enhanced production is achieved.

9. That project proponent shall comply with the provisions of Manufacture, Storage and import of Hazardous Chemicals Rules, 1989 and Hazardous Waste (Management & handling) Rules, 1989 and will submit the details in the prescribed forms under these rules to this Board and take necessary safety measures as envisaged in above rules. You shall also get prepared on site and off site plan and approved from the chief inspector of Factories and Boilers. Also necessary authorisation for disposal of hazardous waste shall be taken from the Board separately before operation on enhanced capacity.

10. That project proponent will ensure that the cost of pollution control measures have been included in the project report submitted to Financial Institutions.

11. Implementation of all necessary measures as specified Environment management Plan for existing units for taking Care of the environment shall be ensured and reported to this office.

12. Project proponent shall submit the quarterly progress to this office about the project.

  
Member Secretary.

P.12(Chittor-60) RPCB/Gr.III/

Date:

Copy to:-

1. RO, RPCB, Bhilwara.
2. Registry Cell, RPCB, Jaipur.
3. Consent Register, Gr. III, RPCB, Jaipur.

Group Incharge-III.





राजस्थान राज्य प्रदूषण नियंत्रण मण्डल  
RAJASTHAN STATE POLLUTION CONTROL BOARD

F.12(Chittor-60)RPCB/Gr.III/ 14372

Date: 18.7.04

General Manager,  
M/s Hindustan Zinc Ltd.,  
Chanderiya Lead Zinc Smelter,  
Chittorgarh.

Sub: - Grant of Consent to Establish under the provisions of Air (Prevention & Control of Pollution) Act 1981 and Water (Prevention & Control of Pollution) Act 1974 for proposed installation of Zinc Smelter Plant (1,70,000 TPA) & Captive Power Plant (154 MW) at Chanderiya, Chittorgarh.

Ref: - The application and other documents submitted by the unit vide letter dt. 21.12.02 and subsequent correspondence.

Sir,

In view of the scheme submitted by you on pollution control measures for the purpose of Air/Water Pollution Control, consent to Establish under the provisions of Air Act, 1981 and Water Act, 1974 is hereby granted without prejudice to the powers of the State Board under the provisions of Water (Prevention & Control of Pollution) Act, 1974 and, Air (Prevention & Control of Pollution) Act 1981 with following terms and conditions:-

1. That this Consent to establish shall be valid for three years from the date of issue.
2. That this consent to establish is for installation of Zinc Smelter Plant (1,70,000 TPA) and Captive Power Plant (154MW) at Chanderiya, Chittorgarh.
3. That all conditions imposed in Environmental Clearance issued by MoEF, GOI vide letter No. J-11011/155/2003-I A II(1) dt. 31.3.04 and NOC for Environmental Clearance issued vide Board's letter No. 13748-51 dt. 15.10.03 shall be complied with and it shall be ensured that the recommendation of CREP formulated by CPCB are complied with in all respect.
4. That Air Emission shall conform to Emission Regulation Part I, II & IV issued by the Central Board and as adopted by State Board.
5. That the domestic waste water generated from the industry shall be treated as per IS-2470 (Part I & II).
6. That all the pollution control measures as proposed shall be implemented before taking up production for which unit will have to obtain consent to operate from the Board as contemplated under the relevant provisions of the Water act, 1974 and Air Act, 1981 respectively. This consent to establish shall in no way be treated as consent to operate.
7. That it shall be ensured that all pollution control measures implemented are capable of achieving prescribed norms at each source of pollution.
8. That project proponent shall comply with the provision of Manufacture, Storage and Import of Hazardous Chemicals Rules 1989 and will submit the details in the prescribed forms under these rules to this Board and take necessary safety measures as envisaged in above rules. You shall also get prepared on site and off site emergency plan. Also necessary authorization for disposal of hazardous waste shall be taken from the Board separately before operation of the unit.
9. That project proponent will ensure that the cost of pollution control measures have been included in the project report submitted to Financial Institutions.



राजस्थान राज्य प्रदूषण नियंत्रण मण्डल

**RAJASTHAN STATE POLLUTION CONTROL BOARD**

10. Implementation of all necessary measures as specified environment management plan for existing units for taking care of the environment shall be ensured and reported to this office.
11. Project proponent shall submit the quarterly progress to this office about the project.

  
Member Secretary  
Date:

F.12( Chittor-60 )RPCB/Gr.III/

Copy to:-

1. RO, RPCB, Bhilwara.
2. Registrar, Registry cell, RPCB, Jaipur
3. Consent Register, Group-I, RPCB, Jaipur.

  
Sr. Environment Engineer  
Group-III



Registered A.D.

## Rajasthan State Pollution Control Board

4, Institutional Area, Jhalraa Dongri Jaipur-302 004

Tel: 2710647 Fax: 2710647

E-120-B-781R/R B GR III 2555

Date: 18-1-07

M/s Hindustan Zinc Limited,  
Chanderiya Lead Zinc Smelter,  
Village Putholi, Distt. Chittorgarh.

Sub: Grant of Consent to Establish under the provisions of Air (Prevention and Control of Pollution) Act, 1981 and Water (Prevention and Control of Pollution) Act, 1974 for your proposed Zinc manufacturing unit up to 2,50,000 MT/annum capacity & captive power plant of 100 MW at Village Putholi, Tehsil Gangrar, Distt. Chittorgarh.

Ref: Your application for consent to establish along with scheme for pollution control and legal undertaking submitted by you vide your letter dated 30/1/2006.

Su

In view of the scheme submitted by you on pollution control measures for the purpose of Air/Water Pollution Control, and the legal undertaking given you, consent to establish for your proposed Zinc manufacturing unit up to 2,50,000 MT/annum capacity & captive power plant of 100 MW at Village Putholi, Tehsil Gangrar, Distt. Chittorgarh and implementation of pollution control scheme is being issued without prejudice to the powers of the State Board under the provisions of Water (Prevention & Control of Pollution) Act-1974, Air (Prevention & Control of Pollution) Act-1981, Environment (Protection) Act, 1986 and without reducing your responsibility under the aforesaid Acts for control of pollution for your aforesaid industry subject to following terms and conditions:

1. That this Consent to establish shall be valid for three years from the date of issue or commencement of production whichever is earlier.

2. That the consent to establish is valid for premises of unit M/s Hindustan Zinc Limited, situated at Village Putholi, Tehsil Gangrar, Distt. Chittorgarh.

3. That this consent to establish is valid for manufacturing/producing following products by products:

S. No.	Item	Capacity
1.	Zinc	2,50,000 MT/annum
2.	Electricity	100 MW
3.	Sulphuric acid	880 MT/day

4. That this consent to establish is being issued for your proposed process/product capacity. In case of any increase in capacity or addition/modifications/alteration or change in process, or change in raw material/product you have to obtain fresh consent to establish.

5. That the responsibility for performance evaluation of pollution control measures shall be of industry and industry will not commence production unless the satisfactory operation of the Pollution Control Measures is done in presence of Regional Officer, Chittorgarh, duly certified by him before commencement of production.

6. That total waste water discharge from the plant shall in any case, not exceed the following:

Type of effluent	Max. discharge (KLD)
Domestic	82
Industrial (Process, floor and equipment washing, cooling and bleed waters)	Nil

7. That industrial effluent shall not be discharged outside the premises and the entire effluent shall be either reused in process or be utilized in ash pond or for irrigation within the premises.

8. That the domestic waste water generated from the industry shall be treated as per IS: 2470(part I&II) and shall be discharged in soak pit through septic tank. The treated effluent should conform to standards as prescribed by the state Board.

9. The total cost of project shall not exceed Rs.970 crores.

10. That the trade effluent shall be treated before disposal so as to conform 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.	Total Chromium (as Cr)	Not to exceed 2 mg/l

**Rajasthan State Pollution Control Board**

4, Institutional Area, Jhalana Doongri Jaipur-302 004

Ph: 2711263, 2711631 Fax: 2710647

S. No.	Parameters	Limits
7.	Phosphate	Not to exceed 5 mg/l
8.	Zinc	Not to exceed 1.0 mg/l
9.	Free available Chlorine	Not to exceed 0.5 mg/l
10.	Iron (total)	Not to exceed 1.0 mg/l
11.	Copper (total)	Not to exceed 1.0 mg/l
12.	Temperature	Not more than 5°C higher than the intake in once through cooling system

11. That water consumption of unit shall not exceed from 11000 M<sup>3</sup>/day without prior consent of the Board and permission from Central Ground Water Authority.
12. That the industry shall install meters at all the inlets of water duly sealed and verified by the Regional Officer, Bhilwara and daily water consumption record shall be maintained.
13. That industry shall have to comply with the conditions stipulated in the Environmental Clearance issued by the Ministry of Environment & Forests, Government of India, vide letter No. J-11011/279/2006/IA-II(I) dated 6/12/2006.
14. That the unit shall have to comply with the Government of India Notification no. SO-763(E) dated 14/9/1999, regarding management of fly ash and submit relevant details/ documents to the Board, CPCB and Ministry of Environment & Forest, Government of India, New Delhi.
15. That opacity meter/ continuous monitoring system shall be installed at the stack attached with CPP with proper calibration system for online continuous monitoring of stack emissions.
16. That stack of adequate height as per the norms prescribed shall be provided along with pollution control equipments as proposed in your report.
17. That the management shall achieve the prescribed standards of Ambient Air Quality and emissions from the various pollution sources & stack attached to different plant as prescribed under Environment (Protection) Rules, 1986 and shall maintain adequate pollution control measures as per the details submitted along with consent to operate application. The emissions standards in your case shall be as under:

S. No.	Ambient Air	Stack emission
SPM	500 $\mu\text{g}/\text{M}^3$	100 $\text{mg}/\text{NM}^3$ (Particulate Matter)
SO <sub>2</sub>	120 $\mu\text{g}/\text{M}^3$	
NO <sub>x</sub>	120 $\mu\text{g}/\text{M}^3$	
CO	5000 $\mu\text{g}/\text{M}^3$	
RSPM	150 $\mu\text{g}/\text{M}^3$	
Oxide of sulphur		2 Kg/Ton (one hundred %) acid produced
Acid mist		50 $\text{mg}/\text{NM}^3$

18. That this consent to establish is valid for following sources of air pollution:

S. No.	Source
1.	Sulphuric Acid Plant
2.	Zinc Melting and dross grinding unit
3.	Roaster plant
4.	Zinc automizing unit
5.	Coal handling unit

19. 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 analyzed for all the parameters in respect of which limits have been fixed vide condition no.10 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.
20. That the control equipments as suggested by you shall be installed before trial or actual 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 and Air Act, 1981 respectively. This consent to establish shall not be treated as consent to operate in any way.
21. That infrastructure facility for monitoring of stack emissions on each stack and flow measuring devices at each unit of effluent treatment plant shall be provided.
22. That for the diesel generator sets acoustic enclosure/acoustic treatment shall be provided to meet the prescribed norms with respect to noise as per the Gazette Notification dated 02.01.99 issued by the Ministry of Environment & Forests, Government of India. Adequate stack height with D.G. Sets(S) shall also be provided and maintained.
  - a. Noise from the diesel Generator Sets shall be controlled by providing an acoustic enclosure or by treating the room acoustically. The acoustic enclosure/acoustic treatment of room should be designed for minimum 25 dB (A) Insertion Loss or for meeting the ambient noise standards.



**Rajasthan State Pollution Control Board**

4, Institutional Area, Jhalana Doongri Jaipur-302 004

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whichever is on the higher. The measurement for Insertion Loss may be done at different points at 0.5 meter from the acoustic enclosure/room and then averaged. The Diesel Generator Sets should also be provided with proper exhausts muffler with Insertion Loss of minimum 25 dB (A).

b. The stack height for the Diesel Generator Sets shall be as below:

Height of Stack (in Meters) = Height of Building +  $0.2\sqrt{\text{KVA of D.G Set}}$ .

23. The industry shall ensure the proper channelisation/ control system for the fugitive emissions from the various activities/ process are maintained in good condition and operated properly so as to maintain clean and safe environment in and around the premises of the unit.
24. The industry shall ensure that the noise from the unit does not exceed the prescribed noise standards for the industrial area i.e. 75 dB(A) Leq during the day time and 70 dB(A) 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.
25. That the stack monitoring and ambient air monitoring shall be conducted you as per Emission Regulation (Part III) and monitoring results shall be submitted to the Board.
26. That hour meter shall be provided at suitable places so as to ensure continued operation of pollution control equipment/device and a log book shall be maintained wherein the entries of the working of the production plant and control equipment shall be entered. The copies of the log book will be submitted once in three months to the Regional Officer of the Board office.
27. That you shall comply with the provisions of Manufacture Storage and Import of Hazardous Chemicals Rules, 1989 and Hazardous Waste (Management and Handling Rules 1989 (both as amended to date) and you will submit the details in the prescribed forms under these rules to this Board and take necessary safety measures as envisaged in above rules. You shall also get prepared on site and off site plan and approved from the Chief Inspector of Factories and Boilers. Also necessary authorization for disposal of Hazardous Waste shall be taken from the Board separately before establishment of the industry.
28. That 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.
29. 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 37(2) of the Water (Prevention & Control of Pollution) Act-1974 and under Section 21(6) of the under Air (Prevention & Control of Pollution) Act 1981 as amended to date to review anyone/or all the conditions imposed hereinabove and to make such variations as deemed fit for the purpose of these Acts by the State Board.
30. That any incorrect information submitted in the consent application form shall make the industry liable for legal action under Section 43 of the Water Act and under section 38 of the Air Act.
31. The Consent to Establish is being 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.
32. That you shall submit monthly progress to this office about the individual compliance of conditions contained herein the letter and progress of installation of pollution control equipments and effluent treatment plant.
33. That you will ensure that the cost of pollution control equipment have been included in the project report submitted to Financial Institutions.
34. That the factory authorities shall comply with the provisions of Water (Prevention & Control of Pollution) Cess Act-1977 (as amended to 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.
35. That 33% of the total area of factory premises shall be covered by tree plantation and a proper scheme for the same shall be submitted.
36. That all the general condition as per Comprehensive Guidelines 1998 as published by the Board shall be complied with.
37. That the unit shall have to comply with the provisions of the Fly Ash notification.
38. That the unit shall have to comply with the charter of Corporate Responsibility for Environment Protection.
39. That the unit shall provide water meter on each tube well/bore well and daily record of water withdrawal meter readings shall be maintained.

Non-compliance of any of the above conditions would tantamount to withdrawal of this consent to establish and action under the provisions of concerned Acts will be initiated against you.

Yours faithfully,

Member Secretary

Copy to:

1. Environmental Engineer, RO, RPCB, Bhilwara to monitor compliance of consent conditions and report.
2. Registrar, Registry cell, RPCB, Jaipur
3. Consent Register, Group-I, RPCB, Jaipur.

Environment Engineer (Group-III)





Head Office (CPM)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302

Phone: 0141-5159600, 5159695 Fax: 0141-5159697

Registered

File No : F(CPM)/Chittorgarh(Gangrar)/2(1)/2016-2017/3942-3944

Order No : 2017-2018/CPM/4915

Unit Id : 263

Dispatch Date: 01/08/2017

M/s Hindustan Zinc Ltd.

Chandera Lead Zinc Smelter, P.O. Putholi,

Tehsil:Gangrar

District:CHITTORGARH

**Sub:** Consent to Establish 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.

**Re:** Your application(s) for Consent to Establish dated 07/12/2016 and subsequent correspondence.

Sir,

Consent to Establish 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 **Fumer Plant (Pyro Metallurgical fuming Process)** within existing **Hydro Zinc Smelter Phase-II** plant situated / proposed at **Chandera Lead Zinc Smelter, PO Putholi Putholi Tehsil:Gangrar District:Chittorgarh**, Rajasthan under the provisions of the said Act(s). This consent is granted on the basis of examination of the information furnished by you in consent application(s) and the documents submitted therewith, subject to the following conditions:-

1. That this Consent to Establish is valid for a period from **08/12/2016 to 30/11/2021** or **date of Commencement of production / commissioning of the project or activities whichever is earlier.**
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 / Capacity
Fumer Plant	Service	1.00 NO.
POWER GENERATION	By Product	2100 KW
Slag	By Product	150,000.00 MT/A

3. That in case of any increase in capacity or addition / modification / alteration or change in product mix or process or raw material or fuel the project proponent is required to obtain fresh consent to establish.







Head Office (CPM )  
Rajasthan State Pollution Control Board  
4, Institutional Area, Jhalana Doongari, Jaipur-302  
Phone: 0141-5159600, 5159695 Fax: 0141-5159697

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File No : F(CPM)/Chittorgarh(Gangrar)/2(1)/2016-2017/3942-3944

Order No : 2017-2018/CPM/4915

Dispatch Date: 01/08/2017

Unit Id : 263

Sources of Air Emissions	Pollution Control Measures	Prescribed	
		Parameter	Standard
Coal Pulveriser	ADEQUATE STACK HEIGHT, Bag Filter	Particulate Matter	50 mg/NM3
Furnace Furnace	ADEQUATE STACK HEIGHT, Bag Filter	Particulate Matter	50 mg/NM3
Off Gases	ADEQUATE STACK HEIGHT, Scrubber	Particulate Matter	50 mg/NM3
BMH Stack	ADEQUATE STACK HEIGHT, Bag Filter	Particulate Matter	50 mg/NM3

7. That the Fumer Plant (Pyro Metallurgical fuming Process) within existing Hydro Zinc Smelter Phase-II 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.
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





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**Rajasthan State Pollution Control Board**  
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File No : P(CPM)/Chittorgarh(Gangrar)/2(1)/2016-2017/3942-3944

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Dispatch Date: 01/08/2017

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- 10 That total proposed capital investment as per the project report submitted by the unit is Rs 580 Cr. which includes the cost of Building and Plant & Machinery.
- 11 That the industry shall comply with all the conditions of Environmental Clearance (E.C.) issued by Ministry of Environment, Forests and Climate Change (MoEF&CC), Government of India vide letter no. J-11011/279/2006-IA II(i) dated 05.10.2015.
- 12 The total water requirement for the proposed fumer plant is about 2400 KLD which would be within the stipulated water requirement (11000 KLD) of the existing Hydro-II plant water requirement including 100 MW CPP which will be sourced from Gosunda Dam.
- 13 That no ground water shall be abstracted without prior permission from CGWA & the State Board.
- 14 That water flow meters shall be provided at all suitable points to measure quantity of daily water received from Gosunda Dam and water consumption for different purposes. Record of the same shall be maintained on daily basis.
- 15 That the trade effluent (150 KLD) generated from fumer plant shall be treated through existing effluent treatment plant (ETP) of 4200 KLD capacity along with trade effluent generated from Hydro-II & 100 MW CPP up to the norms mentioned at condition no 8.
- 16 That quantity of total trade effluent generation from existing Hydro-II plant, CPP (100 MW) and proposed fumer plant will not exceed to 2352 KLD as allowed under consent to operate order no.2016-2017/CPM/4565 dated 03.08.2016.
- 17 That treated trade effluent will be further treated through two stage Reverse Osmosis (RO) plant and R.O. permeate shall be recycled/reused.
- 18 That R.O. reject shall be disposed of through scientifically designed forced evaporation system of adequate capacity and no reject shall be discharged within or out side the premises on land, nallah well etc.
- 19 That no treated/untreated waste water (domestic & trade effluent) shall be discharged outside the factory premises on land or into sewer or well or stream in any case and complete zero discharge status shall be maintained.
- 20 That industry shall provide stack of adequate height and adequate air pollution control measures at all the sources of air emission to achieve the prescribed standards/norms.
- 21 That adequate infrastructure facility shall be provided for stack emission monitoring at the stacks of off gases, Fuming furnace, RMH Stack and Coal Pulveriser.
- 22 That industry shall provide continuous online monitoring system at all the major stacks of fumer plant.





Head Office (CPM )

Rajasthan State Pollution Control Board  
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File No : P(CPM)/Chittorgarh(Gangrar)/2(1)/2016-2017/3942-3944

Order No : 2017-2018/CPM/4915

Unit Id : 263

Dispatch Date: 01/08/2017

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 Establish** and project proponent / occupier shall be liable for legal  
action under the 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, Chittorgarh to  
ensure the compliance
- 2- Master File.

Group Incharge[ CPM ]







# Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Dongri Jaipur-302 004  
Ph: 2711261, 2711631 Fax: 2710647

F.12(CH-70)RPCB/Gr.III/ 752

Date 14/9/05

General Manager,  
M/S. Hindustan Zinc Ltd.,  
Chanderya Lead Zinc Smelter,  
Chittorgarh.

Subject: Grant of Consent to establish under the provisions of Air Act & Water Acts for implementation of Pollution Control Scheme for your proposed 60,000 TPA Lead Smelter with existing Zinc Smelter, Chanderya, Chittorgarh.

Reference: Your consent application dated Nil for consent to establish received through R.O. Bhilwara letter No. 336 dated 12.5.2004 and subsequent correspondence.

Sir,

In view of the scheme submitted by you on pollution control measures for the propose of Air/Water Pollution Control and the legal undertaking given by you, consent to establish for implementation of pollution control scheme is being issued without prejudice to the powers of the State Board under the provisions of Water (Prevention & Control of Pollution) Act-1974 and Air (Prevention & Control of Pollution) Act-1981 and E.P. Act, 1986 and without reducing the responsibility of the unit under the aforesaid Acts for control of pollution for your aforesaid industry with following terms and conditions:-

1. That this consent to establish is valid for three years from the dated of issue.
2. 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 concerning Regional Officer and is duly certified by him before commencement of production.
3. That Air Emission shall conform to Emission Regulation Part I, II & V issued by the Control Board and as adopted by State Board.
4. That the management shall achieve the prescribed standards of Ambient Air Quality and emissions from the various stack attached to different plant as prescribed under Environment (Protection) Rules, 1986. The emissions standards in your case shall be as under:

Pollutant	Ambient Air	Residential	Stack
SPM	500 $\mu\text{g}/\text{m}^3$	200 $\mu\text{g}/\text{m}^3$	150 mg/NM <sup>3</sup>
SO <sub>2</sub>	120 $\mu\text{g}/\text{m}^3$	80 $\mu\text{g}/\text{m}^3$	4 Kg/ton of 100% sulphuric acid produced
NO <sub>x</sub>	120 $\mu\text{g}/\text{m}^3$	80 $\mu\text{g}/\text{m}^3$	
CO	5000 $\mu\text{g}/\text{m}^3$	2000 $\mu\text{g}/\text{m}^3$	
RPM	150 $\mu\text{g}/\text{m}^3$	120 $\mu\text{g}/\text{m}^3$	
Lead	1.5 $\mu\text{g}/\text{m}^3$	1.5 $\mu\text{g}/\text{m}^3$	10 mg/NM <sup>3</sup>

5. That total waste water discharge from expansion shall not exceed the following:-

Type of effluent	Max. Discharge (KLD)
a) Domestic	20
b) Industrial (Process, floor and equipment washing, cooling and bleed waters)	450

6. That the domestic waste water generated from the industry shall be treated as per IS-2470 (Part-I&II) and the treated effluent should conform to standards as prescribed by the State Board.
7. That the industrial effluent shall be treated so as to conform to the prescribed the Board viz the general standards for discharge of effluent as notified under Environment (Protection) Act, 1986 for disposal on land into inland surface waters.
8. That this consent to establish is being issued for installation of a 60,000 TPA lead smelter with existing Chanderya Lead Zinc Smelter, Chanderya, Chittorgarh.  
In case of any increase in capacity or addition/modifications/alteration or change in process, or change in raw material you shall have to obtain consent to establish afresh.
9. That this consent is being issued for following sources of air pollution:
  - i. Lead Furnace one no.
  - ii. Lead Smelter one no.
10. That the control equipments as suggested by you shall be installed before trial or actual production is started, for which you will have to obtain the consent to operate from the Board as



**Rajasthan State Pollution Control Board**

4, Institutional Area, Jhalana Doongri Jaipur-302 004

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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.

That infrastructure facilities for the monitoring of stack emission on each stack and flow measuring devices at each unit of Effluent Treatment Plant shall be provided.

2. That the stack monitoring and ambient air monitoring shall be conducted by you as per emission regulation part III and monitoring results shall be submitted to the Board.
13. That hour meter shall be provided at suitable places so as to ensure continued operation of pollution control equipment/divide and a log book shall be maintained wherein the entries of the working of the production plant and control equipment shall be entered. The copies of the log book will be submitted once in three months to the Regional Officer of the Board Office.
14. That you shall comply with the provisions of Manufacture Storage and Import of Hazardous Chemicals Rules, 1989 and Hazardous Waste (Management and Handling) Amendment Rules, 2000 and you will submit the details in the prescribed forms under these rules to this Board and take necessary safety measures as envisaged in above rules. You shall also get prepared on-site and off-site plan and approved from the Chief Inspector of Factories & Boilers. Also necessary authorization for disposal of Hazardous Waste.
15. That for the diesel Generator Set acoustic enclosure/acoustic treatment shall be provided to meet the prescribed norms w.r.t. noise as per the Gazette Notification of Ministry of Environment & Forests dated 02.01.99. Adequate stack height with D.G. Sets shall also be provided and maintained.
16. Noise from the diesel Generator Sets shall be controlled by providing an acoustic enclosure or by treating the room acoustically. The acoustic enclosure/acoustic treatment of room should be designed for minimum 25 dB (A) Insertion Loss or for meeting the ambient noise standards, whichever is on the higher. The measurement for Insertion Loss may be done at different points at 0.5 meter from the acoustic enclosure/room and then averaged. The Diesel Generator Sets should also be provided with proper exhausts muffler with Insertion Loss of minimum 25 dB (A).
17. That 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.
18. That management shall comply with the conditions of Environmental Clearance issued by the Ministry of Environment & Forest, Government of India vide letter No. J-11015/17/2005-IA-II(I) dated 3.8.2005.
19. 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.
20. That you will ensure that the cost of pollution control equipment have been included in the project report submitted to Financial Institutions.
21. 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 return in the prescribed form and the cess as specified under Section 3 of the said Act.
22. That 33% of the total area of factory premises shall be conveyed by tree plantation and a proper scheme for the same shall be submitted.
23. That this consent is valid subject to fulfillment of all other statutory requirement under any other law/rules/notifications applicable.

Non-compliance of any of the above stated conditions would tantamount to revocation/ withdrawal of this consent and the industry shall be liable for prosecution under the provisions of Acts will be initiated against you.

Yours Sincerely,



MEMBER SECRETARY

Date

F-12/CH-76/RPCB/Gr.III

Copy to:-

1. E.E., RO, RPCB, Bhalwara.
2. Registry Cell, RPCB, Jaipur.
3. Consent Register: G-III, RPCB, Jaipur.

Group Incharge-III



**Rajasthan State Pollution Control Board**  
**4, Institutional Area, Jhalana Doongari, Jaipur-302 004**  
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**www.rpcb.nic.in**  
**Registered**

o : F(Tech)/Chittorgarh(Gangrar)/1(1)/2010-2011/10359-10361  
 No: 2012-2013/CPM/1610

Dispatch Date: 20/03/2013

Hindustan Zinc Ltd.

deria Lead Zinc Smelter, P.O. Putholi,

il:Gangrar

ict:CHITTORGARH

Consent to Establish 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.

Your application(s) for Consent to Establish dated 01/04/2009 and subsequent correspondence.

Consent to Establish 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 D.G Sets ( 2x8 MW) at Pyro plant situated / proposed at Tehsil:Gangrar District:Chittorgarh, Rajasthan under the provisions of the said Act(s). This consent is granted on the basis of examination of the information furnished by you in consent application(s) and the documents submitted therewith, subject to the following conditions:-

- 1 That this Consent to Establish is valid for a period from 01/01/2013 to 31/12/2015 or date of Commencement of production / commissioning of the project or activities whichever is earlier.
- 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 / Capacity
D.G. SET	Product	16.00 MW

- 3 That in case of any increase in capacity or addition / modification / alteration or change in product mix or process or raw material or fuel the project proponent is required to obtain fresh consent to establish.
- 4 That the control equipment as proposed by the applicant shall be installed before trial operation is started for which prior consent to operate under the provision of the Water Act and Air Act shall be obtained. This consent to establish shall not be treated as consent to operate.
- 5 That the sources of air emissions along with pollution control measures and the emission standards for the prescribed parameters shall be as under:



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Registered

F(Tech)/Chittorgarh(Gangrar)/1(1)/2010-2011/10359-10361

No: 2012-2013/CPM/1610

Dispatch Date: 20/03/2011

that, non compliance of any of the above stated conditions would tantamount to revocation of Consent to Establish and project proponent / occupier shall be liable for legal action under the the relevant provisions of the said Act(s).

This bears the approval of the competent authority.

Yours Sincerely



Group Incharge  
वरिष्ठ पर्यावरण अधिकारी

राजस्थान राज्य प्रदूषण नियंत्रण मण्डल  
जयपुर (राज.)

Group Incharge

Copy To:-

- 1 Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Chittorgarh
- 2 Master File.



Registered

File No : F(HDF)/Chittorgarh(Gangrar)/1(1)/2019-2020/1091-1093

Order No : 2020-2021/HDF/3070

Date: 08/06/2020

Unit Id : 263

M/s Hindustan Zinc Ltd.

Chandaria Lead Zinc Smelter, P.O. Putholi , Tehsil:Gangrar

District:CHITTORGARH

**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 16/10/2018 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 **Pyro Metallurgical Zinc Smelter plant** situated at **Chandaria Lead Zinc Smelter, Putholi Tehsil:Gangrar District:Chittorgarh** , 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
CADMIUM	By Product	375.00 MT/ANNUM
COPPER	By Product	2,100.00 MT/ANNUM
REFINED LEAD	Product	35,000.00 MT/ANNUM
REFINED ZINC	Product	105,000.00 MT/ANNUM
SILVER	By Product	74.00 MT/ANNUM
SULPHURIC ACID	By Product	176,000.00 MT/ANNUM

- 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 (HDF )**  
**Rajasthan State Pollution Control Board**  
**4, Institutional Area, Jhalana Doongari, Jaipur-302 004**  
**Phone: 0141-5159600,5159695 Fax: 0141-5159697**

**Registered**

**File No : F(HDF)/Chittorgarh(Gangrar)/1(1)/2019-2020/1091-1093**

**Order No : 2020-2021/HDF/3070**

**Date: 08/06/2020**

**Unit Id : 263**

- 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	250.000	NIL	250.000 To be treated in STP and to be used in plantation and horticulture
Trade Effluent	1500.000	120.000	1,380.000 Recycled in the process plantation and Horticulture within premises

- 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
Acid Plant (TGT)	ADEQUATE STACK HEIGHT , Double Conversion Double Absorption Plant , VENTURY SCRUBBER	SO2  Acid Mist	2 kg/Ton of 100 percent concentrated acid produced from acid plant 50 mg/NM3
Copper Recovery Dross Milling	ADEQUATE STACK HEIGHT , Bag Filter	Particulate Matter	150 mg/NM3







**Head Office (HDF )**  
**Rajasthan State Pollution Control Board**  
**4, Institutional Area, Jhalana Doongari, Jaipur-302 004**  
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**File No : F(HDF)/Chittorgarh(Gangrar)/1(1)/2019-2020/1091-1093**

**Order No : 2020-2021/HDF/3070**

**Date: 08/06/2020**

**Unit Id : 263**

Imperial Smelting Furnace	ADEQUATE STACK HEIGHT , Bag Filter	Particulate Matter Lead	150 mg/NM3  10 mg/NM3
Lead Refinery Copper Drossing	ADEQUATE STACK HEIGHT , Bag Filter	Particulate Matter Lead	150 mg/NM3  10 mg/NM3
Lead Refinery(Hygiene gases of kettle & Rotary furnace)	ADEQUATE STACK HEIGHT , Bag Filter	Particulate Matter Lead	150 mg/NM3  10 mg/NM3
Sinter Plant Crusher(Venturi)	ADEQUATE STACK HEIGHT , VENTURY SCRUBBER	Particulate Matter Lead	150 mg/NM3  10 mg/NM3
Sinter Plant Dedusting(Crusher Main)	ADEQUATE STACK HEIGHT , Bag Filter	Particulate Matter Lead	150 mg/NM3  10 mg/NM3
Sinter PLant Main Exhaust	ADEQUATE STACK HEIGHT , Bag Filter	Particulate Matter Lead	150 mg/NM3  10 mg/NM3





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Sinter Plant Wet Scrubber(Sinter Venturi)	ADEQUATE STACK HEIGHT , VENTURY SCRUBBER	Particulate Matter Lead	150 mg/NM3 10 mg/NM3
ZRP FLUE GAS STACK	ADEQUATE STACK HEIGHT , Bag Filter	Particulate Matter	150 mg/NM3
ZRP FUME EXTRACTION	ADEQUATE STACK HEIGHT , Bag Filter	Particulate Matter	150 mg/NM3

- 6 That the **Pyro Metallurgical 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
Oil and Grease	Not to exceed 10 mg/l
Total Residual Chlorine	Not to exceed 1.0 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
pH Value	Between 6.5 to 8.5
Chemical Oxygen Demand	Not to exceed 250 mg/l
Nitrate (as NO3)	Not to exceed 50 mg/l





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- 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

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
Chemical Oxygen Demand	Not to exceed 250 mg/l

- 9 That the consent to operate is valid for production of products mentioned at condition no. 2. The industry has to seek fresh consent to establish & operate for any change in product/by product/process/modification/alteration.
- 10 That total capital cost as per the C.A. certificate submitted by the unit is Rs. 837.62 Crore which includes the cost of Land, Building & Plant & Machinery.
- 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 vide letter no. J-11013/29/92-EI-IA.II (I) dated 03.06.1983 shall be complied with.
- 13 (i) That total water consumption for Pyro Plant shall not exceed to 5,600 KLD (Industrial purpose-850 KLD, Domestic purpose- 250 KLD and Boiler/Cooling purpose- 4500 KLD) which shall be met from Gosunda Dam.  
(ii) That no ground water shall be abstracted for the Pyro-Mettallurgical Zinc Smelter without prior permission from the CGWA and the State Board.  
(iii) That water flow meters shall be provided and maintained at all suitable points to measure quantity of water received from Gosunda Dam and water consumption for different purposes. Record of the same shall be maintained on daily basis.  
(iv) That industry shall maintain sewage treatment plant (STP) of adequate capacity so as to treat the entire domestic waste water (250 KLD) up to the norms mentioned at condition no. 7 and treated domestic waste water shall be used for plantation with in the premises.  
(v) That the trade effluent (1500 KLD) shall be treated in the effluent treatment plant (ETP) of 8400 KLD capacity along with trade effluent generated from the Ausmelt Plant (450 KLD) and Hydro - I (3296 KLD) upto the norms mentioned at condition no. 8.  
(vi) That 1200 KLD, out of total 5246 KLD of treated trade effluent, will be used for Slag Granulation and Lime slurry preparation and remaining treated trade effluent will be further treated through two stage reverse osmosis (R.O.) plants and R.O. permeate will be recycled/ reused in the process within the premises.





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- 14 (i) That R.O. reject shall be disposed off through scientifically designed forced evaporation system of adequate capacity and no reject shall be disposed within or outside the premises on land, nallah, well etc.
- (ii) That industry shall maintain logbook for recording the daily running hour of R.O. plant, permeate and reject generation.
- (iii) 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.
- (iv) That separate energy meter & hour meter shall be provided and maintained at all the air pollution control measures & ETP/STP/R.O. and daily record of running hours of pollution control measures and energy consumption shall be maintained in log book.
- (v) That separate energy meter & hour meter shall be provided and maintained at all the air pollution control measures & ETP/STP/R.O. and daily record of running hours of pollution control measures and energy consumption shall be maintained in log book.
- (vi) That proper logbook of Sewage Treatment Plant (STP) and Effluent Treatment Plant (ETP) shall be maintained and record of daily consumption of chemicals and running hours of STP and ETP along with daily quantity of product shall be maintained.
- 15 (i) That flow meters shall be provided at inlet & outlet of STP, ETP & R.O. and on the pipeline for utilizing the treated effluent /sewage in process/ for plantation and daily record of the same shall be maintained.
- (ii) That trained/skilled operators/supervisors shall be employed to operate the STP, ETP & R.O. plant.
- (iii) That good quality of chemicals shall be used to achieve the desired results and to minimize the quantity of hazardous waste (ETP sludge).
- (iv) That treated & untreated effluent carrying pipeline should be in different colors. That all the recommendation made in the charter of Corporate Responsibility for Environment Protection (CREP) for Lead and Zinc smelter plant shall be implemented and complied.







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- 16 (i) That for the control of fugitive emission guidelines / code of practice as issued by CPCB will be followed.
- (ii) 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.
- (iii) That SO<sub>2</sub> emissions from lead 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.
- (iv) That continuous Sulphur Di-Oxide monitoring system installed at Acid Plant shall be maintained properly and operated regularly. Daily record of Sulphur Di-Oxide emission shall be maintained.
- (v) That adequate measures shall be taken for handling the accidental leakages of gaseous emissions (SO<sub>2</sub>) along with interlocking arrangement for corrective action and stoppage of the plant.
- (vi) That the industry shall maintain adequate height of stack at all the sources of air emissions and adequate air pollution control measures so as to achieve the prescribed emission standards as per condition no.5.
- (vii) That adequate infrastructure facility for stack emission monitoring shall be maintained at all the major stacks.
- 17 (i) That no additional source of air emission shall be installed without prior consent from the State Board.
- (ii) That all the raw materials and products shall be stored in closed sheds.
- (iii) That dust suppression system shall be maintained to minimize fugitive dust emission in Zinc, Lead concentrate handing area & at various transfer points and closed conveyor belts shall be maintained for the transfer of material to reduce the fugitive emissions.
- (iv) That water sprinkling and cleaning of haul roads by vacuum cleaner shall be done regularly to control the fugitive emissions generated due to vehicular movement.
- (v) That the industry shall maintain dust collection and extraction system to control fugitive dust emissions at all the transfer points & loading/unloading areas.





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- 18 (i) That in compliance of the recommendations of the inter-departmental committee formed by District Collector, the industry shall submit a proposal for the installation of water supply system ATM RO for supply of drinking water in nearby villages where concentration of NO<sub>3</sub>, Iron etc have exceeded the prescribed norms.
- (ii) That additional PTZ camera connected to CPCB/RSPCB server shall be installed at jorofix ponds 2 and 3 covering the boundary wall on the side of village-Putholi, SLF-3 etc such that the sprinkling done by tankers in the area is also included in the PTZ camera to ensure that no blowing of jarofix during winds.
- (iii) That the industry shall ensure that total of meter reading of reject holding pond and the reject transported through tanker should be equal to the RO reject generated and shall maintain a log book of the same which shall be submitted to R.O Chittorgarh on monthly basis.
- (iv) That installation of of PTZ online cameras and fog cannon for dust suppression at the coal yard connected to the CPCB/RSPCB server covering the boundary wall as well as the mist evaporation system(Lagoon)shall be ensured and appropriate lights shall be installed at places to give a clear view during night also or two such cameras can be installed if one is found inadequate.
- (v) That the industry shall install piezometric well near mist evaporator site to assess the level of ground water quality.
- (vi) That the camera installed at leachate ponds should be made online and connected to CPCB/RSPCB server.
- (vii) That the industry shall explore the possibility of identifying the real reasons for higher concentrations of sulphate, iron etc in ground water and carry out a geophysical investigation cum underground mapping and exploration study.
- 19 (i) 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.
- (ii) That the system made to avoid flow of pollutants along with rain water shall be maintained properly.
- 20 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 & Climate Change (MoEF&CC), Government of India.





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- 21 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 daily record of sludge generation and its disposal shall be maintained.
- 22 That the industry shall install and maintain adequately designed rain water harvesting structure for recharge of ground water in and around the area.
- 23 That the plantation of local species in the 33% of total area of the project shall be carried out & maintained.
- 24 That the industry shall get policy renewed under Public Liability Insurance Act (PLIA) and submit its copy to the Board from time to time.
- 25 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.
- 26 That the industry shall comply with all the conditions of consent to operate order no -2016-2017/CPM/4564 dt 08/08/2016.
- 27 That the industry shall submit the quarterly compliance report of all the above conditions to the State Board.
- 28 That, notwithstanding 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.
- 29 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.
- 30 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 against 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





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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[ HDF ]**

**(A): Copy To:-**

- 1 Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Chittorgarh to ensure the compliance.
- 2 Master File.

**Group Incharge[ HDF ]**





Registered

File No : F(HDF)/Chittorgarh(Gangrar)/1(1)/2019-2020/3750-3753

Order No : 2019-2020/HDF/2859

Date: 16/01/2020

Unit Id : 263

M/s Hindustan Zinc Ltd.

Chandaria Lead Zinc Smelter, P.O. Putholi , Tehsil:Gangrar

District:CHITTORGARH

**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 27/04/2018 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 **Hydro Phase-I and 154 MW Power plant** situated at **Chandaria Lead Zinc Smelter, PO Putholi Chittorgarh Tehsil:Gangrar District:Chittorgarh** , Rajasthan, subject to the following conditions:-

- 1 That this Consent to Operate is valid for a period from **01/09/2018** to **31/08/2023** .
- 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
CADMIUM SPONGE	By Product	680.00 MTPA
COPPER CEMENT	By Product	510.00 MTPA
ELECTRIC POWER	Product	154.00 MW
Low Grade Lead Concentrate	By Product	30,000.00 MTPA
SULPHURIC ACID	By Product	289,000.00 MTPA
ZINC	Product	210,000.00 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.







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- 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	65.600	NIL	65.600 To be treated in STP and to be used in plantation and horticulture
Trade Effluent	3296.000	3,296.000	NIL Recycle in process

- 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
Calcine handling unit	ADEQUATE STACK HEIGHT , Bag Filter	Particulate Matter	50 mg/NM3
Preheater	ADEQUATE STACK HEIGHT , Cyclone	Particulate Matter	50 mg/NM3
Roaster start up	ADEQUATE STACK HEIGHT , Cyclone , ESP	Particulate Matter	50 mg/NM3





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Sulphuric Acid Plant	ADEQUATE STACK HEIGHT , Double Conversion Double Absorption Plant	SO2  Acid Mist	2 kg/Ton of 100 percent concentrated acid production from acid plant 50 mg/NM3
Two nos of coal fired boiler(2 X 310 TPH)( 620TPH)	ADEQUATE STACK HEIGHT , ESP	SO2 Particulate Matter NOx Hg and its compounds	600 mg/NM3 50 mg/NM3 300 mg/NM3 0.03 mg/NM3
Two nos of Zinc Melting Furnaces(300 TPD each)( 600TPD)	ADEQUATE STACK HEIGHT , Bag Filter	Particulate Matter	50 mg/NM3
Zinc Atomizing section for Zn dust	ADEQUATE STACK HEIGHT , Bag Filter	Particulate Matter	50 mg/NM3
Zinc Dross Milling	ADEQUATE STACK HEIGHT , Bag Filter	Particulate Matter	50 mg/NM3

**6** That the **Hydro Phase-I and 154 MW Power 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.





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- 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
Total Residual Chlorine	Not to exceed 1.0 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
Fecal Coliform (FC) (MPN per 100ml)	Not to exceed 1000

- 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





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Parameters	Standards
Total Suspended Solids	Not to exceed 100 mg/l
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
Total Chromium ( as Cr )	Not to exceed 2.0 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
Chlorides	Not to exceed 1000 mg/l
Sulphates	Not to exceed 1000 mg/l
pH Value	Between 6.5 to 8.5
Iron ( as Fe )	Not to exceed 1.0 mg/l
Copper ( as Cu )	Not to exceed 2.0 mg/l
Chromium (total)	Not to exceed 2.0 mg/l
Chemical Oxygen Demand	Not to exceed 250 mg/l
Phosphate (as P)	Not to exceed 5.0 mg/l





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- 9 1 That the consent to operate is valid for production of products mentioned at condition no. 2. The industry has to seek fresh consent to establish & operate for any change in product/by product/process/modification/alteration.
- 2 That total capital cost as per the C.A. certificate as on 31/03/2018 submitted by the unit is Rs. 1341.99 Crore which includes the cost of Land, Building & Plant & Machinery.
- 3 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.
- 4 That all the conditions imposed by MOE&F, New Delhi in the environmental clearance granted vide letter no.J-11011/155/2003-IA(II) T dt 31.03.2004 and letter no. J-11011/279/2006-IA.II (I) dated 06.12.2006 shall be complied with.
- 5 That total water consumption for Hydro-II & 100 MW Plant shall not exceed to 19670 KLD (Industrial purpose-5476 KLD, Domestic purpose- 82 KLD and Boiler/Cooling purpose- 14112 KLD) which shall be met from Gosunda Dam and R.O. permeate. That no ground water shall be abstracted without prior permission from the CGWA and the State Board.
- 6 That water flow meters shall be provided and maintained at all suitable points to measure quantity of water received from Gosunda Dam and water consumption for different purposes. Record of the same shall be maintained on daily basis.
- 7 That industry shall maintain sewage treatment plant (STP) of adequate capacity so as to treat the entire domestic waste water (65.6 KLD) up to the norms mentioned at condition no. 7 and treated domestic waste water shall be used for plantation with in the premises.
- 8 That the trade effluent (3296 KLD) shall be treated in the effluent treatment plant (ETP) of 8400 KLD capacity upto the norms mentioned at condition no. 8. That R.O. reject shall be disposed of through scientifically designed forced evaporation system of adequate capacity and no reject shall be disposed within or outside the premises on land, nallah, well etc
- 9 That 1200 KLD treated effluent, out of total 3296 KLD, will be used for slag granulation & lime slurry preparation and remaining treated trade effluent will be further treated through two stage reverse osmosis (R.O.) plant and R.O. permeate will be recycled/ reused in Hydro-I and Hydro- II plants.
- 10 That the industry shall complete the work of providing MEE by 31/03/2020 and R.o reject shall be disposed off through MEE from 01/04/2020 onwards positively.
- 11 That industry shall maintain logbook for recording the daily running hour of R.O. plant, permeate and reject generation.







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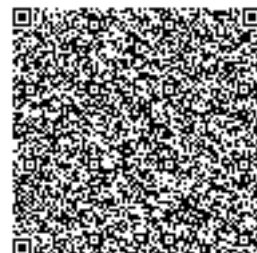
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- 10 1 That no waste water (domestic & trade effluent) shall be discharged inside or outside the factory premises in to a stream or well or sewer or on land in any case and complete zero discharge status shall be maintained.
- 2 That separate energy meter & hour meter shall be provided and maintained at all the air pollution control measures & ETP/STP/R.O. and daily record of running hours of pollution control measures and energy consumption shall be maintained in log book.
- 3 That proper logbook of Sewage Treatment Plant (STP) and Effluent Treatment Plant (ETP) shall be maintained and record of daily consumption of chemicals and running hours of STP and ETP along with daily quantity of product shall be maintained.
- 4 That flow meters shall be provided at inlet & outlet of STP, ETP & R.O. and on the pipeline for utilizing the treated effluent /sewage in process/ for plantation and daily record of the same shall be maintained.
- 5 That trained/skilled operators/supervisors shall be employed to operate the STP, ETP & R.O. plant.
- 6 That good quality of chemicals shall be used to achieve the desired results and to minimize the quantity of hazardous waste (ETP sludge).
- 7 That treated & untreated effluent carrying pipeline should be in different colors. That the guidelines of Corporate Responsibility for Environment Protection (CREP) for Lead and Zinc smelter plant shall be complied.
- 8 That for the control of fugitive emission guidelines / code of practice as issued by CPCB will be followed.
- 9 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.
- 10 That SO<sub>2</sub> emissions from Zinc Smelter plant shall be taken to the sulphuric Acid plants for proper conversion and recovery as sulphuric Acid through Double Conversion Double Absorption (DCDA) system.
- 11 That continuous Sulphur Di-Oxide monitoring system installed at Acid Plant shall be maintained properly and operated regularly. Daily record of Sulphur Di-Oxide emission shall be maintained.





Head Office (HDF )

**Rajasthan State Pollution Control Board**

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695 Fax: 0141-5159697

**Registered**

File No : F(HDF)/Chittorgarh(Gangrar)/1(1)/2019-2020/3750-3753

Order No : 2019-2020/HDF/2859

Date: 16/01/2020

Unit Id : 263

- 11 1 That adequate measures shall be taken for handling the accidental leakages of gaseous emissions (SO<sub>2</sub>) along with interlocking arrangement for corrective action and stoppage of the plant.
- 2 That the industry shall maintain adequate height of stack at all the sources of air emissions and adequate air pollution control measures so as to achieve the prescribed emission standards as per condition no.5.
- 3 That no additional source of air emission shall be installed without prior consent from the State Board.
- 4 That all the raw materials and products shall be stored in closed sheds. That dust suppression system shall be maintained to minimize fugitive dust emission in Zinc, Lead concentrate handing area & at various transfer points and closed conveyor belts shall be maintained for the transfer of material to reduce the fugitive emissions.
- 5 That in compliance of the recommendations of the inter-departmental committee formed by district Collector, the industry shall submit a proposal for the installation of water supply system ATM RO for supply of drinking water in nearby villages where concentration of NO<sub>3</sub>, Iron etc have exceeded the prescribed norms.
- 6 That the industry shall submit a bank guarantee of 100% of the total amount to be incurred on the connection of SO<sub>x</sub> and NO<sub>x</sub> parameters on the stack of CPP boiler stack to CPCB/RSPCB server within 30 days of issuance of this consent and shall also ensure that the work related to connectivity of these parameters to CPCB/RSPCB server is made within 30 days of issuance of this consent.
- 7 That additional PTZ camera connected to CPCB/RSPCB server shall be installed at jorofix ponds 2 and 3 covering the boundary wall on the side of village-Tutholi, SLF-3 etc such that the sprinkling done by tankers in the area is also included in the PTZ camera to ensure that no blowing of jarofix during winds.
- 8 That the industry shall ensure that total of meter reading of reject holding pond and the reject transported through tanker should be equal to the RO reject generated and shall maintain a log book of the same which shall be submitted to R.O Chittorgarh on monthly basis.





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File No : F(HDF)/Chittorgarh(Gangrar)/1(1)/2019-2020/3750-3753

Order No : 2019-2020/HDF/2859

Date: 16/01/2020

Unit Id : 263

- 12 1 That water sprinkling and cleaning of haul roads by vacuum cleaner shall be done regularly to control the fugitive emissions generated due to vehicular movement.
- 2 That installation of of PTZ online cameras and fog cannon for dust suppression at the coal yard connected to the CPCB/RSPCB server covering the boundary wall as well as the mist evaporation system(Lagoon)shall be ensured and appropriate lights shall be installed at places to give a clear view during night also or two such cameras can be installed if one is found inadequate.
- 3 That the industry shall install piezometric well near mist evaporator site to assess the level of ground water quality.
- 4 That the camera installed at leachate ponds should be made online and connected to CPCB/RSPCB server.
- 5 That the industry shall maintain dust collection and extraction system to control fugitive dust emissions at all the transfer points & loading/unloading areas.
- 6 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.
- 7 That the system made to avoid flow of pollutants along with rain water shall be maintained properly.
- 8 That the industry shall carryout effluent sampling/peizeometric 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 (MoE&F), Government of India.
- 9 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 daily record of sludge generation and its disposal shall be maintained.





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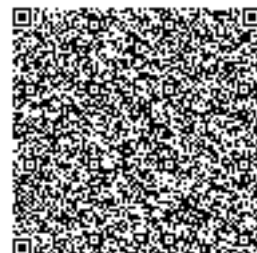
Order No : 2019-2020/HDF/2859

Date: 16/01/2020

Unit Id : 263

- 13 1 That the industry shall explore the possibility of identifying the real reasons for higher concentrations of sulphate, iron etc in ground water and carry out a geophysical investigation cum underground mapping and exploration study
- 2 That the industry shall install and maintain adequately designed rain water harvesting structure for recharge of ground water in and around the area.
- 3 That the plantation of local species in the 33% of total area of the project shall be carried out & maintained.
- 4 That the industry shall get policy renewed under Public Liability Insurance Act (PLIA) and submit its copy to the Board from time to time.
- 5 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.
- 6 That the industry shall submit the quarterly compliance report of all the above conditions to the State Board.
- 7 That the industry shall comply with all the conditions of consent to operate order no -2016-2017/CPM/4591 dt 25/08/2016.
- 14 That, notwithstanding 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.
- 15 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.
- 16 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 against 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





**Head Office (HDF )**  
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**File No : F(HDF)/Chittorgarh(Gangrar)/1(1)/2019-2020/3750-3753**

**Order No : 2019-2020/HDF/2859**

**Date: 16/01/2020**

**Unit Id : 263**

action under the relevant provisions of the said Act(s).

This bears the approval of the competent authority.

**Yours Sincerely**

**Group Incharge[ HDF ]**

**(A): Copy To:-**

- 1 P.S. to Chairperson, RSPCB, Jaipur..
- 2 Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Chittorgarh to ensure the compliance of consent conditions and installation and operation of MEE by 31/03/2020.
- 3 Master File.

**Group Incharge[ HDF ]**







Head Office (HDF )  
**Rajasthan State Pollution Control Board**  
4, Institutional Area, Jhalana Doongari, Jaipur-302 004  
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Annexure 4b(i)

Registered

File No : F(HDF)/Chittorgarh(Gangrar)/2(1)/2020-2021/6085-6087

Order No : 2020-2021/HDF/3324

Date: 26/03/2021

Unit Id : 263

M/s Hindustan Zinc Ltd.

Chandaria Lead Zinc Smelter, P.O. Putholi , Tehsil:Gangrar

District:CHITTORGARH

**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 18/01/2021 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 **Hydro Phase-I and 154 MW Power plant** situated at **Chandaria Lead Zinc Smelter, PO Putholi Chittorgarh Tehsil:Gangrar District:Chittorgarh** , Rajasthan, subject to the following conditions:-

- 1 That this Consent to Operate is valid for a period from **26/03/2021** to **28/02/2026** .
- 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
Calomel	By Product	20.00 MTPA
SHG Zinc/Ingot/Zn Alloy (Special High Grade)	Product	42,000.00 MTPA
Sodium Chloride	By Product	250.00 MTPA
SODIUM SULPHATE	By Product	1,250.00 MTPA
Sulphuric Acid	By Product	18,774.00 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.





Head Office (HDF )

**Rajasthan State Pollution Control Board**

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

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**Registered**

File No : F(HDF)/Chittorgarh(Gangrar)/2(1)/2020-2021/6085-6087

Order No : 2020-2021/HDF/3324

Date: 26/03/2021

Unit Id : 263

- 4 That the **Hydro Phase-I and 154 MW Power 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.
- 5 That this consent to establish is being issued for enhancement of production capacity of Hydro-I plant from 2,10,000 MTPA to 2,52,000 MTPA (20 % increase) in the existing plant premises by improving the current efficiency in cell house (89 % to 93%), increasing current input in cell house (190KA to 200KA) and debottlenecking of existing equipments and increasing the number of cells from 124 to 132 (8 No.) in Hydro-I cell house.
- 6 The industry has to seek fresh consent to establish for any change in product/by product/ process / service/activity and for any modification / alteration.
- 7 That additional plant & machinery shall not be installed for increase in production capacity and same will be achieved by improving the current efficiency in cell house and debottlenecking of existing equipments used for 2,10,000 MTPA production capacity & upgrading upto 2,52,000 MTPA.
- 8 That the industry shall obtain Environmental Clearance from competent authority under EIA Notification dated 14.09.2006 for taking up any such activity which attracts Environmental clearance under EIA Notification dated 14.09.2006 in future.
- 9 That the industry shall comply with all the conditions of Environmental Clearance (E.C.) issued by the Ministry of Environment, Forest & Climate Change (MoEF& CC), Government of India, vide letter no. J-11011/155/2003-IA (II) dated 31.03.2004 and J-11011/279/2006-IA.II(M) dated 06.12.2006 and 14.10.2020.
- 10 That the industry shall comply with all the revised standards for emission (SO<sub>2</sub>- 1 Kg/ Ton of Sulphuric Acid Produced, SO<sub>3</sub>/ Acid Mist- 30 mg/Nm<sup>3</sup> & PM- 30 mg/Nm<sup>3</sup>) as per Environmental Clearance (E.C.) issued by the Ministry of Environment, Forest & Climate Change (MoEF& CC), Government of India, vide letter no. J-11011/279/2006-IA.II(M) dated 14.10.2020. And, the industry shall improve/upgrade/replace the existing pollution control measures to achieve these standards, as required.
- 11 That capital investment for increase in production capacity by debottlenecking of existing equipments is Rs. 69.25 Crore as per C.A. certificate submitted by the industry.
- 12 That the industry shall comply the revised emission standards for thermal power plants as notified by MoEF, GoI New Delhi vide gazette notification dated 07/12/2015 and for this purpose the industry shall upgrade the air pollution control measures.





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**Rajasthan State Pollution Control Board**  
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**File No : F(HDF)/Chittorgarh(Gangrar)/2(1)/2020-2021/6085-6087**

**Order No : 2020-2021/HDF/3324**

**Date: 26/03/2021**

**Unit Id : 263**

- 13 That industry shall comply directions issued by Central Pollution Control Board, New Delhi on 01.02.2021 regarding time extension for compliance of new emission norms notified vide notification No. S.O.3305 (E) dated 07.12.2015.
- 14 That total water consumption and waste water generation of the industry shall not exceed from existing as allowed under consent to operate order no. 2019-2020/HDF/2859 dated 16.01.2020 due to proposed expansion in the production capacity by debottlenecking of existing equipments.
- 15 That the industry shall not abstract ground water without obtaining prior NOC/Permission from CGWA for withdrawal of ground water.
- 16 That wastewater generated from various sources shall be treated to meet standards of pH : 6.5-8.5; Total Suspended Solids: 100 mg/l; Oil & Grease: 10 mg/l; Copper: 1 mg/l; Iron: 1 mg/l; Zinc:1.0 mg/l; Free Chlorine: 0.5 mg/l; Total Chromium: 0.2 mg/l; Phosphate: 5.0 mg/l.
- 17 That no waste water (domestic & trade effluent) shall be discharged inside or outside the factory premises into a stream or well or sewer or on land in any case and complete zero discharge status shall be maintained.
- 18 That no additional source of Air/Water pollution shall be installed without prior consent to establish from the State Board.
- 19 That the guidelines on co-processing of hazardous waste in Cement/Power/Steel industries issued by Central Pollution Control Board shall be complied.
- 20 That the industry shall maintain continuous real time monitoring system at stack attached to boilers to monitor the particulate matter, Mercury & its compounds and gaseous emission levels and same shall be connected with RPCB/CPCB server.
- 21 That regular (at least once in six months) monitoring of groundwater quality in and around the ash pond area including presence of heavy metals (Hg, Cr, As, Pb, etc.) shall be carried out as per CPCB guidelines. Surface water quality monitoring shall be undertaken for major surface water bodies as per the EMP. The data so obtained should be compared with the baseline data so as to ensure that the groundwater and surface water quality is not adversely impacted due to the project and its activities.
- 22 That the industry shall carryout effluent sampling/stack monitoring/ambient air quality monitoring and submit half yearly analysis report from the State Board laboratory/laboratory recognized by Ministry of Environment, Forests & Climate Change (MoEF&CC), Government of India.
- 23 That industry shall comply with the provisions of Hazardous Waste (Management, Handling and Trans boundary Movement) Rules, 2016 and daily record of Hazardous waste generation and its disposal shall be maintained.





Head Office (HDF )

**Rajasthan State Pollution Control Board**

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

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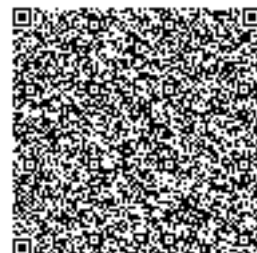
File No : F(HDF)/Chittorgarh(Gangrar)/2(1)/2020-2021/6085-6087

Order No : 2020-2021/HDF/3324

Date: 26/03/2021

Unit Id : 263

- 24 That industry will comply with all the guidelines, directions, orders and notifications issued by competent authorities' time to time and submit compliance report of the same under intimation to State Board.
- 25 i. That the industry shall ensure the compliance of all the conditions of consent to operate (existing) order no. 2019-2020/HDF/2859 dated 16.01.2020 & consent to establish (expansion) order no. 2020-2021/HDF/3286 dated 19.02.2021.
- ii. That Industry shall install tail gas treatment (TGT) with Hydro-I and Hydro-II plants and for the same a time bound action plan shall be submitted to the State Board within a period of one month.
- iii. That Industry shall install online monitoring system for lead emissions at the Pyro plant and Ausmelt plant.
- iv. That Industry shall install meters at linkage of RO-I to RO-2 to ascertain the waste water balance in the system and the water flow meters shall be installed at all suitable points to measure water consumption for different uses and record of the same shall be maintained on daily basis.
- v. That with issuance of this consent to operate, emission/ effluent standards mentioned in consent to operate issued vide order no. 2019-2020/HDF/2859 dated 16.01.2020 are hereby being revised in compliance of latest Environmental Clearance dated 14.10.2021 & industry shall comply with the same.
- 26 That the industry shall submit the quarterly compliance report of all the above conditions to the State Board.
- 27 That industry shall get done paid monitoring from Central Laboratory, RPCB within one month so as to adjudge the efficiency and adequacy of the pollution control measures to achieve new standards.
- 28 That, notwithstanding 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**.
- 29 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.





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**File No : F(HDF)/Chittorgarh(Gangrar)/2(1)/2020-2021/6085-6087**

**Order No : 2020-2021/HDF/3324**

**Date: 26/03/2021**

**Unit Id : 263**

**30** 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 against 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[ HDF ]**

**(A): Copy To:-**

- 1 Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Chittorgarh to ensure compliance of the above conditions and submit monitoring report within one month to adjudge the adequacy of pollution control measures.
- 2 Master File.

**Group Incharge[ HDF ]**







Registered

File No : F(CPM)/Chittorgarh(Gangrar)/2(1)/2016-2017/3302-3305

Order No : 2019-2020/HDF/2818

Date: 18/12/2019

Unit Id : 263

M/s Hindustan Zinc Ltd.

Chandaria Lead Zinc Smelter, P.O. Putholi , Tehsil:Gangrar

District:CHITTORGARH

**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 18/09/2018 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 **Hydro Phase-II and 100 MW Captive Power plant** situated at **Chandaria Lead Zinc Smelter, PO Putholi Putholi Tehsil:Gangrar District:Chittorgarh** , Rajasthan, subject to the following conditions:-

- 1 That this Consent to Operate is valid for a period from **01/02/2019** to **31/01/2024** .
- 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
ELECTRICITY	Product	100.00 MW
SULPHURIC ACID	By Product	850.00 TPD
ZINC	Product	210,000.00 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.
- 4 That the quantity of effluent generation along with mode of disposal for the treated effluent shall be as under:





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**File No : F(CPM)/Chittorgarh(Gangrar)/2(1)/2016-2017/3302-3305**

**Order No : 2019-2020/HDF/2818**

**Date: 18/12/2019**

**Unit Id : 263**

Type of effluent	Max. effluent generation (KLD)	Recycled Qty of Effluent (KLD)	Disposed Qty of effluent (KLD)and mode of disposal
Domestic Sewage	82.000	82.000	NIL On land for Plantation/ Horticulture inside the factory premises
Trade Effluent	2352.000	NIL	2,352.000 Reuse in Process

- 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
One Coal Fired Boiler( 320TPH)	ADEQUATE STACK HEIGHT , ESP	SO2 Particulate Matter NOx Hg and its compounds	600 mg/NM3 50 mg/NM3 300 mg/NM3 0.03 mg/NM3
One no of coal crusher(common for 154 MW and 100 MW CPP)( 210TPH)	ADEQUATE STACK HEIGHT , Bag Filter	Particulate Matter	50 mg/NM3
Pre-heater	ADEQUATE STACK HEIGHT	Particulate Matter	50 mg/NM3





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**Order No : 2019-2020/HDF/2818**

**Date: 18/12/2019**

**Unit Id : 263**

Roaster start up	ADEQUATE STACK HEIGHT , Cyclone	Particulate Matter	50 mg/NM3
Sulphuric Acid Plant	ADEQUATE AIR POLLUTION CONTROL MEASURES , ADEQUATE STACK HEIGHT	SO2  Acid Mist	2 kg/Ton of 100 percent concentrated acid production from acid plant 50 mg/NM3
Two nos of Melting induction furnaces(600 TPD each)( 1200TPD)	ADEQUATE STACK HEIGHT , Bag Filter	Particulate Matter	50 mg/NM3
Zinc Atomizing section for Zn dust with 04 furnaces each having 8 TPD capacity( 32TPD)	ADEQUATE STACK HEIGHT , Bag Filter	Particulate Matter	50 mg/NM3
Zinc Dross Milling	ADEQUATE STACK HEIGHT , Bag Filter	Particulate Matter	50 mg/NM3

**6** That the **Hydro Phase-II and 100 MW Captive Power 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.





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**File No : F(CPM)/Chittorgarh(Gangrar)/2(1)/2016-2017/3302-3305**

**Order No : 2019-2020/HDF/2818**

**Date: 18/12/2019**

**Unit Id : 263**

- 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
Oil and Grease	Not to exceed 10 mg/l
Total Residual Chlorine	Not to exceed 1.0 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
pH Value	Between 6.5 to 9.0
Chemical Oxygen Demand	Not to exceed 250 mg/l
Fecal Coliform (FC) (MPN per 100ml)	Not to exceed 1000

- 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





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**File No :** F(CPM)/Chittorgarh(Gangrar)/2(1)/2016-2017/3302-3305

**Order No :** 2019-2020/HDF/2818

**Date:** 18/12/2019

**Unit Id :** 263

Parameters	Standards
Total Suspended Solids	Not to exceed 100 mg/l
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
Total Chromium ( as Cr )	Not to exceed 2.0 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
Chlorides	Not to exceed 1000 mg/l
Sulphates	Not to exceed 1000 mg/l
pH Value	Between 6.5 to 8.5
Iron ( as Fe )	Not to exceed 1.0 mg/l
Copper ( as Cu )	Not to exceed 2.0 mg/l
Chemical Oxygen Demand	Not to exceed 250 mg/l
Phosphate (as P)	Not to exceed 5.0 mg/l

- 9 That the consent to operate is valid for production of products mentioned at condition no. 2. The industry has to seek fresh consent to establish & operate for any change in product/by product/process/modification/alteration.
- 10 That total capital cost as per the C.A. certificate as on 31/03/2019 submitted by the unit is Rs. 1305.33 Crore which includes the cost of Land, Building & Plant & Machinery.







Head Office (HDF )

**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)/Chittorgarh(Gangrar)/2(1)/2016-2017/3302-3305

Order No : 2019-2020/HDF/2818

Date: 18/12/2019

Unit Id : 263

- 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.
- 12 That all the conditions imposed by MOE&F, New Delhi in the environmental clearance granted vide letter no. J-11011/279/2006-IA.II (I) dated 06.12.2006 shall be complied with.
- 13 That total water consumption for Hydro-II & 100 MW Plant shall not exceed to 11,000 KLD (Industrial purpose-1704 KLD, Domestic purpose- 108 KLD and Cooling purpose- 9188 KLD) which shall be met from Gosunda Dam and R.O. permeate.
- 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 Gosunda Dam and water consumption for different purposes. Record of the same shall be maintained on daily basis.
- 16 That industry shall maintain sewage treatment plant (STP) of adequate capacity so as to treat the entire domestic waste water (82 KLD) up to the norms mentioned at condition no. 7 and treated domestic waste water shall be used for plantation with in the premises.
- 17 That the trade effluent (2352 KLD) shall be treated in the effluent treatment plant (ETP) of 4200 KLD capacity upto the norms mentioned at condition no. 8.
- 18 That 26 KLD treated effluent, out of total 2352 KLD, will be used for lime slurry preparation and remaining treated trade effluent will be further treated through two stage reverse osmosis (R.O.) plant and R.O. permeate will be recycled/ reused in Hydro-I and Hydro- II plants.
- 19 That R.O. reject shall be disposed of through scientifically designed forced evaporation system of adequate capacity and no reject shall be disposed within or outside the premises on land, nallah, well etc.
- 20 That the industry shall complete th work of providing MEE by 31/03/2020 and R.o reject shall be disposed off through MEE from 01/04/2020 onwards positively.
- 21 That industry shall maintain logbook for recording the daily running hour of R.O. plant, permeate and reject generation.
- 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 daily record of running hours of pollution control measures and energy consumption shall be maintained in log book.





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**Registered**

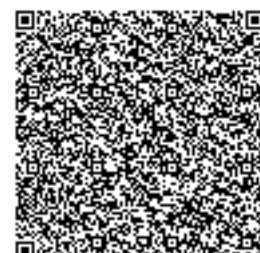
File No : F(CPM)/Chittorgarh(Gangrar)/2(1)/2016-2017/3302-3305

Order No : 2019-2020/HDF/2818

Date: 18/12/2019

Unit Id : 263

- 24 That proper logbook of Sewage Treatment Plant (STP) and Effluent Treatment Plant (ETP) shall be maintained and record of daily consumption of chemicals and running hours of STP and ETP along with daily quantity of product shall be maintained.
- 25 That flow meters shall be provided at inlet & outlet of STP, ETP & R.O. and on the pipeline for utilizing the treated effluent /sewage in process/ for plantation and daily record of the same shall be maintained.
- 26 That trained/skilled operators/supervisors shall be employed to operate the STP, ETP & R.O. plant.
- 27 That good quality of chemicals shall be used to achieve the desired results and to minimize the quantity of hazardous waste (ETP sludge).
- 28 That treated & untreated effluent carrying pipeline should be in different colors. That the guidelines of Corporate Responsibility for Environment Protection (CREP) for Lead and Zinc smelter plant shall be complied.
- 29 That for the control of fugitive emission guidelines / code of practice as issued by CPCB will be followed.
- 30 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.
- 31 That SO<sub>2</sub> emissions from Zinc Smelter plant shall be taken to the sulphuric Acid plants for proper conversion and recovery as sulphuric Acid through Double Conversion Double Absorption (DCDA) system.
- 32 That continuous Sulphur Di-Oxide monitoring system installed at Acid Plant shall be maintained properly and operated regularly. Daily record of Sulphur Di-Oxide emission shall be maintained.
- 33 That adequate measures shall be taken for handling the accidental leakages of gaseous emissions (SO<sub>2</sub>) along with interlocking arrangement for corrective action and stoppage of the plant.
- 34 That the industry shall maintain adequate height of stack at all the sources of air emissions and adequate air pollution control measures so as to achieve the prescribed emission standards as per condition no.5.
- 35 That no additional source of air emission shall be installed without prior consent from the State Board.
- 36 That all the raw materials and products shall be stored in closed sheds. That dust suppression system shall be maintained to minimize fugitive dust emission in Zinc, Lead concentrate handling area & at various transfer points and closed conveyor belts shall be maintained for the transfer of material to reduce the fugitive emissions.





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Order No : 2019-2020/HDF/2818

Date: 18/12/2019

Unit Id : 263

- 37 That in compliance of the recommendations of the inter-departmental committee formed by district Collector, the industry shall submit a proposal for the installation of water supply system ATM RO for supply of drinking water in nearby villages where concentration of NO<sub>3</sub>, Iron etc have exceeded the prescribed norms.
- 38 That the industry shall submit a bank guarantee of 100% of the total amount to be incurred on the connection of SO<sub>x</sub> and NO<sub>x</sub> parameters on the stack of CPP boiler stack to CPCB/RSPCB server within 30 days of issuance of this consent and shall also ensure that the work related to connectivity of these parameters to CPCB/RSPCB server is made within 30 days of issuance of this consent.
- 39 That additional PTZ camera connected to CPCB/RSPCB server shall be installed at jorofix ponds 2 and 3 covering the boundary wall on the side of village-Tutholi, SLF-3 etc such that the sprinkling done by tankers in the area is also included in the PTZ camera to ensure that no blowing of jarofix during winds.
- 40 That the industry shall ensure that total of meter reading of reject holding pond and the reject transported through tanker should be equal to the RO reject generated and shall maintain a log book of the same which shall be submitted to R.O Chittorgarh on monthly basis.
- 41 That water sprinkling and cleaning of haul roads by vacuum cleaner shall be done regularly to control the fugitive emissions generated due to vehicular movement.
- 42 That installation of of PTZ online cameras and fog cannon for dust suppression at the coal yard connected to the CPCB/RSPCB server covering the boundary wall as well as the mist evaporation system(Lagoon)shall be ensured and appropriate lights shall be installed at places to give a clear view during night also or two such cameras can be installed if one is found inadequate.
- 43 That the industry shall install piezometric well near mist evaporator site to assess the level of ground water quality.
- 44 That the camera installed at leachate ponds should be made online and connected to CPCB/RSPCB server.
- 45 That the industry shall maintain dust collection and extraction system to control fugitive dust emissions at all the transfer points & loading/unloading areas.
- 46 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.
- 47 That the system made to avoid flow of pollutants along with rain water shall be maintained properly.





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Order No : 2019-2020/HDF/2818

Date: 18/12/2019

Unit Id : 263

- 48 That the industry shall carryout effluent sampling/peizeometric 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 (MoE&F), Government of India.
- 49 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 daily record of sludge generation and its disposal shall be maintained.
- 50 That the industry shall explore the possibility of identifying the real reasons for higher concentrations of sulphate, iron etc in ground water and carry out a geophysical investigation cum underground mapping and exploration study
- 51 That the industry shall install and maintain adequately designed rain water harvesting structure for recharge of ground water in and around the area.
- 52 That the plantation of local species in the 33% of total area of the project shall be carried out & maintained.
- 53 That the industry shall get policy renewed under Public Liability Insurance Act (PLIA) and submit its copy to the Board from time to time.
- 54 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.
- 55 That the industry shall submit the quarterly compliance report of all the above conditions to the State Board.
- 56 That the industry shall comply with all the conditions of consent to operate order no -2016-2017/CPM/4565 dt 03/08/2016.
- 57 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.
- 58 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.





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**Registered**

**File No : F(CPM)/Chittorgarh(Gangrar)/2(1)/2016-2017/3302-3305**

**Order No : 2019-2020/HDF/2818**

**Date: 18/12/2019**

**Unit Id : 263**

59 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 against 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[ HDF ]**

**(A): Copy To:-**

- 1 P.S. to Chairperson, RSPCB, Jaipur..
- 2 Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Chittorgarh to ensure the compliance and installation and operation of MEE by 31/03/2020.
- 3 Master File.

**Group Incharge[ HDF ]**







Head Office (HDF )  
**Rajasthan State Pollution Control Board**  
4, Institutional Area, Jhalana Doongari, Jaipur-302 004  
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Annexure 4c(i)

Registered

File No : F(HDF)/Chittorgarh(Gangrar)/2(1)/2020-2021/6088-6090

Order No : 2020-2021/HDF/3325

Date: 26/03/2021

Unit Id : 263

M/s Hindustan Zinc Ltd.

Chandaria Lead Zinc Smelter, P.O. Putholi , Tehsil:Gangrar

District:CHITTORGARH

**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 18/01/2021 and subsequent correspondence.

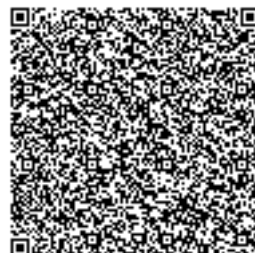
Sir,

**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 **Hydro Phase-II and 100 MW Captive Power plant** situated at **Chandaria Lead Zinc Smelter, PO Putholi Putholi Tehsil:Gangrar District:Chittorgarh** , Rajasthan, subject to the following conditions:-

- 1 That this Consent to Operate is valid for a period from **26/03/2021** to **28/02/2026** .
- 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
Calomel	By Product	20.00 MTPA
SHG Zinc/Ingot/Zn Alloy (Special High Grade)	Product	42,000.00 MTPA
Sodium Chloride	By Product	250.00 MTPA
SODIUM SULPHATE	By Product	1,250.00 MTPA
Sulphuric Acid	By Product	18,774.00 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.





Head Office (HDF )

**Rajasthan State Pollution Control Board**

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695 Fax: 0141-5159697

**Registered**

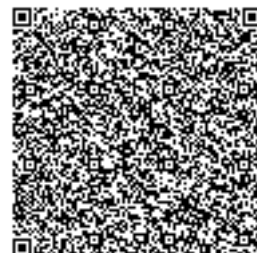
File No : F(HDF)/Chittorgarh(Gangrar)/2(1)/2020-2021/6088-6090

Order No : 2020-2021/HDF/3325

Date: 26/03/2021

Unit Id : 263

- 4 That the Hydro Phase-II and 100 MW Captive Power 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.
- 5 That this consent to operate is being issued for enhancement of production capacity of Hydro-II plant from 2,10,000 MTPA to 2,52,000 MTPA (20 % increase) in the existing plant premises by improving the current efficiency in cell house (89 % to 93%), increasing current input in cell house (190KA to 200KA) and debottlenecking of existing equipments.
- 6 The industry has to seek fresh consent to establish for any change in product/by product/ process / service/activity and for any modification / alteration.
- 7 That additional plant & machinery shall not be installed for increase in production capacity and same will be achieved by improving the current efficiency in cell house and debottlenecking of existing equipments used for 2,10,000 MTPA production capacity & upgrading upto 2,52,000 MTPA.
- 8 That the industry shall obtain Environmental Clearance from competent authority under EIA Notification dated 14.09.2006 for taking up any such activity which attracts Environmental clearance under EIA Notification dated 14.09.2006 in future.
- 9 That the industry shall comply with all the conditions of Environmental Clearance (E.C.) issued by the Ministry of Environment, Forest & Climate Change (MoEF& CC), Government of India, vide letter no. J-11011/279/2006-IA.II(M) dated 06.12.2006 and 14.10.2020.
- 10 That the industry shall comply with all the revised standards for emission (SO<sub>2</sub>- 1 Kg/ Ton of Sulphuric Acid Produced, SO<sub>3</sub>/ Acid Mist- 30 mg/Nm<sup>3</sup> & PM- 30 mg/Nm<sup>3</sup>) as per Environmental Clearance (E.C.) issued by the Ministry of Environment, Forest & Climate Change (MoEF& CC), Government of India, vide letter no. J-11011/279/2006-IA.II(M) dated 14.10.2020. And, the industry shall improve/upgrade/replace the existing pollution control measures to achieve these standards, as required.
- 11 That capital investment for increase in production capacity by debottlenecking of existing equipments is Rs. 69.25 Crore as per C.A. certificate submitted by the industry.
- 12 That the industry shall comply the revised emission standards for thermal power plants as notified by MoEF, GoI New Delhi vide gazette notification dated 07/12/2015 and for this purpose the industry shall upgrade the air pollution control measures (if required).





Head Office (HDF )

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File No : F(HDF)/Chittorgarh(Gangrar)/2(1)/2020-2021/6088-6090

Order No : 2020-2021/HDF/3325

Date: 26/03/2021

Unit Id : 263

- 13 That industry shall comply directions issued by Central Pollution Control Board, New Delhi on 01.02.2021 regarding time extension for compliance of new emission norms notified vide notification No. S.O.3305 (E) dated 07.12.2015.
- 14 That total water consumption and waste water generation of the industry shall not exceed from existing as allowed under consent to operate order no 2019-2020/HDF/2818 dated 18.12.2019 due to proposed expansion in the production capacity by debottlenecking of existing equipments.
- 15 That the industry shall not abstract ground water without obtaining prior NOC/Permission from CGWA for withdrawal of ground water.
- 16 That wastewater generated from various sources shall be treated to meet standards of pH : 6.5-8.5; Total Suspended Solids: 100 mg/l; Oil & Grease: 10 mg/l; Copper: 1 mg/l; Iron: 1 mg/l; Zinc:1.0 mg/l; Free Chlorine: 0.5 mg/l; Total Chromium: 0.2 mg/l; Phosphate: 5.0 mg/l.
- 17 That no waste water (domestic & trade effluent) shall be discharged inside or outside the factory premises into a stream or well or sewer or on land in any case and complete zero discharge status shall be maintained.
- 18 That no additional source of Air/Water pollution shall be installed without prior consent to establish from the State Board.
- 19 That the guidelines on co-processing of hazardous waste in Cement/Power/Steel industries issued by Central Pollution Control Board shall be complied.
- 20 That the industry shall maintain continuous real time monitoring system at stack attached to boilers to monitor the particulate matter, Mercury & its compounds and gaseous emission levels and same shall be connected with RPCB/CPCB server.
- 21 That regular (at least once in six months) monitoring of groundwater quality in and around the ash pond area including presence of heavy metals (Hg, Cr, As, Pb, etc.) shall be carried out as per CPCB guidelines. Surface water quality monitoring shall be undertaken for major surface water bodies as per the EMP. The data so obtained should be compared with the baseline data so as to ensure that the groundwater and surface water quality is not adversely impacted due to the project and its activities.
- 22 That the industry shall carryout effluent sampling/stack monitoring/ambient air quality monitoring and submit half yearly analysis report from the State Board laboratory/laboratory recognized by Ministry of Environment, Forests & Climate Change (MoEF&CC), Government of India.
- 23 That industry shall comply with the provisions of Hazardous Waste (Management, Handling and Trans boundary Movement) Rules, 2016 and daily record of Hazardous waste generation and its disposal shall be maintained.





Head Office (HDF )

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Order No : 2020-2021/HDF/3325

Date: 26/03/2021

Unit Id : 263

- 24 That industry will comply with all the guidelines, directions, orders and notifications issued by competent authorities' time to time and submit compliance report of the same under intimation to State Board.
- 25 i. That the industry shall ensure the compliance of all the conditions of consent to operate (existing) order no. 2019-2020/HDF/2818 dated 18.12.2019 & consent to establish (expansion) order no. 2020-2021/HDF/3287 dated 23.02.2021.
- ii. That Industry shall install tail gas treatment (TGT) with Hydro-I and Hydro-II plants and for the same a time bound action plan shall be submitted to the State Board within a period of one month.
- iii. That Industry shall install online monitoring system for lead emissions at the Pyro plant and Ausmelt plant.
- iv. That Industry shall install meters at linkage of RO-I to RO-2 to ascertain the waste water balance in the system and the water flow meters shall be installed at all suitable points to measure water consumption for different uses and record of the same shall be maintained on daily basis.
- v. That with issuance of this consent to operate, emission/ effluent standards mentioned in consent to operate issued vide order no. 2019-2020/HDF/2818 dated 18.12.2019 are hereby being revised in compliance of latest Environmental Clearance dated 14.10.2021 & industry shall comply with the same.
- 26 That the industry shall submit the quarterly compliance report of all the above conditions to the State Board.
- 27 That industry shall get done paid monitoring from Central Laboratory, RPCB within one month so as to adjudge the efficiency and adequacy of the pollution control measures to achieve new standards.
- 28 That, notwithstanding 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**.
- 29 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 (HDF )**  
**Rajasthan State Pollution Control Board**  
**4, Institutional Area, Jhalana Doongari, Jaipur-302 004**  
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**File No : F(HDF)/Chittorgarh(Gangrar)/2(1)/2020-2021/6088-6090**

**Order No : 2020-2021/HDF/3325**

**Date: 26/03/2021**

**Unit Id : 263**

**30** 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 against 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[ HDF ]**

**(A): Copy To:-**

- 1 Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Chittorgarh to ensure compliance of the above conditions and submit monitoring report within one month to adjudge the adequacy of pollution control measures.
- 2 Master File.

**Group Incharge[ HDF ]**







**Head Office (HDF )**  
**Rajasthan State Pollution Control Board**  
**4, Institutional Area, Jhalana Doongari, Jaipur-302 004**  
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**Registered**

Annexure 4d

**File No : F(HDF)/Chittorgarh(Gangrar)/1(1)/2019-2020/252-254**

**Order No : 2020-2021/HDF/3009**

**Date: 08/05/2020**

**Unit Id : 263**

**M/s Hindustan Zinc Ltd.**

**Chandaria Lead Zinc Smelter, P.O. Putholi , Tehsil:Gangrar**

**District:CHITTORGARH**

**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 09/01/2018 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 **Fumer Plant (Pyro Metallurgical fuming Process)** within existing **Hydro Zinc Smelter Phase-II plant** situated at **Chandaria Lead Zinc Smelter, PO Putholi Putholi Tehsil:Gangrar District:Chittorgarh** , Rajasthan, subject to the following conditions:-

- 1 That this Consent to Operate is valid for a period from **30/04/2020** to **31/03/2025** .
- 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
COPPER SPEISS/COPPER RESIDUE	By Product	700.00 MTPA
Lead Silver Cake	By Product	16,000.00 MTPA
POWER GENERATION	Product	21.00 MWH
Slag	Product	150,000.00 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:





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**Rajasthan State Pollution Control Board**  
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**Registered**

**File No : F(HDF)/Chittorgarh(Gangrar)/1(1)/2019-2020/252-254**

**Order No : 2020-2021/HDF/3009**

**Date: 08/05/2020**

**Unit Id : 263**

Type of effluent	Max. effluent generation (KLD)	Recycled Qty of Effluent (KLD)	Disposed Qty of effluent (KLD) and mode of disposal
Domestic Sewage	25.000	NIL	25.000 To be treated in STP and to be used in plantation and horticulture
Trade Effluent	150.000	150.000	NIL Reuse In Process or Solar Evaporation

- 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
COAL PULVERISER( 60521NM <sup>3</sup> /HR.)	Bag Filter	--  Particulate Matter	--  50 mg/Nm <sup>3</sup>
FUMING FURNACE( 178500NM <sup>3</sup> /HR.)	Bag Filter	SO <sub>2</sub> Particulate Matter NO <sub>x</sub>	600 mg/Nm <sup>3</sup> 50 mg/Nm <sup>3</sup> 300 mg/Nm <sup>3</sup>
OFF GASSES( 235902NM <sup>3</sup> /HR.)	Scrubber	Particulate Matter	50 mg/Nm <sup>3</sup>

RMH STACK( 3000NM<sup>3</sup>/HR.)      Bag Filter





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		Particulate Matter	50 mg/Nm <sup>3</sup>
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6 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
Total Residual Chlorine	Not to exceed 1.0 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
Fecal Coliform (FC) (MPN per 100ml)	Not to exceed 1000

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





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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
Hexavalent Chromium ( as Cr+6 )	Not to exceed 0.1 mg/l
Total Chromium ( as Cr )	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
Iron ( as Fe )	Not to exceed 3.0 mg/l
Chlorides	Not to exceed 1000 mg/l
Sulphates	Not to exceed 1000 mg/l
Chemical Oxygen Demand	Not to exceed 250 mg/l
Phosphate (as P)	Not to exceed 5.0 mg/l

- 8 That this consent to operate is being issued for operation of fumer plant and generation of 21 MW power within the existing zinc smelter & CPP i.e. (Hydro-II plant) to convert Jarosite into slag. The industry has to seek fresh consent to establish & operate for any change in product/by product/process/ modification/ alteration/activity/services.





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- 9 That total proposed capital investment as per the CA certificate submitted by the unit is Rs 580 Cr. which includes the cost of Building and Plant & Machinery.
- 10 That the industry shall comply with all the conditions of Environmental Clearance (E.C.) issued by Ministry of Environment, Forests and Climate Change (MoEF&CC), Government of India vide letter no. J-11011/279/2006-IA II(I) dated 05.10.2015.
- 11 The total water requirement for the fumer plant is about 2400 KLD which would be within the stipulated water requirement (11000 KLD) of the existing Hydro-II plant water requirement including 100 MW CPP which shall be sourced from Gosunda Dam.
- 12 That no ground water shall be abstracted without prior permission from CGWA & the State Board.
- 13 That water flow meters shall be provided at all suitable points to measure quantity of daily water received from Gosunda Dam and water consumption for different purposes. Record of the same shall be maintained on daily basis.
- 14 That the trade effluent (150 KLD) generated from fumer plant shall be treated through existing effluent treatment plant (ETP) of 4200 KLD capacity along with trade effluent generated from Hydro-II & 100 MW CPP up to the norms mentioned at condition no 8.
- 15 That quantity of total trade effluent generation from existing Hydro-II plant, CPP (100 MW) and fumer plant will not exceed to 2352 KLD as allowed under consent to operate order no.2016-2017/CPM/4565 dated 03.08.2016.
- 16 That treated trade effluent will be further treated through two stage Reverse Osmosis (RO) plant and R.O. permeate shall be recycled/reused.
- 17 That R.O. reject shall be disposed of through scientifically designed forced evaporation system of adequate capacity and no reject shall be discharged within or out side the premises on land, nallah well etc.
- 18 That no treated/untreated waste water (domestic & trade effluent) shall be discharged outside the factory premises on land or into sewer or well or stream in any case and complete zero discharge status shall be maintained.
- 19 That industry shall provide stack of adequate height and adequate air pollution control measures at all the sources of air emission to achieve the prescribed standards/norms.
- 20 That adequate infrastructure facility shall be provided for stack emission monitoring at the stacks of off gases, Fuming furnace, RMH Stack and Coal Pulveriser.
- 21 That industry shall provide continuous online monitoring system at all the major stacks of fumer plant.







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- 22 That no additional source of Air/Water pollution shall be installed without prior consent to operate from the State Board.
- 23 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.
- 24 That industry shall comply with the provisions of Hazardous & others Waste (Management, & Transboundary Movement) Rules, 2016 and record of daily hazardous waste generation shall be maintained.
- 25 That the industry shall install adequately designed rain water harvesting structure for recharge of ground water in and around the area.
- 26 That the plantation of local species in the 33% of total area of the project shall be carried out.
- 27 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.
- 28 That petcoke and furnace oil shall not be utilized within the premises in compliance of Hon'ble Supreme Court Orders dated 24/10/2017.
- 29 That no additional machinery shall be installed without prior permission from the State Board.
- 30 That the industry shall not install any additional machinery/ or any activity that attracts the provisions of EIA Notification, 2006 without permission from competent authority.
- 31 That the industry shall not produce jarosite from hydor-II after commencement of Fumer Plant.
- 32 That industry shall comply all the conditions imposed in consent to operate order no 2019-2020/HDF/2859 dated 16/01/2020.
- 33 That, notwithstanding 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**.
- 34 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.





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35 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 against 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[ HDF ]**

**(A): Copy To:-**

- 1 Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Chittorgarh to ensure the compliance.
- 2 Master File.

**Group Incharge[ HDF ]**





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Annexure 4e

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**M/s Hindustan Zinc Ltd.**

**Chandaria Lead Zinc Smelter, P.O. Putholi , Tehsil:Gangrar**

**District:CHITTORGARH**

**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 27/04/2018 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 **Ausmelt Lead plant** situated at **Chandaria Lead Zinc Smelter, PO Putholi Tehsil:Gangrar District:Chittorgarh** , Rajasthan, subject to the following conditions:-

- 1 That this Consent to Operate is valid for a period from **01/09/2018** to **31/08/2023** .
- 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
COPPER SULPHATE	By Product	24.00 MT/DAY
LEAD	Product	182.00 MT/DAY(MAX UPTO 60000 TPA)
SILVER	By Product	287.00 KG/DAY
SULPHURIC ACID	By Product	153.00 MT/DAY
ZINC RICH DUST	By Product	20.00 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:



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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	12.000	NIL	12.000 To be treated in STP and to be used in plantation and horticulture
Trade Effluent	450.000	NIL	450.000 Recycled in the process, Plantation or other uses within premises

- 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
DUST EXTRACTION SYSTEM -Raw Material Handling( 75000NM <sup>3</sup> /HR.)	ADEQUATE STACK HEIGHT , Bag Filter	Particulate Matter Lead	50 mg/NM3 10 mg/NM3
LEAD SMELTER BUILDING (HYGIENE & VENTILATION) BAG FILTER( 33000NM <sup>3</sup> /HR.)	ADEQUATE STACK HEIGHT , Bag Filter	Particulate Matter Lead	50 mg/NM3 10 mg/NM3



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- 6 That the **Ausmelt Lead 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 Environment (Protection) Act-1986 for disposal **Into Inland Surface Water**. The main parameters for regular monitoring shall be as under.





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Parameters	Standards
Total Suspended Solids	Not to exceed 100 mg/l
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
pH Value	Between 6.5 to 8.5
Chemical Oxygen Demand	Not to exceed 250 mg/l
Nitrate (as NO <sub>3</sub> )	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



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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
Total Chromium ( as Cr )	Not to exceed 2.0 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
Chlorides	Not to exceed 1000 mg/l
Sulphates	Not to exceed 1000 mg/l
Iron ( as Fe )	Not to exceed 1.0 mg/l
Copper ( as Cu )	Not to exceed 2.0 mg/l
Chemical Oxygen Demand	Not to exceed 250 mg/l
Phosphate (as P)	Not to exceed 5.0 mg/l

- 9 That the consent to operate is valid for production of products mentioned at condition no. 2. The industry has to seek fresh consent to establish & operate for any change in product/by product/process/modification/alteration.
- 10 That total capital cost as per the C.A. certificate submitted by the unit is Rs. 167.13 Crore which includes the cost of Land, Building & Plant & Machinery.
- 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-11011/17/2005-IA.II (I) dated 03.08.2005 shall be complied with.
- 13 That total water consumption for Ausmelt Plant shall not exceed to 2,300 KLD (Industrial purpose-170 KLD, Domestic purpose- 20 KLD and Cooling purpose- 2110 KLD) which shall be met from Gosunda Dam.
- 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 Gosunda Dam and water consumption for different purposes. Record of the same shall be maintained on daily basis.
- 16 That industry shall maintain sewage treatment plant (STP) of adequate capacity so as to treat the entire domestic waste water (12 KLD) up to the norms mentioned at condition no. 7 and treated domestic waste water shall be used for plantation with in the premises.
- 17 That the trade effluent (450 KLD) shall be treated in the effluent treatment plant (ETP) of 8400 KLD capacity along with trade effluent generated from the Pyro Plant (1500 KLD) and Hydro - I (3296 KLD) upto the norms mentioned at condition no. 8.
- 18 That 1200 KLD, out of total 5246 KLD of treated trade effluent, will be used for Slag Granulation and Lime slurry preparation and remaining treated trade effluent will be further treated through two stage reverse osmosis (R.O.) plants and R.O. permeate will be recycled/ reused in the process within the premises.
- 19 That R.O. reject shall be disposed off through scientifically designed forced evaporation system of adequate capacity and no reject shall be disposed within or outside the premises on land, nallah, well etc.
- 20 That industry shall maintain logbook for recording the daily running hour of R.O. plant, permeate and reject generation.
- 21 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.
- 22 That separate energy meter & hour meter shall be provided and maintained at all the air pollution control measures & ETP/STP/R.O. and daily record of running hours of pollution control measures and energy consumption shall be maintained in log book.



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- 23 That proper logbook of Sewage Treatment Plant (STP) and Effluent Treatment Plant (ETP) shall be maintained and record of daily consumption of chemicals and running hours of STP and ETP along with daily quantity of product shall be maintained.
- 24 That flow meters shall be provided at inlet & outlet of STP, ETP & R.O. and on the pipeline for utilizing the treated effluent /sewage in process/ for plantation and daily record of the same shall be maintained.
- 25 That trained/skilled operators/supervisors shall be employed to operate the STP, ETP & R.O. plant.
- 26 That good quality of chemicals shall be used to achieve the desired results and to minimize the quantity of hazardous waste (ETP sludge).
- 27 That treated & untreated effluent carrying pipeline should be in different colors. That all the recommendation made in the charter of Corporate Responsibility for Environment Protection (CREP) for Lead and Zinc smelter plant shall be implemented and complied.
- 28 That for the control of fugitive emission guidelines / code of practice as issued by CPCB will be followed.
- 29 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.
- 30 That SO<sub>2</sub> emissions from lead 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.
- 31 That continuous Sulphur Di-Oxide monitoring system installed at Acid Plant shall be maintained properly and operated regularly. Daily record of Sulphur Di-Oxide emission shall be maintained.
- 32 That adequate measures shall be taken for handling the accidental leakages of gaseous emissions (SO<sub>2</sub>) along with interlocking arrangement for corrective action and stoppage of the plant.
- 33 That the industry shall maintain adequate height of stack at all the sources of air emissions and adequate air pollution control measures so as to achieve the prescribed emission standards as per condition no.5.
- 34 That adequate infrastructure facility for stack emission monitoring shall be maintained at all the major stacks.
- 35 That no additional source of air emission shall be installed without prior consent from the State Board.
- 36 That all the raw materials and products shall be stored in closed sheds.



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- 37 That dust suppression system shall be maintained to minimize fugitive dust emission in Zinc, Lead concentrate handling area & at various transfer points and closed conveyor belts shall be maintained for the transfer of material to reduce the fugitive emissions.
- 38 That water sprinkling and cleaning of haul roads by vacuum cleaner shall be done regularly to control the fugitive emissions generated due to vehicular movement.
- 39 That the industry shall maintain dust collection and extraction system to control fugitive dust emissions at all the transfer points & loading/unloading areas.
- 40 That in compliance of the recommendations of the inter-departmental committee formed by District Collector, the industry shall submit a proposal for the installation of water supply system ATM RO for supply of drinking water in nearby villages where concentration of NO<sub>3</sub>, Iron etc have exceeded the prescribed norms.
- 41 That additional PTZ camera connected to CPCB/RSPCB server shall be installed at jorofix ponds 2 and 3 covering the boundary wall on the side of village-Putholi, SLF-3 etc such that the sprinkling done by tankers in the area is also included in the PTZ camera to ensure that no blowing of jarofix during winds.
- 42 That the industry shall ensure that total of meter reading of reject holding pond and the reject transported through tanker should be equal to the RO reject generated and shall maintain a log book of the same which shall be submitted to R.O Chittorgarh on monthly basis.
- 43 That installation of of PTZ online cameras and fog cannon for dust suppression at the coal yard connected to the CPCB/RSPCB server covering the boundary wall as well as the mist evaporation system(Lagoon)shall be ensured and appropriate lights shall be installed at places to give a clear view during night also or two such cameras can be installed if one is found inadequate.
- 44 That the industry shall install piezometric well near mist evaporator site to assess the level of ground water quality.
- 45 That the camera installed at leachate ponds should be made online and connected to CPCB/RSPCB server.
- 46 That the industry shall explore the possibility of identifying the real reasons for higher concentrations of sulphate, iron etc in ground water and carry out a geophysical investigation cum underground mapping and exploration study.
- 47 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.
- 48 That the system made to avoid flow of pollutants along with rain water shall be maintained properly.





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- 49 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 & Climate Change (MoEF&CC), Government of India.
- 50 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 daily record of sludge generation and its disposal shall be maintained.
- 51 That the industry shall install and maintain adequately designed rain water harvesting structure for recharge of ground water in and around the area.
- 52 That the plantation of local species in the 33% of total area of the project shall be carried out & maintained.
- 53 That the industry shall get policy renewed under Public Liability Insurance Act (PLIA) and submit its copy to the Board from time to time.
- 54 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.
- 55 That the industry shall comply with all the conditions of consent to operate order no -2016-2017/CPM/4590 dt 25/08/2016.
- 56 That the industry shall submit the quarterly compliance report of all the above conditions to the State Board.
- 57 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.
- 58 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.
- 59 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 against 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



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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[ HDF ]**

**(A): Copy To:-**

- 1 Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Chittorgarh to ensure the compliance.
- 2 Master File.

**Group Incharge[ HDF ]**



Annexure 4f

Registered

File No : F(HDF)/Chittorgarh(Gangrar)/1(1)/2019-2020/1006-1008  
Order No : 2020-2021/HDF/3068  
Unit Id : 263  
M/s Hindustan Zinc Ltd.  
Chandaria Lead Zinc Smelter, P.O. Putholi , Tehsil:Gangrar  
District:CHITTORGARH

Date: 05/06/2020

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 17/12/2018 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 D.G Sets ( 2 x 7.405 MW) plant situated at Chandaria Lead Zinc Smelter, PO Putholi Tehsil:Gangrar District:Chittorgarh , Rajasthan, subject to the following conditions:-

- 1 That this Consent to Operate is valid for a period from 01/05/2019 to 30/04/2024 .
- 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
D.G. SET	Service	14.81 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 sources of air emissions 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
D.G set( 1000KVA)	ACOUSTIC ENCLOSURE , ADEQUATE STACK HEIGHT		





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**Rajasthan State Pollution Control Board**  
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**Registered**

**File No : F(HDF)/Chittorgarh(Gangrar)/1(1)/2019-2020/1006-1008**

**Order No : 2020-2021/HDF/3068**

**Date: 05/06/2020**

**Unit Id : 263**

		CO	150 mg/NM3
		Particulate	75 mg/NM3
		Matter	
		NOx	710 mg/NM3
		NMHC	100 mg/NM3
D.G set( 125KVA)	ACOUSTIC ENCLOSURE , ADEQUATE STACK HEIGHT	--	--
D.G set(2 X 7.405 MW)( 14.81MW)	ACOUSTIC ENCLOSURE , ADEQUATE STACK HEIGHT	CO	150 mg/NM3
		Particulate	75 mg/NM3
		Matter	
		NOx	710 mg/NM3
		NMHC	100 mg/NM3

- 5 That the **D.G Sets ( 2 x 7.405 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.
- 6 That this consent to operate is being issued for the operation of two D.G Sets of 7.405 MW each capacity, one no of 1000 KVA D.G set and 1X 1256 kVA D.G set only within the existing plant premises. The industry has to seek fresh consent to establish & operate for any change in product/by product/process/modification/alteration.
- 7 That the total capital investment as on 31.03.2018 as per the C.A. certificate submitted by the industry is Rs 1988 lacs which includes the cost of Plant & Machinery only.
- 8 That industry shall maintain adequate stack height and acoustic enclosures at the two D.G Sets of 7.405 MW each capacity, 1X 1000 KVA D.G set.





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Order No : 2020-2021/HDF/3068

Date: 05/06/2020

Unit Id : 263

- 9 That the unit shall provide accoustic enclosure and adequate infrastructure facilities for stack emission monitoring upon the stack attached to the D.G set of 2 X 7.405 MW by 31/07/2020, failing which the bank guarantee submitted by the unit of Rs. 4,18,000/- issued by ICICI Bank, Mumbai vide letter dated 16/03/2020, shall be forfeited without any further notice.
- 10 That industry shall maintain adequate infrastructure facility at the two D.G Sets of 7.405 MW each capacity, 1 X 1000 KVA D.G set for stack emission monitoring.
- 11 That no water shall be consumed for the operation of two D.G Sets of 7.405 MW each capacity, 1 X 1000 KVA + 1 X 125 KVA D.G set and hence no waste water shall be generated from the operation of said D.G sets.
- 12 That ground water shall not be abstracted for the operation of D.G sets without prior permission from the CGWA and the State Board.
- 13 That no trade effluent will be discharged inside or outside the factory premises in to a stream or well or sewer or on land.
- 14 That industry shall comply with the provisions of Hazardous & others Waste (Management, & Transboundary Movement) Rules, 2016 and daily record of sludge generation and its disposal shall be maintained.
- 15 That the industry shall maintain adequately designed rain water harvesting structure for recharge of ground water in and around the area.
- 16 That the plantation of local species in the 33% of total area of the project shall be carried out & maintained.
- 17 That the industry shall carryout effluent sampling/stack monitoring/ambient air quality monitoring and submit half-yearly analysis report from the State Board laboratory/ laboratory recognized by Ministry of Environment & Forests (MoE&F), Government of India.
- 18 That the unit shall submit the stack and noise monitoring of all the D.G sets within a period of three months from the issuance of this consent and for that the unit may avail paid monitoring facilities available with the State Board.
- 19 That the industry shall obtain Environmental Clearance from competent authority under EIA Notification dated 14.09.2006 for taking up any such activity which attracts Environmental clearance under EIA Notification dated 14.09.2006 in future.
- 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 this consent to operate shall be subjected to compliance of any direction or order passed by NGT/ Honorable Court of law in the matter.







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**File No : F(HDF)/Chittorgarh(Gangrar)/1(1)/2019-2020/1006-1008**

**Order No : 2020-2021/HDF/3068**

**Date: 05/06/2020**

**Unit Id : 263**

**22 That the industry shall ensure compliance of all the conditions of Consent to operate imposed by Board's order no. 2016-2017/CPM/4789 dated 23.02.2017.**

**23 That the industry shall submit the half-yearly compliance of all the above conditions to the State Board.**

**24 That, notwithstanding 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.**

**25 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.**

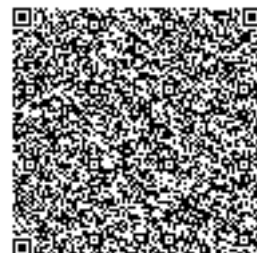
**26 That the grant of this Consent to Operate shall not, in any way, adversely affect or jeopardize the legal proceeding, if any, instituted in the past or that could be instituted against you by the State Board for violation of the provisions of the Act or the Rules made thereunder.**

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[ HDF ]**





**Head Office (HDF )**

**Rajasthan State Pollution Control Board**  
**4, Institutional Area, Jhalana Doongari, Jaipur-302 004**  
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**Registered**

**File No : F(HDF)/Chittorgarh(Gangrar)/1(1)/2019-2020/1006-1008**

**Order No : 2020-2021/HDF/3068**

**Date: 05/06/2020**

**Unit Id : 263**

**(A): Copy To:-**

- 1 Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Chittorgarh to ensure the compliance.
- 2 Master File.

**Group Incharge[ HDF ]**





Annexure 4g

Registered

File No : F(HDF)/Chittorgarh(Gangrar)/4(1)/2021-2022/7194-7196

Order No : 2021-2022/HDF/8905

Date: Mar 4 2022 11:55AM

Unit Id : 263

M/s Hindustan Zinc Ltd.

Chandaria Lead Zinc Smelter, P.O. Putholi , Tehsil:Gangrar

District:CHITTORGARH

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 01/01/2022 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 **Zinc Nagar Residential Colony -Township plant** situated at **Village-Mataji Ki Pandoli, Kapasan Road Tehsil:Chittorgarh District:Chittorgarh** , 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
BUILT UP AREA	Activity	60,819.62 SQ. METER
PLOT AREA	Activity	61.00 HECTARE

- 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:





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File No : F(HDF)/Chittorgarh(Gangrar)/4(1)/2021-2022/7194-7196

Order No : 2021-2022/HDF/8905

Date: Mar 4 2022 11:55AM

Unit Id : 263

Type of effluent	Max. effluent generation (KLD)	Recycled Qty of Effluent (KLD)	Disposed Qty of effluent (KLD)and mode of disposal
Domestic Sewage	400.000	NIL	400.000 To be treated in STP and to be utilized in plantation & other gainfull uses after disinfection

- 5 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
Fecal Coliform (FC) (MPN per 100ml)	Not to exceed 1000

- 6 That this consent to operate is valid for the residential colony/township having plot area - 61 Hectare and built up area- 60,819.62 sq.mtrs located in the premises of M/s Hindsutan Zinc Ltd, Zinc Nagar.
- 7 That the unit shall not establish any plant/ process/or does not carry out any activity/services which attracts environmental clearance under the provisions of the Environmental Clearance Notification dated 14/09/2006 and its subsequent amendments.





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**File No : F(HDF)/Chittorgarh(Gangrar)/4(1)/2021-2022/7194-7196**

**Order No : 2021-2022/HDF/8905**

**Date: Mar 4 2022 11:55AM**

**Unit Id : 263**

- 8 That the total plot area and built up area shall not be increased from 61 hectare and 60,819.62 sq.mtrs respectively without obtaining prior consent to establish from the State Board.
- 9 That industry shall install online monitoring system at the STP by 30.04.2022 and connect it with the server of the State Board.
- 10 That the total capital investment as on 30.09.2021 as per the C.A certificate submitted by the unit is Rs. 4529 Lacs which includes the cost of land, building and plant & machinery & miscellaneous assets.
- 11 That the total fresh water consumption/requirement for the residential colony/township shall not exceed to 500 KLD for domestic use which shall be met from Gosunda Dam(Captive Dam).
- 12 That water meter shall be provided & maintained at the intake source of water and record of daily water received alongwith daily consumption shall be maintained.
- 13 That ground water shall not be abstracted for the residential colony/ township without prior permission from the State Board & CGWA, New Delhi.
- 14 That entire domestic waste water 400 KLD generated from the township/residential area shall be treated through Sewage Treatment Plant(STP) of 1000 KLD capacity up to the norms mentioned at condition no 5.
- 15 That treated domestic waste water shall be utilized for plantation /horticulture/green belt development within the premises.
- 16 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.
- 17 That trained/ skilled operators/ supervisors shall be employed to operate the STP.
- 18 That treated and untreated sewage carrying pipeline should be in different colors.
- 19 That sludge generated from the sewage treatment plant shall be handled/disposed/ utilized in an environmentally safe manner.
- 20 That the industry shall provide and maintain separate energy meter for sewage treatment plant and records of the daily energy consumption shall be maintained in logbook.
- 21 That industry shall make alternate arrangements for power supply to the STP to ensure regular functioning of STP.
- 22 That flow measuring devices/meters shall be maintained at the inlet and outlet of sewage treatment plant and record of daily waste water generation & its treatment and utilization shall be maintained.
- 23 That no source of air emissions shall be installed without prior consent to establish from the State Board.







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**File No : F(HDF)/Chittorgarh(Gangrar)/4(1)/2021-2022/7194-7196**

**Order No : 2021-2022/HDF/8905**

**Date: Mar 4 2022 11:55AM**

**Unit Id : 263**

- 24 That dense plantation at least in 33% area of the total area shall be carried out & maintained.
- 25 That the industry will comply with the standards as prescribed vide MOEF notification No. GSR 826(E) dated 16th Nov,2009 with respect of National Ambient Air Quality Standards.
- 26 That suitable measure for rain water harvesting for artificial recharge of ground water shall be taken.
- 27 That this consent to operate is issued to the unit on the basis of documents submitted by the applicant, if any discrepancies are found in the documents/facts submitted by the unit, then the consent shall be treated as revoked without any further notice and the unit shall be liable for action in accordance with provisions of law.
- 28 That the industry shall carryout treated waste water sampling and submit half yearly analysis report from the State Board laboratory/ laboratory recognized by Ministry of Environment & Forests (MoE&F), Government of India.
- 29 That all the conditions of consent to operate order no. 2018-2019/CPM/5201 dated 23.05.2018 shall be complied.
- 30 That the industry shall submit half yearly compliance report of all the above conditions to the State Board.
- 31 That, notwithstanding 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**.
- 32 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.
- 33 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 against you by the State Board for violation of the provisions of the Act or the Rules made thereunder.
- 34 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.





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**File No : F(HDF)/Chittorgarh(Gangrar)/4(1)/2021-2022/7194-7196**

**Order No : 2021-2022/HDF/8905**

**Date: Mar 4 2022 11:55AM**

**Unit Id : 263**

- 35 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.
- 36 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
- 37 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.
- 38 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.
- 39 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).

This bears the approval of the competent authority.

**Yours Sincerely**

**Group Incharge[ HDF ]**

**(A): Copy To:-**

- 1 Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Chittorgarh to ensure the compliance.
- 2 Master File.





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**File No : F(HDF)/Chittorgarh(Gangrar)/4(1)/2021-2022/7194-7196**

**Order No : 2021-2022/HDF/8905**

**Date: Mar 4 2022 11:55AM**

**Unit Id : 263**

**Group Incharge[ HDF ]**





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Annexure4g(i)

File No : F(HDF)/Chittorgarh(Gangrar)/3(1)/2021-2022/5727-5729

Order No : 2021-2022/HDF/8858

Date: 18/01/2022

Unit Id : 263

M/s Hindustan Zinc Ltd.

Chandaria Lead Zinc Smelter, P.O. Putholi , Tehsil:Gangrar  
District:CHITTORGARH

**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 25/08/2021 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 **Waste Heat Recovery and Sewage Treatment Plant plant** situated at **Chandaria Lead Zinc Smelter, PO Putholi Putholi Chittorgarh Tehsil:Gangrar District:Chittorgarh** , Rajasthan, subject to the following conditions:-

- 1 That this Consent to Operate is valid for a period from **01/01/2022** to **31/12/2026** .
- 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
SEWAGE TREATMENT PLANT	Service	1,000.00 KLD
STEAM FROM WHRB	Product	24.00 TPH

- 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:





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File No : F(HDF)/Chittorgarh(Gangrar)/3(1)/2021-2022/5727-5729  
Order No : 2021-2022/HDF/8858  
Unit Id : 263  
Date: 18/01/2022

Type of effluent	Max. effluent generation (KLD)	Recycled Qty of Effluent (KLD)	Disposed Qty of effluent (KLD)and mode of disposal
Domestic Sewage	220.000	NIL	220.000 To be treated in STP and to be used in plantation and horticulture
Trade Effluent	6.000	NIL	6.000 To be utilized in plantation & other gainfull uses after proper scientific treatment in ETP

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
Waste Heat Recovery Boiler Stack	ADEQUATE STACK HEIGHT	--	--

6 That the **Waste Heat Recovery and Sewage Treatment Plant 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.







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**Registered**

File No : F(HDF)/Chittorgarh(Gangrar)/3(1)/2021-2022/5727-5729  
Order No : 2021-2022/HDF/8858  
Unit Id : 263  
Date: 18/01/2022

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
Total Residual Chlorine	Not to exceed 1.0 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
Sulphide ( as S )	Not to exceed 2.0 mg/l
Chemical Oxygen Demand	Not to exceed 250 mg/l
Fecal Coliform (FC) (MPN per 100ml)	Not to exceed 1000

- 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





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**Registered**

**File No : F(HDF)/Chittorgarh(Gangrar)/3(1)/2021-2022/5727-5729**

**Order No : 2021-2022/HDF/8858**

**Date: 18/01/2022**

**Unit Id : 263**

Parameters	Standards
Total Suspended Solids	Not to exceed 100 mg/l
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
Hexavalent Chromium ( as Cr+6 )	Not to exceed 0.1 mg/l
Total Chromium ( as Cr )	Not to exceed 2.0 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
Sulphates	Not to exceed 1000 mg/l
pH Value	Between 6.5 to 8.5
Iron ( as Fe )	Not to exceed 1.0 mg/l
Copper ( as Cu )	Not to exceed 2.0 mg/l
Chemical Oxygen Demand	Not to exceed 250 mg/l

- 9 That this consent to operate is valid for the operation of sewage treatment plant (STP) of 1000.00 KLD capacity and generation of steam @ 24 TPH from waste heat recovery boiler (WHRB) in the premises of Zinc-Lead Smelter of M/s Hindustan Zinc Limited, Chanderia, Chittorgarh.
- 10 That the total capital investment as on 31.03.2021 as per the C.A. certificate submitted by the unit is Rs. 14.65 crores which includes the cost of land, Building and plant & machinery for WHRB and STP.





**Head Office (HDF )**  
**Rajasthan State Pollution Control Board**  
**4, Institutional Area, Jhalana Doongari, Jaipur-302 004**  
**Phone: 0141-5159600,5159695 Fax: 0141-5159697**

**Registered**

**File No : F(HDF)/Chittorgarh(Gangrar)/3(1)/2021-2022/5727-5729**

**Order No : 2021-2022/HDF/8858**

**Date: 18/01/2022**

**Unit Id : 263**

- 11 That domestic waste water (220 KLD) generated from the plant premises shall be treated through sewage treatment plant (STP) up to the standards mentioned at condition no.7 and shall be used for plantation/horticulture purposes within the premises.
- 12 That waste water (trade effluent) generated from boiler shall be treated in effluent treatment plant followed by two stage R.O plant alongwith trade effluent generated from other plants located in the premises of M/s Hindustan Zinc Limited, Chanderia, Chittorgarh and R.O permeate shall be reused.
- 13 That R.O reject shall be disposed through forced evaporation system of adequate capacity.
- 14 That no auxiliary fuel will be used for generation of steam from WHRB and only waste heat of imperial smelting furnace of pyro plant shall be used.
- 15 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.
- 16 That suitable flow measuring devices/meters on the intake source of water, inlet and outlet of STP & ETP shall be maintained and daily record of water consumption, effluent generation and its treatment and utilization shall be maintained.
- 17 That the industry shall maintain separate energy metering device for STP & ETP and daily records of the energy consumption shall be maintained in logbook.
- 18 That industry shall maintain alternate arrangements for power supply to the STP & ETP to ensure regular functioning of the same.
- 19 That sludge generated from sewage treatment plant (STP) shall be handled/ disposed/ utilized in an environmentally safe manner.
- 20 That the industry shall install and maintain adequately designed rain water harvesting structure for recharge of ground water in and around the area.
- 21 That the industry shall carryout effluent sampling and submit half- yearly report from the State Board laboratory/ laboratory recognized by Ministry of Environment & Forests (MoE&F) & Climate Change, Government of India.
- 22 That dense plantation at least in 33% area of the total area shall be carried out & maintain.
- 23 That industry shall comply with all the conditions of consent to operate letter no. F(Tech)/ Chittorgarh (Gangar)/2(1)/2016-20117/3156-3158 dated 07.07.2017 shall be complied.
- 24 That the industry shall submit the half-yearly compliance report of all the above conditions to the State Board.





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- 25 That, notwithstanding 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**.
- 26 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.
- 27 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 against you by the State Board for violation of the provisions of the Act or the Rules made thereunder.
- 28 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.
- 29 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.
- 30 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
- 31 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.
- 32 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.
- 33 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





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**Unit Id : 263**

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.

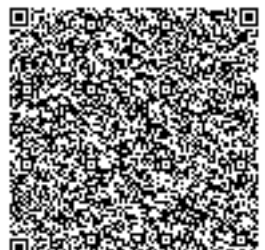
**Yours Sincerely**

**Group Incharge[ HDF ]**

**(A): Copy To:-**

- 1 Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Chittorgarh to ensure the compliance.
- 2 Master File.

**Group Incharge[ HDF ]**







HZL/CLZS/ENV/40/2022- 23

07/10/2022

The Member Secretary,  
Rajasthan State Pollution Control Board,  
4, Institutional Area, Jhalana Dungri,  
Jaipur (Raj.)

Sub: Regarding Submission of Quarterly Compliance Report along with monitoring report for the Month of July 2022 to September 2022 carried out by MOEF Approved Third Party.

Ref. Consent to Operate of Pyro, Ausmelt, Hydro 1 & 154 MW CPP & its expansion and Hydro 2 & 100 MW and its expansion.


Sir,

Please find enclosed Quarterly Compliance Report along with Monitoring Report for the month of July 2022 to September 2022 for Chanderiya Lead Zinc Smelter carried out by MOEF Approved by third party.

We assure you that we stand committed to high standards of compliance on environmental performance and will proactively work towards this objective

Thanking you,

Yours faithfully,  
For Hindustan Zinc Limited

  
(Tarun Meghwal)  
Sr Manager Environment  
Chanderiya Lead Zinc Smelter

Cc:

The Regional Officer,  
Rajasthan State Pollution Control Board  
Near FCI Godawn, Chanderiya, Chittorgarh -312001

### Hindustan Zinc Limited

Chanderiya Lead Zinc Smelter P.O. Putholi, Chittorgarh (Rajasthan) - 312 021  
www.hztindia.com

Registered Office : Yashad Bhawan, Udaipur (Rajasthan) - 313 004  
CIN : L27204RJ1966PLC001208

**Pyro Metallurgical Zinc Smelter Plant**  
**Period of Compliance: July 2022 to Sep 2022**

Consent to Operate Issued for Pyro Metallurgical Zinc Smelter Plant Vide letter no. F(HDF)/Chittorgarh (Gangrar)/1(1)/2019-2020/1091-1093 dated 8.06.2020 valid upto 29.02.2024 situated at Chauderia Lead Zinc Smelter, PO Putholi Chittorgarh Tehsil; Gangrar District: Chittorgarh.

S. No.
 Condition
 Status

1	That this Consent to Operate is valid for a period from 01/03/2019 to 29/02/2024.	Agreed.																					
2	<p>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.</p> <table> <tr> <th>Particular</th> <th>Type</th> <th>Quantity with Unit</th> </tr> <tr> <td>Cadmium</td> <td>By Product</td> <td>375.00 MTPA</td> </tr> <tr> <td>Copper</td> <td>By Product</td> <td>2,100.00 MTPA</td> </tr> <tr> <td>Refined lead</td> <td>Product</td> <td>35,000.00 MTPA</td> </tr> <tr> <td>Refined zinc</td> <td>Product</td> <td>105,000.00 MTPA</td> </tr> <tr> <td>Silver</td> <td>By Product</td> <td>74.00 MTPA</td> </tr> <tr> <td>Sulphuric acid</td> <td>By Product</td> <td>176,000.00 MTPA</td> </tr> </table>	Particular	Type	Quantity with Unit	Cadmium	By Product	375.00 MTPA	Copper	By Product	2,100.00 MTPA	Refined lead	Product	35,000.00 MTPA	Refined zinc	Product	105,000.00 MTPA	Silver	By Product	74.00 MTPA	Sulphuric acid	By Product	176,000.00 MTPA	Agreed and complied with this Consent is granted for manufacturing / producing mentioned products / by products or carrying out the activities or operation/processes or providing services with granted capacities.
Particular	Type	Quantity with Unit																					
Cadmium	By Product	375.00 MTPA																					
Copper	By Product	2,100.00 MTPA																					
Refined lead	Product	35,000.00 MTPA																					
Refined zinc	Product	105,000.00 MTPA																					
Silver	By Product	74.00 MTPA																					
Sulphuric acid	By Product	176,000.00 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.	Agreed and complied with the condition that 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	<p>That the quantity of effluent generation along with mode of disposal for the treated effluent shall be as under:</p> <table> <tr> <th>Type of effluent</th> <th>Max. effluent generation (KLD)</th> <th>Recycled Qty of Effluent (KLD)</th> <th>Disposed Qty of effluent (KLD) and mode of disposal</th> </tr> <tr> <td>Domestic Sewage</td> <td>250</td> <td>NIL</td> <td>250.00 To be treated in STP and to be used in</td> </tr> </table>	Type of effluent	Max. effluent generation (KLD)	Recycled Qty of Effluent (KLD)	Disposed Qty of effluent (KLD) and mode of disposal	Domestic Sewage	250	NIL	250.00 To be treated in STP and to be used in	Being Complied.													
Type of effluent	Max. effluent generation (KLD)	Recycled Qty of Effluent (KLD)	Disposed Qty of effluent (KLD) and mode of disposal																				
Domestic Sewage	250	NIL	250.00 To be treated in STP and to be used in																				



				Plantation and Horticulture	
	Trade Effluent	1500	120	1380 Recycle in Process Planation and Horticulture within premises.	
5	That the sources of air emissions along with pollution control measures and the emission standards for the prescribed parameters shall be as under:				Is being complied.  <b>Stack Monitoring results are annexed herewith the report.</b>
	<b>Sources of Air Emissions</b>	<b>Pollution Control Measures</b>	<b>Prescribe</b>		
			<b>Parameter</b>	<b>Standard</b>	
	Acid plant (TGT)	Adequate stack height , double conversion double absorption plant , ventury scrubber	SO <sub>2</sub>	2 kg/Ton of 100 percent Concentrated Acid produced From acid plant	
			Acid Mist	50 mg/NM3	
	Copper recovery dross milling	Adequate stack height, bag filter	Particulate Matter	150 mg/NM3	
	Imperial smelting furnace	Adequate stack height, bag filter	Particulate Matter	150 mg/NM3	
			Lead	10 mg/NM3	
	Lead refinery copper drossing	Adequate stack height, bBag filter	Particulate Matter	150 mg/NM3	
			Lead	10 mg/NM3	
	Lead refinery (hygiene gases of kettle & rotary furnace)	Adequate stack Height , bag filter	Particulate Matter	150 mg/NM3	
			Lead	10 mg/NM3	
	Sinter plant	Adequate	Particulate	150 mg/NM3	

	crusher(venturi)	stack height, ventury scrubber	Matter Lead	10 mg/NM3	
	Sinter plant dedusting (crusher main)	Adequate stack height, bag filter	Particulate Matter Lead	150 mg/NM3 10 mg/NM3	
	Sinter plant main exhaust	Adequate stack height, bag filter	Particulate Matter Lead	150 mg/NM3 10 mg/NM3	
	Sinter plant wet scrubber (sinter venturi)	Adequate stack height, ventury scrubber	Particulate Matter Lead	150 mg/NM3 10 mg/NM3	
	ZRP flue gas stack	Adequate stack height, bag filter	Particulate Matter	150 mg/NM3	
	ZRP fume extraction	Adequate stack height, bag filter	Particulate Matter	150 mg/NM3	
6	That the Pyro Metallurgical 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.				Complied with NAAQM Standard. Ambient air quality reports are annexed herewith the report.

- 7 That the domestic sewage 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:

Parameters	Standards
Total Suspended Solids	Not to exceed 100 mg/l
Oil and Grease	Not to exceed 10 mg/l
Total Residual Chlorine	Not to exceed 1.0 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
pH Value	Between 6.5 to 8.5
Chemical Oxygen Demand	Not to exceed 250 mg/l
Nitrate (as NO <sub>3</sub> )	Not to exceed 50 mg/l

All parameters are within limits as prescribed.  
Zero discharge is maintained.  
Treated sewerage monitoring results are enclosed herewith the report.

- 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

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 3.0mg/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

All parameters are within limits as prescribed.  
Zero discharge is maintained.  
Treated effluent monitoring results are annexed herewith the report.



		mg/l	
	Sulphide ( as S )	Not to exceed 2.0 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 production of products mentioned at condition no. 2. The industry has to seek fresh consent to establish & operate for any change in product/by product/process/modification/alteration		Complied, Last three years production data shows that all are within Granted limit.
10	That total capital cost as per the C.A. certificate submitted by the unit is Rs. 837.62 Crore which includes the cost of Land, Building & Plant & Machinery		Complied
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.		Complied
12	That all the conditions imposed by MOE&F, New Delhi vide letter no. J-11013/29/92-EI-IA.II(I) dated 03.06.1983 shall be complied with.		Complied
13	(i)	That total water consumption for Pyro Plant shall not exceed to 5,600 KLD (Industrial purpose-850 KLD, Domestic purpose- 250 KLD and Boiler/Cooling purpose- 4500 KLD) which shall be met from Gosunda Dam	Water consumption for pyro plant is within granted water consumption.
	(ii)	That no ground water shall be abstracted for the Pyro-Metallurgical Zinc Smelter without prior permission from the CGWA and the State Board	Not applicable. Water source is Gosunda Dam.
	(iii)	That water flow meters shall be provided and maintained at all suitable points to measure quantity of water received from Gosunda Dam and water consumption for different purposes. Record of the same shall be maintained on daily basis.	Water flow meters are provided and maintained at all suitable points to measure quantity of water received from Gosunda Dam and water consumption for different purposes. Record of the same is being maintained on daily basis.
	(iv)	That industry shall maintain sewage treatment plant (STP) of adequate capacity so as to treat the entire domestic waste water (250 KLD) up to the norms mentioned at condition no. 7 and treated domestic waste water shall be used for plantation with in the premises.	Industry is maintaining sewage treatment plant (STP) of adequate capacity so as to treat the entire domestic waste water up to the norms mentioned at condition no. 7 and treated domestic waste water is being used for plantation with in the premises.



	(v) That the trade effluent (1500 KLD) shall be treated in the effluent treatment plant (ETP) of 8400 KLD capacity along with trade effluent generated from the Ausmelt Plant (450 KLD) and Hydro - I (3296 KLD) upto the norms mentioned at condition no.8.	The trade effluent (1500 KLD) is being treated in the effluent treatment plant (ETP) of 8400 KLD capacity along with trade effluent generated from the Ausmelt Plant (450 KLD) and Hydro - I (3296 KLD) upto the norms mentioned at condition no. 8.
	(vi) That 1200 KLD, out of total 5246 KLD of treated trade effluent, will be used for Slag Granulation and Lime slurry preparation and remaining treated trade effluent will be further treated through two stage reverse osmosis (R.O.) plants and R.O. permeate will be recycled/reused in the process within the premises.	1200 KLD treated effluent, out of total 5246 KLD is being used for slag granulation & lime slurry preparation and remaining treated trade effluent is being further treated through two stage reverse osmosis (R.O.) plant and R.O. permeate is being recycled/reused in process.
14	(i) That R.O. reject shall be disposed off through scientifically designed forced evaporation system of adequate capacity and no reject shall be disposed within or outside the premises on land, nallah, well etc.	That R.O. reject is disposed off through scientifically designed forced evaporation system of adequate capacity and no reject is disposed within or outside the premises on land, nallah, well etc.
	(ii) That industry shall maintain logbook for recording the daily running hour of R.O. plant, permeate and reject generation.	Industry is maintaining logbook for recording the daily running hour of R.O. plant, permeate and reject generation.
	(iii) 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.	No waste water (domestic & trade effluent) is being 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 is being maintained.
	(iv) That separate energy meter & hour meter shall be provided and maintained at all the air pollution control measures & ETP/STP/R.O. and daily record of running hours of pollution control measures and energy consumption shall be maintained in log book.	Separate energy meter & hour meter provided and maintained at all the air pollution control measures & ETP/STP/R.O. and daily record of running hours of pollution control measures and energy consumption is being maintained in log book.
	(v) That proper logbook of Sewage Treatment Plant (STP) and Effluent Treatment Plant (ETP) shall be maintained and record of daily consumption of chemicals and running hours of STP and ETP along with daily quantity of product shall be maintained.	Proper logbook of Sewage Treatment Plant (STP) and Effluent Treatment Plant (ETP) is being maintained and record of daily consumption of chemicals and running hours of STP and ETP along with daily quantity of product is being maintained.



15	(i) That flow meters shall be provided at inlet & outlet of STP, ETP & R.O. and on the pipeline for utilizing the treated effluent /sewage in process/ for plantation and daily record of the same shall be maintained.	Flow meters are provided at inlet & outlet of STP, ETP & R.O. and on the pipeline for utilizing the treated effluent / sewage in process / for plantation and daily record of the same is maintained.
	(ii) That trained/skilled operators/supervisors shall be employed to operate the STP, ETP & R.O. plant.	Trained/skilled operators/supervisors are employed to operate the STP, ETP & R.O. plant.
	(iii) That good quality of chemicals shall be used to achieve the desired results and to minimize the quantity of hazardous waste (ETP sludge).	Good quality chemicals are used to achieve the desired results and to minimize the quantity of hazardous waste (ETP sludge).
	(iv) That treated & untreated effluent carrying pipeline should be in different colors. That all the recommendation made in the charter of Corporate Responsibility for Environment Protection (CREP) for Lead and Zinc smelter plant shall be implemented and complied.	Treated & untreated effluent carrying pipeline is in different colors at site. The guidelines of Corporate Responsibility for Environment Protection (CREP) for Lead and Zinc Smelter plant is being complied.
16	(i) That for the control of fugitive emission guidelines / code of practice as issued by CPCB will be followed.	For the control of fugitive emission guidelines / code of practice as issued by CPCB is being followed.
	(ii) 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.	Industry has provided 4 fixed continuous ambient air quality monitoring stations in all directions for monitoring of gaseous emissions and particulate matter in the ambient air.
	(iii) That SO <sub>2</sub> emissions from lead 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	SO <sub>2</sub> emissions from plant is taken to the sulphuric acid plants for proper conversion and recovery as sulphuric acid through Double Conversion Double Absorption (DCDA) system.
	(iv) That continuous Sulphur Di-Oxide monitoring system installed at Acid Plant shall be maintained properly and operated regularly. Daily record of Sulphur Di-Oxide emission shall be maintained.	Continuous Sulphur Di-Oxide monitoring system installed at Acid Plant, maintained properly and operated regularly. Daily record of Sulphur Di-Oxide emission is maintained.
	(v) That adequate measures shall be taken for handling the accidental leakages of gaseous emissions (SO <sub>2</sub> ) along with interlocking arrangement for corrective action and stoppage of the plant.	Adequate measures is being taken for handling the accidental leakages of gaseous emissions (SO <sub>2</sub> ) along with interlocking arrangement for corrective action and stoppage of the plant.



	(vi) That the industry shall maintain adequate height of stack at all the sources of air emissions and adequate air pollution control measures so as to achieve the prescribed emission standards as per condition no.5.	The industry maintained adequate height of stack at all the sources of air emissions and adequate air pollution control measures so as to achieve the prescribed emission standards as per condition no. 5.
	(vii) That adequate infrastructure facility for stack emission monitoring shall be maintained at all the major stacks.	Is being complied with.
17	(i) That no additional source of air emission shall be installed without prior consent from the State Board	No additional source of air emission will be installed without prior consent from the State Board.
	(ii) That all the raw materials and products shall be stored in closed sheds.	All the raw materials and products are stored in closed sheds.
	(iii) That dust suppression system shall be maintained to minimize fugitive dust emission in Zinc, Lead concentrate handling area & at various transfer points and closed conveyor belts shall be maintained for the transfer of material to reduce the fugitive emissions.	Is being complied at site.
	(iv) That water sprinkling and cleaning of haul roads by vacuum cleaner shall be done regularly to control the fugitive emissions generated due to vehicular movement.	Water sprinkling and cleaning of haul roads by vacuum cleaner is being carried out to control the fugitive emissions generated due to vehicular movement.
	(v) That the industry shall maintain dust collection and extraction system to control fugitive dust emissions at all the transfer points & loading/unloading areas.	We are maintaining dust collection and extraction system to control fugitive dust emissions at all the transfer points & loading/unloading areas.
18	(i) That in compliance of the recommendations of the inter-departmental committee formed by District Collector, the industry shall submit a proposal for the installation of water supply system ATM RO for supply of drinking water in nearby villages where concentration of NO <sub>3</sub> , Iron etc have exceeded the prescribed norms.	Installation of ATM RO is completed.
	(ii) That additional PTZ camera connected to CPCB/RSPCB server shall be installed at jarofix ponds 2 and 3 covering the boundary wall on the side of village-Putholi, SLF-3 etc such that the sprinkling done by tankers in the area is also included in the PTZ camera to ensure that no blowing of jarofix during winds.	PTZ camera installation is completed as per condition on site and connectivity to RSPCB/CPCB server is made.



	(iii) That the industry shall ensure that total of meter reading of reject holding pond and the reject transported through tanker should be equal to the RO reject generated and shall maintain a log book of the same which shall be submitted to R.O Chittorgarh on monthly basis.	Log book is being maintained at site and record is being submitted to RSPCB office on Monthly basis.
	(iv) That installation of PTZ online cameras and fog cannon for dust suppression at the coal yard connected to the CPCB/RSPCB server covering the boundary wall as well as the mist evaporation system(Lagoon)shall be ensured and appropriate lights shall be installed at places to give a clear view during night also or two such cameras can be installed if one is found inadequate.	Camera is installed at site as per condition and connected with CPCB/RSPCB. Fog canon is installed for dust suppression at the coal yard.
	(v) That the industry shall install piezometric well near mist evaporator site to assess the level of ground water quality.	Piezometric wells are installed near mist evaporator site.
	(vi) That the camera installed at leachate ponds should be made online and connected to CPCB/RSPCB server.	Camera is installed and connected with CPCB/RSPCB server.
	(vii) That the industry shall explore the possibility of identifying the real reasons for higher concentrations of sulphate, iron etc in ground water and carry out a geophysical investigation cum underground mapping and exploration study.	Geophysical investigation cum underground mapping and study is completed.
19.	(i) That the power supply to the production/process shall be interlocked with the pollution control equipment's so that in the event of nonfunctioning of the pollution equipment and/ or increase in emission level from prescribed norms the production process stops automatically.  (ii) That the system made to avoid flow of pollutants along with rain water shall be maintained properly.	The power supply to the production/process is interlocked with the pollution control equipment's so that in the event of nonfunctioning of the pollution equipment and/or increase in emission level from prescribed norms the production process stops automatically. Zero discharge maintained from premises.
20	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 & Climate Change (MoEF&CC), Government of India.	The industry is being carrying out effluent sampling/piezometric well sampling/stack monitoring/ambient air quality monitoring through recognized laboratories & reports submitting to Boards. Enclosed herewith this report for Period {July 2022 to Sep 2022}



21	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 daily record of sludge generation and its disposal shall be maintained.	Industry is complying 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 daily record of sludge generation and its disposal maintained
22	That the industry shall install and maintain adequately designed rain water harvesting structure for recharge of ground water in and around the area.	The industry has already installed and maintaining adequately designed rain water harvesting structure for recharge of ground water in and around the area. (Zinc colony and nearby villages under its CSR activities)
23	That the plantation of local species in the 33% of total area of the project shall be carried out & maintained	Plantation of local species in the 33% of total area of the project has been completed and being maintained at site.
24	That the industry shall get policy renewed under Public Liability Insurance Act (PLIA) and submit its copy to the Board from time to time.	<b>Renewed PLI Policy</b> is enclosed with this report.
25	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	Industry will 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.
26	That the industry shall comply with all the conditions of consent to operate order no-2016-2017/CPM/4564 dt 08/08/2016.	Industry is being regularly submitted the quarterly compliance report of all the conditions to the State Board.
27	That the industry shall submit the quarterly compliance report of all the above conditions to the State Board.	We are herewith submitting this report for <b>July 2022 to Sep 2022.</b>
28	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.	Agreed

29	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.	Agreed
30	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 against you by the State Board for violation of the provisions of the Act or the Rules made thereunder.	Agreed



**Ausmelt Lead Plant**  
**Period of Compliance: July 2022 to Sep 2022**

Consent to Operate issued for Ausmelt Lead plant Vide letter No. F(HDF)/Chittorgarh(Gangrar)/1(1)/2019-2020/1077-1079 dated 5.06.2020 valid up to 31.8.2023 situated at Chanderia Lead Zinc Smelter, PO Patholi Chittorgarh Tehsil: Gangrar District: Chittorgarh.

S.NO.	Condition	Status																		
1.	That this Consent to Operate is valid for a period from <b>01/09/2018 to 31/08/2023.</b>	Noted & Agreed																		
2.	<div>That this Consent is granted for manufacturing / producing following products / by products or carrying out the following activities or operation/processes or providing</div> <table><tr><th>Particular</th><th>Type</th><th>Quantity with Unit</th></tr><tr><td>Copper sulphate</td><td>By Product</td><td>24.00 MT/DAY</td></tr><tr><td>Lead</td><td>Product</td><td>182.00 MT/Day (Max up to 60000 TPA)</td></tr><tr><td>Silver</td><td>By Product</td><td>287.00 KG/DAY</td></tr><tr><td>Sulphuric acid</td><td>By Product</td><td>153.00 MT/DAY</td></tr><tr><td>Zinc rich dust</td><td>By Product</td><td>20.00 MT/DAY</td></tr></table> <div>following services with capacities given below.</div>	Particular	Type	Quantity with Unit	Copper sulphate	By Product	24.00 MT/DAY	Lead	Product	182.00 MT/Day (Max up to 60000 TPA)	Silver	By Product	287.00 KG/DAY	Sulphuric acid	By Product	153.00 MT/DAY	Zinc rich dust	By Product	20.00 MT/DAY	Agreed and complied with this Consent is granted for manufacturing / producing mentioned products / by products or carrying out the activities or operation/processes or providing services with granted capacities.
Particular	Type	Quantity with Unit																		
Copper sulphate	By Product	24.00 MT/DAY																		
Lead	Product	182.00 MT/Day (Max up to 60000 TPA)																		
Silver	By Product	287.00 KG/DAY																		
Sulphuric acid	By Product	153.00 MT/DAY																		
Zinc rich dust	By Product	20.00 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.	Agreed. This Consent to operate is for existing plant, process & capacity. Separate consent to establish/operate if required to be taken for any addition / modification / alteration in process or change in capacity or change in fuel.																		
4.	<div>That the quantity of effluent generation along with mode of disposal for the treated effluent shall be as under:</div> <table><tr><th>Type of effluent</th><th>Max. effluent generation (KLD)</th><th>Recycle d Qty of Effluent (KLD)</th><th>Disposed Qty of effluent (KLD) and mode of disposal</th></tr><tr><td></td><td></td><td></td><td></td></tr></table> <div>Is being Complied. Zero discharge maintained.</div>	Type of effluent	Max. effluent generation (KLD)	Recycle d Qty of Effluent (KLD)	Disposed Qty of effluent (KLD) and mode of disposal															
Type of effluent	Max. effluent generation (KLD)	Recycle d Qty of Effluent (KLD)	Disposed Qty of effluent (KLD) and mode of disposal																	

Domestic Sewage	12	NIL	12.00 To be treated in STP and to be used in Plantation and Horticulture
Trade Effluent	450	Nil	450 Recycle in Process Planation and other uses in the premises.

That the sources of air emissions along with pollution control measures and the emission standards for the prescribed parameters shall be as under:

Is being been complied.  
Stack Monitoring results are annexed herewith the report.

5:

Sources of Air Emissions	Pollution Control Measures	Prescribed	
		Param eter	Standard
Dust extraction system -raw material handling( 75000NM <sup>3</sup> /HR. )	Adequate stack Height, bag filter	Particulate Matter Lead	50 mg/NM <sup>3</sup> 10 mg/NM <sup>3</sup>
Lead smelter building (hygiene & ventilation) bag filter( 33000NM <sup>3</sup> /HR. )	Adequate stack Height, bag filter	Particulate Matter Lead	50 mg/NM <sup>3</sup> 10 mg/NM <sup>3</sup>
Stack on So <sub>2</sub> absorption tower (acid plant)(24000NM <sup>3</sup> /HR.)	Adequate stack Height, Double Conversion Double Absorption Plant , Gas Conditioning Plant	SO <sub>2</sub>  Acid Mist	2 kg/Ton of 100 percent concentrate d acid production from acid plant 50 mg/NM <sup>3</sup>
Startup stack for lead furnace( 7500NM <sup>3</sup> /HR.)	Adequate stack Height Bag Filter	Particulate Matter Lead	50 mg/NM <sup>3</sup> 10 mg/NM <sup>3</sup>



6.	That the Ausmelt Lead 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.	Complied with NAAQM Standard. Ambient air quality reports are enclosed.																														
7.	<p>That the domestic sewage 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:</p> <table border="1"> <thead> <tr> <th>Parameters</th> <th>Standards</th> </tr> </thead> <tbody> <tr> <td>Total Suspended Solids</td> <td>Not to exceed 100 mg/l</td> </tr> <tr> <td>Oil and Grease</td> <td>Not to exceed 10 mg/l</td> </tr> <tr> <td>Ammonical Nitrogen (as N)</td> <td>Not to exceed 50 mg/l</td> </tr> <tr> <td>Biochemical Oxygen Demand (3 days at 27°C)</td> <td>Not to exceed 30 mg/l</td> </tr> <tr> <td>pH Value</td> <td>Between 6.5 to 8.5</td> </tr> <tr> <td>Chemical Oxygen Demand</td> <td>Not to exceed 250 mg/l</td> </tr> <tr> <td>Nitrate (as NO<sub>3</sub>)</td> <td>Not to exceed 50 mg/l</td> </tr> </tbody> </table>	Parameters	Standards	Total Suspended Solids	Not to exceed 100 mg/l	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	pH Value	Between 6.5 to 8.5	Chemical Oxygen Demand	Not to exceed 250 mg/l	Nitrate (as NO <sub>3</sub> )	Not to exceed 50 mg/l	<p>All parameters are within limits as prescribed, Zero discharge maintained. Results are enclosed herewith the report.</p>														
Parameters	Standards																															
Total Suspended Solids	Not to exceed 100 mg/l																															
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8.	<p>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:</p> <table border="1"> <thead> <tr> <th>Parameters</th> <th>Standards</th> </tr> </thead> <tbody> <tr> <td>Total Suspended Solids</td> <td>Not to exceed 100 mg/l</td> </tr> <tr> <td>pH Value</td> <td>Between 5.5 to 9.0</td> </tr> <tr> <td>Oil and Grease</td> <td>Not to exceed 10 mg/l</td> </tr> <tr> <td>Biochemical Oxygen Demand (3 days at 27°C)</td> <td>Not to exceed 30 mg/l</td> </tr> <tr> <td>Lead (as Pb)</td> <td>Not to exceed 0.1 mg/l</td> </tr> <tr> <td>Cadmium (as Cd)</td> <td>Not to exceed 2.0 mg/l</td> </tr> <tr> <td>Total Chromium (as Cr)</td> <td>Not to exceed 2.0 mg/l</td> </tr> <tr> <td>Zinc (as Zn)</td> <td>Not to exceed 5.0 mg/l</td> </tr> <tr> <td>Nickle (as Ni)</td> <td>Not to exceed 3.0 mg/l</td> </tr> <tr> <td>Cyanide (as CN)</td> <td>Not to exceed 0.2 mg/l</td> </tr> <tr> <td>Fluoride (as F)</td> <td>Not to exceed 2.0 mg/l</td> </tr> <tr> <td>Chlorides</td> <td>Not to exceed 1000 mg/l</td> </tr> <tr> <td>Sulphates</td> <td>Not to exceed 1000 mg/l</td> </tr> <tr> <td>Iron(as Fe)</td> <td>Not to exceed 1.0 mg/l</td> </tr> </tbody> </table>	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	Total Chromium (as Cr)	Not to exceed 2.0 mg/l	Zinc (as Zn)	Not to exceed 5.0 mg/l	Nickle (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	Chlorides	Not to exceed 1000 mg/l	Sulphates	Not to exceed 1000 mg/l	Iron(as Fe)	Not to exceed 1.0 mg/l	<p>Zero Discharge maintained, No disposal on surface land. ETP outlet monitoring results are annexed herewith the report.</p>
Parameters	Standards																															
Total Suspended Solids	Not to exceed 100 mg/l																															
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Chemical Oxygen Demand	Not to exceed 250 mg/l							
Phosphate (as P)	Not to exceed 5.0 mg/l							
9.	That the consent to operate is valid for production of products mentioned at condition no. 2. The industry has to seek fresh consent to establish & operate for any change in product/by product/process/modification/alteration	Complied. Last three years production data shows all are within limit.						
10.	That total capital cost as per the C.A. certificate submitted by the unit is Rs. 167.13 Crore which includes the cost of Land, Building & Plant & Machinery	Complied						
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	Complied, HW is not used as raw materials.						
12.	That all the conditions imposed by MOE&F, New Delhi vide letter no. J-11011/17/2005-IA.II (I) dated 03.08.2005 shall be complied with.	Complied						
13.	That total water consumption for Ausmelt Plant shall not exceed to 2300 KLD (Industrial purpose-170 KLD, Domestic purpose- 20 KLD and Boiler/Cooling purpose- 2110 KLD) which shall be met from Gosunda Dam	Water consumption for plant is within granted water consumption.						
14.	That no ground water shall be abstracted without prior permission from the CGWA and the State Board	Not applicable. Water source is Gosunda Dam.						
15.	That water flow meters shall be provided and maintained at all suitable points to measure quantity of water received from Gosunda Dam and water consumption for different purposes. Record of the same shall be maintained on daily basis.	Water flow meters are provided and maintained at all suitable points to measure quantity of water received from Gosunda Dam and water consumption for different purposes. Record of the same is being maintained on daily basis.						
16.	That industry shall maintain sewage treatment plant (STP) of adequate capacity so as to treat the entire domestic waste water (12 KLD) up to the norms mentioned at condition no. 7 and treated domestic waste water shall be used for plantation with in the premises.	Industry is maintaining sewage treatment plant (STP) of adequate capacity so as to treat the entire domestic waste water up to the norms mentioned at condition no. 7 and treated domestic waste water is being used for plantation with in the premises.						



17.	That the trade effluent (450 KLD) shall be treated in the effluent treatment plant (ETP) of 8400 KLD capacity along with trade effluent generated from the Pyro Plant (1500 KLD) and Hydro - I (3296 KLD) upto the norms mentioned at condition no. 8.	The trade effluent (450 KLD) is being treated in the effluent treatment plant (ETP) of 8400 KLD capacity along with trade effluent generated from the Pyro Plant (1500 KLD) and Hydro - I (3296 KLD) upto the norms mentioned at condition no. 8.
18.	That 1200 KLD, out of total 5246 KLD of treated trade effluent, will be used for Slag Granulation and Lime slurry preparation and remaining treated trade effluent will be further treated through two stage reverse osmosis (R.O.) plants and R.O. permeate will be recycled/ reused in the process within the premises.	1200 KLD treated effluent, out of total 5246 KLD, is being used for slag granulation & lime slurry preparation and remaining treated trade effluent is being further treated through two stage reverse osmosis (R.O.) plant and R.O. permeate is being recycled/reused in process.
19.	That R.O. reject shall be disposed off through scientifically designed forced evaporation system of adequate capacity and no reject shall be disposed within or outside the premises on land, nallah, well etc.	That R.O. reject is disposed off through scientifically designed forced evaporation system of adequate capacity and no reject is disposed within or outside the premises on land, nallah, well etc.
20.	That industry shall maintain logbook for recording the daily running hour of R.O. plant, permeate and reject generation.	Industry is being maintaining logbook for recording the daily running hour of R.O. plant, permeate and reject generation.
21.	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.	No waste water (domestic & trade effluent) is being 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 is 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 daily record of running hours of pollution control measures and energy consumption shall be maintained in logbook.	Separate energy meter & hour meter is provided and maintained at all the air pollution control measures & ETP/STP/R.O. and daily record of running hours of pollution control measures and energy consumption is being maintained in log book.



23.	That proper logbook of Sewage Treatment Plant (STP) and Effluent Treatment Plant (ETP) shall be maintained and record of daily consumption of chemicals and running hours of STP and ETP along with daily quantity of product shall be maintained.	Proper logbook of Sewage Treatment Plant (STP) and Effluent Treatment Plant (ETP) is being maintained and record of daily consumption of chemicals and running hours of STP and ETP along with daily quantity of product is being maintained.
24.	That flow meters shall be provided at inlet & outlet of STP, ETP & R.O. and on the pipeline for utilizing the treated effluent /sewage in process/ for plantation and daily record of the same shall be maintained.	Flow meters are provided at inlet & outlet of ETP & R.O. & outlet of STP and on the pipeline for utilizing the treated effluent / sewage in process / for plantation & daily record of the same is being maintained.
25.	That trained/skilled operators/supervisors shall be employed to operate the STP,ETP & R.O. plant.	Trained/skilled operators/supervisors are employed to operate the STP, ETP & R.O. plant.
26.	That good quality of chemicals shall be used to achieve the desired results and to minimize the quantity of hazardous waste (ETP sludge).	Good quality of chemicals are used to achieve the desired results and to minimize the quantity of hazardous waste (ETP sludge).
27.	That treated & untreated effluent carrying pipeline should be in different colors.  That all the recommendation made in the charter of Corporate Responsibility for Environment Protection (CREP) for Lead and Zinc smelter plant shall be implemented and complied.	Treated & untreated effluent carrying pipeline is in different colors.  The guidelines of Corporate Responsibility for Environment Protection (CREP) for Lead and Zinc Smelter plant is being complied.
28.	That for the control of fugitive emission guidelines / code of practice as issued by CPCB will be followed.	For the control of fugitive emission guidelines / code of practice as issued by CPCB is followed.
29.	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.	Industry has provided 4 fixed continuous ambient air quality monitoring stations in all directions for monitoring of gaseous emissions and particulate matter in the ambient air.



30.	That SO <sub>2</sub> emissions from lead 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.	SO <sub>2</sub> emissions from plant is taken to the sulphuric acid plants for proper conversion and recovery as sulphuric Acid through Double Conversion Double Absorption (DCDA) system.
31.	That continuous Sulphur Di-Oxide monitoring system installed at Acid Plant shall be maintained properly and operated regularly. Daily record of Sulphur Di-Oxide emission shall be maintained.	Continuous Sulphur Di-Oxide monitoring system installed at Acid Plant is maintained properly and operated regularly. Daily record of Sulphur Di-Oxide emission is being maintained.
32.	That adequate measures shall be taken for handling the accidental leakages of gaseous emissions (SO <sub>2</sub> ) along with interlocking arrangement for corrective action and stoppage of the plant.	Adequate measures is being taken for handling the accidental leakages of gaseous emissions (SO <sub>2</sub> ) along with interlocking arrangement for corrective action and stoppage of the plant.
33.	That the industry shall maintain adequate height of stack at all the sources of air emissions and adequate air pollution control measures so as to achieve the prescribed emission standards as per condition no.5.	The industry maintained adequate height of stack at all the sources of air emissions and adequate air pollution control measures so as to achieve the prescribed emission standards as per condition no. 5.
34.	That adequate infrastructure facility for stack emission monitoring shall be maintained at all the major stacks.	That adequate infrastructure facility for stack emission monitoring is maintained at all the major stacks.
35.	That no additional source of air emission shall be installed without prior consent from the State Board	No additional source of air emission will be install without prior consent from the State Board.
36.	That all the raw materials and products shall be stored in closed sheds.	Raw materials and products are stored in closed sheds.
37.	That dust suppression system shall be maintained to minimize fugitive dust emission in Zinc, Lead concentrate handing area & at various transfer points and closed conveyor belts shall be maintained for the transfer of material to reduce the fugitive emissions.	Is being complied.



38.	That water sprinkling and cleaning of haul roads by vacuum cleaner shall be done regularly to control the fugitive emissions generated due to vehicular movement.	Water sprinkling and cleaning of haul roads by vacuum cleaner is being carried out regularly to control the fugitive emissions generated due to vehicular movement.
39.	That the industry shall maintain dust collection and extraction system to control fugitive dust emissions at all the transfer points & loading/unloading areas.	The industry is maintaining dust collection and extraction system to control fugitive dust emissions at all the transfer points & loading/unloading areas.
40.	That in compliance of the recommendations of the inter-departmental committee formed by District Collector, the industry shall submit a proposal for the installation of water supply system ATM RO for supply of drinking water in nearby villages where concentration of NO <sub>3</sub> , Iron etc have exceeded the prescribed norms.	Installation of ATM RO is completed.
41.	That additional PTZ camera connected to CPCB/RSPCB server shall be installed at jarofix ponds 2 and 3 covering the boundary wall on the side of village-Putholi, SLF-3 etc such that the sprinkling done by tankers in the area is also included in the PTZ camera to ensure that no blowing of jarofix during winds.	PTZ camera installation is completed as per condition on site and connectivity to RSPCB/CPCB server is made.
42.	That the industry shall ensure that total of meter reading of reject holding pond and the reject transported through tanker should be equal to the RO reject generated and shall maintain a log book of the same which shall be submitted to R.O Chittorgarh on monthly basis.	RO Reject Log book is being maintained at site and submitted to RSPCB office on Monthly basis.
43.	That installation of of PTZ online cameras and fog cannon for dust suppression at the coal yard connected to the CPCB/RSPCB server covering the boundary wall as well as the mist evaporation system(Lagoon)shall be ensured and appropriate lights shall be installed at places to give a clear view during night also or two such cameras can be installed if one is found inadequate.	Camera is installed and connected with CPCB/RSPCB. fog cannon is installed for dust suppression at the coal yard.
44.	That the industry shall install piezometric well near mist evaporator site to assess the level of ground water quality.	Piezometric wells are installed near mist evaporator site.
45.	That the camera installed at leachate ponds should be made online and connected to CPCB/RSPCBserver.	Camera is installed and connected with CPCB/RSPCB.



46.	That the industry shall explore the possibility of identifying the real reasons for higher concentrations of sulphate, iron etc in ground water and carry out a geophysical investigation cum underground mapping and exploration study.	Geophysical investigation cum underground mapping and study is completed.
47.	That the power supply to the production/process shall be interlocked with the pollution control equipment's so that in the event of nonfunctioning of the pollution equipment and/ or increase in emission level from prescribed norms the production process stops automatically.	The power supply to the production/process is interlocked with the pollution control equipment's so that in the event of nonfunctioning of the pollution equipment and/or increase in emission level from prescribed norms the production process stops automatically.
48.	That the system made to avoid flow of pollutants along with rain water shall be maintained properly.	Is being complied. Zero discharge is maintained.
49.	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 & Climate Change (MoEF&CC), Government of India.	The industry is being carrying out effluent sampling/piezometric well sampling/stack monitoring/ambient air quality monitoring through recognized laboratories & reports submitting to Boards. Enclosed herewith this report for <b>Period (July 2022 to Sep 2022)</b>
50.	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 daily record of sludge generation and its disposal shall be maintained.	Industry is complying 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 daily record of sludge generation and its disposal maintained
51.	That the industry shall install and maintain adequately designed rain water harvesting structure for recharge of ground water in and around the area.	The industry has already installed and maintain adequately designed rain water harvesting structure for recharge of ground water in and around the area. (Zinc colony

		and nearby villages under its CSR activities)
52.	That the plantation of local species in the 33% of total area of the project shall be carried out & maintained	Plantation of local species in the 33% of total area of the project has been completed and being maintained at site.
53.	That the industry shall get policy renewed under Public Liability Insurance Act (PLIA) and submit its copy to the Board from time to time.	Renewed PLI Policy is enclosed with this report.
54.	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.	Industry should 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.
55.	That the industry shall comply with all the conditions of consent to operate order no-2016-2017/CPM/4590 dt 25/08/2016.	That the industry is complying with all the conditions of consent to operate order no -2016-2017/CPM/4590 dt 25/08/2016.
56.	That the industry shall submit the quarterly compliance report of all the above conditions to the State Board.	We are herewith submitting this report for Quarter <b>July 2022 to Sep 2022</b> .
57.	That, notwithstanding 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.	Agreed
58.	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.	Agreed and we are binding on that.



59.	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 against you by the State Board for violation of the provisions of the Act or the Rules made thereunder.	Agreed. We are complying strictly.
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## Hydro Phase-I and 154 MW Captive Power Plant

Period of Compliance: July 2022 to Sep 2022

Consent to Operate Issued for Hydro Phase-I and 154 MW Captive Power plant Vide letter No. F(HDF)/Chittorgarh/(Gangrar)/1 (1)/2019-2020/3750-3753 dated 16.01.2020 valid upto 31.08.2023 situated at Chanderia Lead Zinc Smelter, PO Putholi Chittorgarh Tehsil: Gangrar District: Chittorgarh

S No.	Condition			Status	
1	That this Consent to Operate is valid for a period from 01/09/2018 to 31/08/2023 .			Agreed.	
2	That this Consent is granted for manufacturing / producing following products / by products or carrying out the following activities or			Agreed and complied with the consent condition that Consent is granted for manufacturing / producing mentioned products / by products or carrying out the activities or operation/processes or providing services with granted capacities	
	Particular	Type	Quantity with Unit		
	Cadmium Sponge	By Product	680 MTPA		
	Copper Cement	By Product	510 MTPA		
	Electric Power	Product	154 MW		
	Low Grade Lead Concentrate	By Product	30000 MTPA		
	Sulphuric Acid	By Product	289000 MTPA		
	Zinc	Product	210000 MTPA		
operation/processes or providing following services with capacities given below.					
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.			Agreed to 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.	
4	That the quantity of effluent generation along with mode of disposal for the treated effluent shall be as under:			Is being Complied.	
	Type of effluent	Max. effluent generation (KLD)	Recycle d Qty of Effluent (KLD)		Disposed Qty of effluent (KLD)and mode of disposal
	Domestic Sewage	65.60	NIL		65.60 To be treated in STP and to be used in

				Plantation and Horticulture																													
	Trade Effluent	3296	3296	Nil Recycle in Process																													
5	That the sources of air emissions along with pollution control measures and the emission standards for the prescribed parameters shall be as under: <table><tr><th rowspan="2">Sources of Air Emissions</th><th rowspan="2">Pollution Control Measures</th><th colspan="2">Prescribed</th></tr><tr><th>Parameter</th><th>Standard</th></tr><tr><td>Calcine handling unit</td><td>Adequate stack height, Bag Filter</td><td>Particulate Matter</td><td>50 mg/NM3</td></tr><tr><td>Preheater</td><td>Adequate stack height, Cyclone</td><td>Particulate Matter</td><td>50 mg/NM3</td></tr><tr><td>Roaster start up</td><td>Adequate stack height, Cyclone, ESP</td><td>Particulate Matter</td><td>50 mg/NM3</td></tr><tr><td rowspan="2">Sulphuric Acid Plant</td><td rowspan="2">Adequate stack height, Double Conversion Double Absorption Plant</td><td>SO2</td><td>2 kg/Ton of 100 percent concentrated acid production from acid plant</td></tr><tr><td>Acid Mist</td><td>50 mg/NM3</td></tr><tr><td>Two nos of coal fired boiler(2</td><td>adequate stack Height, ESP</td><td>SO2</td><td>600 mg/NM3</td></tr></table>				Sources of Air Emissions	Pollution Control Measures	Prescribed		Parameter	Standard	Calcine handling unit	Adequate stack height, Bag Filter	Particulate Matter	50 mg/NM3	Preheater	Adequate stack height, Cyclone	Particulate Matter	50 mg/NM3	Roaster start up	Adequate stack height, Cyclone, ESP	Particulate Matter	50 mg/NM3	Sulphuric Acid Plant	Adequate stack height, Double Conversion Double Absorption Plant	SO2	2 kg/Ton of 100 percent concentrated acid production from acid plant	Acid Mist	50 mg/NM3	Two nos of coal fired boiler(2	adequate stack Height, ESP	SO2	600 mg/NM3	Is being complied,  Stack Monitoring results are annexed herewith the report.
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6	That the Hydro Phase-I and 154 MW Power 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.			Complied with NAAQM Standard. Ambient air quality reports are annexed herewith.																						
7	That the domestic sewage shall be treated before disposal so as to conform to the standards prescribed under the Environment (Protection) Act-1986for disposal into Inland Surface Water. The main parameters for regular monitoring shall be as under: <table><tr><th>Parameters</th><th>Standards</th></tr><tr><td>Total Suspended Solids</td><td>Not to exceed 100 mg/l</td></tr><tr><td>pH Value</td><td>Between 5.5 to 9.0</td></tr><tr><td>Oil and Grease</td><td>Not to exceed 10 mg/l</td></tr></table>			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	All parameters are within limits as prescribed. Zero discharge maintained. Treated sewage monitoring results are enclosed herewith the report.														
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																									

	Total Residual Chlorine	Not to exceed 1.0 mg/l	
	Ammoniacal 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	
	Fecal Coliform (FC) (MPN per 100ml)	Not to exceed 1000	
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:		All parameters are within limits as prescribed. Zero discharge maintained. Treated effluent monitoring results are annexed herewith the report.
	<b>Parameters</b>	<b>Standards</b>	
	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	
	Total Chromium (as Cr)	Not to exceed 2.0 mg/l	
	Zinc (as Zn)	Not to exceed 5.0 mg/l	
	Nickle (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	
	Chlorides	Not to exceed 1000 mg/l	
	Sulphates	Not to exceed 1000 mg/l	
	pH Value	Between 6.5 to 8.5	
	Iron(as Fe)	Not to exceed 1.0 mg/l	
	Copper (as Cu)	Not to exceed 2.0 mg/l	
	Chromium (Total)	Not to exceed 2.0 mg/l	
	Chemical Oxygen Demand	Not to exceed 250 mg/l	
	Phosphate (as P)	Not to exceed 5.0 mg/l	
9	1. That the consent to operate is valid for production of products mentioned at condition no. 2. The industry has to seek fresh consent to establish & operate for any change in product/byproduct/process/modification/alteration.		Complied, Last three years production data shows all are within above qty.



2. That total capital cost as per the C.A. certificate as on 31/03/2018 submitted by the unit is Rs. 1341.99 Crore which includes the cost of Land, Building & Plant & Machinery.	Complied
3. 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.	Complied.
4. That all the conditions imposed by MOE&F, New Delhi in the environmental clearance granted vide letter no.J-11011/155/2003-IA(II) T dt 31.03.2004 and letter no. J-11011/279/2006-IA.II (I) dated 06.12.2006 shall be complied with.	Complied
5. That total water consumption for Hydro-II & 100 MW Plant shall not exceed to 19670 KLD (Industrial purpose-5476 KLD, Domestic purpose- 82 KLD and Boiler/ Cooling purpose-14112 KLD) which shall be met from Gosunda Dam and R.O. permeate. That no ground water shall be abstracted without prior permission from the CGWA and the State Board.	Water consumption for plant is within granted water consumption.
6. That water flow meters shall be provided and maintained at all suitable points to measure quantity of water received from Gosunda Dam and water consumption for different purposes. Record of the same shall be maintained on daily basis.	Water flow meters are provided and maintained at all suitable points to measure quantity of water received from Gosunda Dam and water consumption for different purposes. Record of the same is being maintained on daily basis.
7. That industry shall maintain sewage treatment plant (STP) of adequate capacity so as to treat the entire domestic waste water (65.6 KLD) up to the norms mentioned at condition no. 7 and treated domestic waste water shall be used for plantation with in the premises.	Industry is being maintaining sewage treatment plant (STP) of adequate capacity so as to treat the entire domestic waste water up to the norms mentioned at condition no. 7 and treated domestic waste water is being used for plantation with in the premises.
8. That the trade effluent (3296 KLD) shall be treated in the effluent treatment plant (ETP) of 8400 KLD capacity upto the norms mentioned at condition no. 8. That R.O. reject shall be disposed of through scientifically designed forced evaporation system of adequate capacity and no reject shall be disposed within or outside the premises on land, nallah, well etc	The trade effluent (3296 KLD) is being treated in the effluent treatment plant (ETP) of 8400 KLD capacity along with trade effluent generated from pyro plant (450 KLD) upto the norms mentioned at condition no. 8. That R.O. reject is disposed of through scientifically designed forced evaporation system of adequate capacity and no reject is disposed within or outside the premises on land, nallah, well etc



	9. That 1200 KLD treated effluent, out of total 3296 KLD, will be used for slag granulation & lime slurry preparation and remaining treated trade effluent will be further treated through two stage reverse osmosis (R.O.) plant and R.O. permeate will be recycled/ reused in Hydro-I and Hydro- II plants.	1200 KLD treated effluent, out of total 3296 KLD, is being used for slag granulation & lime slurry preparation and remaining treated trade effluent is being further treated through two stage reverse osmosis (R.O.) plant and R.O. permeate is being recycled/reused in Hydro-I and Hydro-II plants.
	10. That the industry shall complete the work of providing MEE by 31/03/2020 and R.O reject shall be disposed off through MEE from 01/04/2020 onwards positively.	MEE installation is completed.
	11. That industry shall maintain logbook for recording the daily running hour of R.O. plant, permeate and reject generation.	Industry is being maintaining logbook for recording the daily running hour of R.O. plant, permeate and reject generation.
10	1. 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.	No waste water (domestic & trade effluent) is being 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 is maintained.
	2. That separate energy meter & hour meter shall be provided and maintained at all the air pollution control measures & ETP/STP/R.O. and daily record of running hours of pollution control measures and energy consumption shall be maintained in log book.	Separate energy meter & hour meter are provided and maintained at all the air pollution control measures & ETP/STP/R.O. and daily record of running hours of pollution control measures and energy consumption is being maintained in log book.
	3. That proper logbook of Sewage Treatment Plant (STP) and Effluent Treatment Plant (ETP) shall be maintained and record of daily consumption of chemicals and running hours of STP and ETP along with daily quantity of product shall be maintained.	Proper logbook of Sewage Treatment Plant (STP) and Effluent Treatment Plant (ETP) is being maintained and record of daily consumption of chemicals and running hours of STP and ETP along with daily quantity of product is maintained.
	4. That flow meters shall be provided at inlet & outlet of STP, ETP & R.O. and on the pipeline for utilizing the treated effluent /sewage in process/ for plantation and daily record of the same shall be maintained.	Flow meters are provided at inlet & outlet of STP, ETP & R.O. and on the pipeline for utilizing the treated effluent / sewage in process / for plantation and daily record of the same is being maintained.
	5. That trained/skilled operators/supervisors shall be employed to operate the STP,ETP & R.O. plant.	Trained/skilled operators/supervisors are employed to operate the STP, ETP & R.O. plant.
	6. That good quality of chemicals shall be used to achieve the desired results and to	Good quality of chemicals is being used to achieve the desired results and to



	minimize the quantity of hazardous waste (ETP sludge).	minimize the quantity of hazardous waste (ETP sludge).
	7. That treated & untreated effluent carrying pipeline should be in different colors. That the guidelines of Corporate Responsibility for Environment Protection (CREP) for Lead and Zinc smelter plant shall be complied.	Treated & untreated effluent carrying pipeline is in different colors. The guidelines of Corporate Responsibility for Environment Protection (CREP) for Lead and Zinc Smelter plant is being complied.
	8. That for the control of fugitive emission guidelines / code of practice as issued by CPCB will be followed.	For the control of fugitive emission guidelines / code of practice as issued by CPCB is followed.
	9. 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.	Industry has 4 fixed continuous ambient air quality monitoring stations in all directions for monitoring of gaseous emissions and particulate matter in the ambient air.
	10. That SO <sub>2</sub> emissions from Zinc Smelter plant shall be taken to the Sulphuric Acid plants for proper conversion and recovery as Sulphuric Acid through Double Conversion Double Absorption (DCDA) system.	SO <sub>2</sub> emissions from Zinc Smelter plant is taken to the Sulphuric Acid plants for proper conversion and recovery as Sulphuric Acid through Double Conversion Double Absorption (DCDA) system.
	11. That continuous Sulphur Di-Oxide monitoring system installed at Acid Plant shall be maintained properly and operated regularly. Daily record of Sulphur Di-Oxide emission shall be maintained.	Continuous Sulphur Di-Oxide monitoring system is installed at Acid Plant, is maintained properly and operated regularly. Daily record of Sulphur Di-Oxide emission is maintained.
11	1. That adequate measures shall be taken for handling the accidental leakages of gaseous emissions (SO <sub>2</sub> ) along with interlocking arrangement for corrective action and stoppage of the plant.	Adequate measures is being taken for handling the accidental leakages of gaseous emissions (SO <sub>2</sub> ) along with interlocking arrangement for corrective action and stoppage of the plant.
	2. That the industry shall maintain adequate height of stack at all the sources of air emissions and adequate air pollution control measures so as to achieve the prescribed emission standards as per condition no.5.	The industry maintained adequate height of stack at all the sources of air emissions and adequate air pollution control measures so as to achieve the prescribed emission standards as per condition no. 5.
	3. That no additional source of air emission shall be installed without prior consent from the State Board.	No additional source of air emission will be installed without prior consent from the State Board.
	4. That all the raw materials and products shall be stored in closed sheds. That dust suppression system shall be maintained to minimize fugitive dust emission in Zinc, Lead concentrate handling area & at various	All the raw materials and products are stored in closed sheds. That dust suppression system is maintained to minimize fugitive dust emission in Zinc, Lead concentrate handling area &



	transfer points and closed conveyor belts shall be maintained for the transfer of material to reduce the fugitive emissions.	at various transfer points and closed conveyor belts is maintained for the transfer of material to reduce the fugitive emissions.
	5. That in compliance of the recommendations of the inter-departmental committee formed by district Collector, the industry shall submit a proposal for the installation of water supply system ATM RO for supply of drinking water in nearby villages where concentration of NO <sub>3</sub> , Iron etc have exceeded the prescribed norms.	Installation of ATM RO is completed.
	6. That the industry shall submit a bank guarantee of 100% of the total amount to be incurred on the connection of SO <sub>x</sub> and NO <sub>x</sub> parameters on the stack of CPP boiler stack to CPCB/RSPCB server within 30 days of issuance of this consent and shall also ensure that the work related to connectivity of these parameters to CPCB/RSPCB server is made within 30 days of issuance of this consent.	Bank Guarantee is already submitted to Board vide letter no. 18.2.2020 and connectivity of SO <sub>x</sub> and NO <sub>x</sub> of CPP stack to CPCB/RSPCB server is made.
	7. That additional PTZ camera connected to CPCB/RSPCB server shall be installed at jarofix ponds 2 and 3 covering the boundary wall on the side of village-Tutholi, SLF-3 etc such that the sprinkling done by tankers in the area is also included in the PTZ camera to ensure that no blowing of jarofix during winds.	PTZ camera installation is completed as per condition on site and connectivity to RSPCB/CPCB server is made.
	8. That the industry shall ensure that total of meter reading of reject holding pond and the reject transported through tanker should be equal to the RO reject generated and shall maintain a log book of the same which shall be submitted to R.O Chittorgarh on monthly basis.	RO Reject Log book is maintained at site and submitted Monthly to board.
12	1. That water sprinkling and cleaning of haul roads by vacuum cleaner shall be done regularly to control the fugitive emissions generated due to vehicular movement.	Water sprinkling and cleaning of haul roads by vacuum cleaner is being carried out regularly to control the fugitive emissions generated due to vehicular movement.
	2. That installation of of PTZ online cameras and fog cannon for dust suppression at the coal yard connected to the CPCB/RSPCB server covering the boundary wall as well as the mist evaporation system(Lagoon)shall be ensured and appropriate lights shall be installed at places	PTZ camera installation is completed as per condition on site and connectivity to RSPCB/CPCB server is done & Fog canon is installed for dust suppression at the coal yard.



	to give a clear view during night also or two such cameras can be installed if one is found inadequate.	
	3. That the industry shall install piezometric well near mist evaporator site to assess the level of ground water quality.	Piezometric wells are installed near mist evaporator site.
	4. That the camera installed at leachate ponds should be made online and connected to CPCB/RSPCB server.	Camera is installed and connected with CPCB/RSPCB server.
	5. That the industry shall maintain dust collection and extraction system to control fugitive dust emissions at all the transfer points & loading/unloading areas.	The industry is maintaining dust collection and extraction system to control fugitive dust emissions at all the transfer points & loading/unloading areas.
	6. That the power supply to the production/process shall be interlocked with the pollution control equipment's so that in the event of nonfunctioning of the pollution equipment and/or increase in emission level from prescribed norms the production process stops automatically.	The power supply to the production/process is interlocked with the pollution control equipment's 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.
	7. That the system made to avoid flow of pollutants along with rain water shall be maintained properly.	The system made to avoid flow of pollutants along with rain water is maintained properly.
	8. 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 (MoE&F), Government of India.	The industry is being carrying out effluent sampling/piezometric well sampling/stack monitoring/ambient air quality monitoring through recognized laboratories & reports submitting to Boards. Enclosed herewith this report for <b>Period {July 2022 to Sep 2022}</b>
	9. 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 daily record of sludge generation and its disposal shall be maintained.	Industry is complying 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 daily record of sludge generation and its disposal maintained
13	1. That the industry shall explore the possibility of identifying the real reasons for higher concentrations of sulphate, iron etc in ground water and carry out a geophysical investigation cum underground mapping and exploration study	Geophysical investigation cum underground mapping and study is completed.
	2. That the industry shall install and maintain adequately designed rain water harvesting	The industry have already installed and maintain adequately designed rain water harvesting structure for recharge of



	structure for recharge of ground water in and around the area,	ground water in and around the area (Zinc colony and nearby villages under its CSR activities)
	3. That the plantation of local species in the 33% of total area of the project shall be carried out & maintained.	Plantation of local species in the 33% of total area of the project has been completed and being maintained at site.
	4. That the industry shall get policy renewed under Public Liability Insurance Act (PLIA) and submit its copy to the Board from time to time.	Renewed PLI Policy is enclosed with this report.
	5. 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.	Industry should 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.
	6. That the industry shall submit the quarterly compliance report of all the above conditions to the State Board.	We are herewith submitting this report for <b>July 2022 to Sep 2022.</b>
	7. That the industry shall comply with all the conditions of consent to operate order no - 2016-2017/CPM/4591 dt 25/08/2016.	Agreed
14	That, notwithstanding 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.	Agreed
15	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.	Agreed
16	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 against you by the State Board for violation of the provisions of the Act or the Rules made thereunder.	Agreed, We are complying as conditions given.

	<p>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 notified by the competent authority. 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).</p>	<p>Agreed</p>
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## Hydro Phase-I and 154 MW Captive Power Plant

Period of Compliance: July 2022 to Sep 2022

Consent to Operate Issued for Hydro Phase-I and 154 MW Captive Power plant Vide letter no. F(HDF)/Chittorgarh/(Gangrar)/2(1)/2020-2021/6117-6119 dated 26.03.2021 valid upto 28.02.2026 situated at Chanderia Lead Zinc Smelter, PO Putholi Chittorgarh Tehsil: Gangrar District: Chittorgarh

S No.	Condition	Status																		
1	That this Consent to Operate is valid for a period from 26/03/2021 to 28/02/2026.	Agreed.																		
2	<p>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:</p> <table border="1"> <thead> <tr> <th>Particular</th><th>Type</th><th>Quantity with Unit</th></tr> </thead> <tbody> <tr> <td>Calomal</td><td>By Product</td><td>20.00 MTPA</td></tr> <tr> <td>SHG Zinc/Ingot/Zn Alloy (Special High Grade)</td><td>Product</td><td>42000.00 MTPA</td></tr> <tr> <td>Sodium Chloride</td><td>By Product</td><td>250.00 MTPA</td></tr> <tr> <td>Sodium Sulphate</td><td>By Product</td><td>1250.00 MTPA</td></tr> <tr> <td>Sulphuric Acid</td><td>By Product</td><td>18774.00 MTPA</td></tr> </tbody> </table>	Particular	Type	Quantity with Unit	Calomal	By Product	20.00 MTPA	SHG Zinc/Ingot/Zn Alloy (Special High Grade)	Product	42000.00 MTPA	Sodium Chloride	By Product	250.00 MTPA	Sodium Sulphate	By Product	1250.00 MTPA	Sulphuric Acid	By Product	18774.00 MTPA	Agreed and complied with consent condition that consent is granted for manufacturing / producing mentioned products / by products or carrying out the activities or operation/processes or providing services with granted capacities.
Particular	Type	Quantity with Unit																		
Calomal	By Product	20.00 MTPA																		
SHG Zinc/Ingot/Zn Alloy (Special High Grade)	Product	42000.00 MTPA																		
Sodium Chloride	By Product	250.00 MTPA																		
Sodium Sulphate	By Product	1250.00 MTPA																		
Sulphuric Acid	By Product	18774.00 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.	Agreed with This Consent to operate is for existing plant, process & capacity. 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 Hydro Phase I and 154 MW Captive Power Plant will comply with the standards as prescribed vide MOEF notification No. GSR 826(E) dated 16 <sup>th</sup> November 2009 with respect to National Ambient Air Quality Standards.	Complied with NAAQM Standard. Ambient air quality reports are annexed herewith.																		
5	That this consent to operate is being issued for enhancement of production capacity of Hydro I plant from 2,10,000 MTPA to 2,52,000 MTPA (20% increase) in existing plant premises by improving the current	Agreed & complied.																		



	efficiency in cell house (89% to 93%) increasing current input in cell house (190 KA to 200 KA) and debottlenecking of existing equipments and increasing the number of cells from 124 to 132 (8 No.) in Hydro 1 Cell House.	
6.	The industry has to seek fresh consent to establish for any change in product/by product/ process / service/activity and for any modification / alteration.	Agreed and will follow as per condition
7.	That additional plant & machinery shall not be installed for increase in production capacity and same will be achieved by improving the current efficiency in cell house and debottlenecking of existing equipment used for 2,10,000 MTPA production capacity & upgrading up to 2,52,000 MTPA.	Complied, additional plant and machinery is not installed for increase in production capacity.
8.	That the industry shall obtain Environmental Clearance from competent authority under EIA Notification dated 14.09.2006 for taking up any such activity which attracts Environmental clearance under EIA Notification dated 14.09.2006 in future.	EC obtained from MoEF vide letter No J-11011/279/2006-IA.II(M) dated 06.12.2006 and 14.10.2020.
9	That the industry shall comply with all the conditions of Environmental Clearance (E.C.) issued by the Ministry of Environment, Forest & Climate Change (MoEF& CC), Government of India, vide letter no. J-11011/155/2003-IA (II) dated 31.03.2004 and J-11011/279/2006-IA.II(M) dated 06.12.2006 and 14.10.2020.	That the industry is complying with all the conditions of Environmental Clearance (E.C.) issued by the Ministry of Environment, Forest & Climate Change (MoEF& CC), Government of India, vide letter no. J-11011/155/2003-IA (II) dated 31.03.2004 and J-11011/279/2006-IA.II(M) dated 06.12.2006 and 14.10.2020.
10	That the industry shall comply with all the revised standards for emission (SO <sub>2</sub> - 1 Kg/ Ton of Sulphuric Acid Produced, SO <sub>3</sub> / Acid Mist- 30 mg/Nm <sup>3</sup> & PM- 30 mg/Nm <sup>3</sup> ) as per Environmental Clearance (E.C.) issued by the Ministry of Environment, Forest & Climate Change (MoEF& CC), Government of India, vide letter no. J-11011/279/2006-IA.II(M) dated 14.10.2020. And, the industry shall improve /upgrade /replace the existing pollution control measures to achieve these standards, as required.	Being complied, Report is attached.
11.	That capital investment for increase in production capacity by debottlenecking of existing equipment is Rs. 69.25 Crore as per C.A. certificate submitted by the industry.	Agreed and complied
12	That the industry shall comply the revised emission standards for thermal power plants as notified by MoEF, Govt New Delhi vide gazette notification dated	Complied, Planned for FGD as per Direction of Board to complete by 31/12/24.



	07/12/2015 and for this purpose the industry shall upgrade the air pollution control measures (if required).	
13	That industry shall comply directions issued by Central Pollution Control Board, New Delhi on 01.02.2021 regarding time extension for compliance of new emission norms notified vide notification No. S.O.3305 (E) dated 07.12.2015.	Complied
14	That total water consumption and wastewater generation of the industry shall not exceed from existing as allowed under consent to operate order no 2019-2020/HDF/2859 dated 16.01.2020 due to proposed expansion in the production capacity by debottlenecking of existing equipments.	That total water consumption and wastewater generation of the industry is not exceeded from existing as allowed under consent to operate order no 2019-2020/HDF/2859 dated 16.01.2020
15	That the industry shall not abstract ground water without obtaining prior NOC/Permission from CGWA for withdrawal of ground water.	No ground water abstraction. Water source is Gosunda dam/
16.	That wastewater generated from various sources shall be treated to meet standards of pH : 6.5-8.5; Total Suspended Solids: 100 mg/l; Oil & Grease: 10 mg/l; Copper: 1 mg/l; Iron: 1 mg/l; Zinc: 1.0 mg/l; Free Chlorine: 0.5 mg/l; Total Chromium: 0.2 mg/l; Phosphate: 5.0 mg/l.	Complied, Zero discharge maintained.
17	That no wastewater (domestic & trade effluent) shall be discharged inside or outside the factory premises into a stream or well or sewer or on land in any case and complete zero discharge status shall be maintained.	No wastewater (domestic and trade effluent) is discharged inside or outside the factory premises into a stream or well or sewer or on land in any case and complete zero discharge status is maintained.
18	That no additional source of Air/Water pollution shall be installed without prior consent to establish from the State Board.	No additional source of air emission will be installed without prior consent from the state Board
19	That the guidelines on co-processing of hazardous waste in Cement/Power/Steel industries issued by Central Pollution Control Board shall be complied.	The guidelines on co-processing of hazardous waste in Cement/Power/Steel industries issued by Central Pollution Control Board is complied.
20	That the industry shall maintain continuous real time monitoring system at stack attached to boilers to monitor the particulate matter, Mercury & its compounds and gaseous emission levels and same shall be connected with RPCB/CPCB server.	That the industry is maintaining continuous real time monitoring system at stack attached to boilers to monitor the particulate matter, Mercury & its compounds and gaseous emission levels and same is connected with RPCB/CPCB server.



21	That regular (at least once in six months) monitoring of groundwater quality in and around the ash pond area including presence of heavy metals (Hg, Cr, As, Pb, etc.) shall be carried out as per CPCB guidelines. Surface water quality monitoring shall be undertaken for major surface water bodies as per the EMP. The data so obtained should be compared with the baseline data so as to ensure that the groundwater and surface water quality is not adversely impacted due to the project and its activities.	No ash pond area at site, Ash is being sold to cement industry from silos.
22	That the industry shall carry out 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 & Climate Change (MoEF&CC), Government of India.	That industry is being carrying out effluent sampling/ stack monitoring/ ambient air quality monitoring and submitting quarterly analysis report from the State Board laboratory/laboratory recognized by Ministry of Environment and Forests (MoE&F), Government of India.
23	That industry shall comply with the provisions of Hazardous Waste (Management, Handling and Trans boundary Movement) Rules, 2016 and daily record of Hazardous waste generation and its disposal shall be maintained.	Industry is being complied 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 daily record of sludge generation and its disposal maintained.
24	That industry will comply with all the guidelines, directions, orders and notifications issued by competent authorities' time to time and submit compliance report of the same under intimation to State Board.	Agreed & We are complying.
25	i. That the industry shall ensure the compliance of all the conditions of consent to operate (existing) order no. 2019-2020/HDF/2859 dated 16.01.2020 & consent to establish (expansion) order no. 2020-2021/HDF/3286 dated 19.02.2021.	Complied
	ii. That Industry shall install tail gas treatment (TGT) with Hydro-I and Hydro-II plants and for the same a time bound action plan shall be submitted to the State Board within a period of one month.	Time bound action plan submitted.
	iii. That Industry shall install online monitoring system for lead emissions at the Pyro plant and Ausmelt plant.	Online monitoring system for PM emission available, No technology is available for online monitoring of lead.



	iv. That Industry shall install meters at linkage of RO-1 to RO-2 to ascertain the waste water balance in the system and the water flow meters shall be installed at all suitable points to measure water consumption for different uses and record of the same shall be maintained on daily basis.	Complied. Flowmeters are provided, & Volumetric record is available.
	v. That with issuance of this consent to operate, emission/ effluent standards mentioned in consent to operate issued vide order no. 2019-2020/HDF/2859 dated 16.01.2020 are hereby being revised in compliance of latest Environmental Clearance dated 14.10.2020 & industry shall comply with the same.	Necessary action is being taken to comply the same,
26	That the industry shall submit the quarterly compliance report of all the above conditions to the State Board.	We are herewith submitting this report for <b>July 2022 to Sep 2022.</b>
27	That industry shall get done paid monitoring from Central Laboratory, RPCB within one month so as to adjudge the efficiency and adequacy of the pollution control measures to achieve new standards.	Complied
28	That this revised consent letter shall supercede the earlier consent letter no F(HDF)/Chittorgarh(Gangrar)/2(1)/2020-2021/6085-6087 dated 26/03/2021	Agreed
29	That, notwithstanding 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.	Agreed
30	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.	Agreed
31	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 against you by the State Board for violation of the provisions of the Act or the Rules made thereunder.	Agreed

32	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).	Agreed
33	Please note that non-compliance of any of the above stated conditions would tantamount to revocation of Consent to Operate and project/occupier shall be liable for legal action under the relevant provisions of the said Act(s).	Agreed and we are complying.



## Hydro Phase-II and 100 MW Captive Power Plant

**Period of Compliance: July 2022 to Sep 2022**

Consent to Operate Issued for Hydro Phase-II and 100 MW Captive Power plant Vide letter no. F(CPM)/Chittorgarh/(Gangrar)/2 (1)/2016-2017/3302-3305 dated 18.12.2019 valid upto 31.01.2024 situated at Chauderia Lead Zinc Smelter, PO Putholi Chittorgarh Tehsil: Gangrar District: Chittorgarh.

Chandaria Lead Zinc Smelter & Refinery, Chitroga, Raipur District, Chhattisgarh

S No.	Condition	Status												
1	That this Consent to Operate is valid for a period from 01/02/2019 to 31/01/2024.	Agreed.												
2	<p>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</p> <table><tr><th>Particular</th><th>Type</th><th>Quantity with Unit</th></tr><tr><td>Electricity</td><td>Product</td><td>100 MW</td></tr><tr><td>Sulphuric Acid</td><td>By Product</td><td>850 TPD</td></tr><tr><td>Zinc</td><td>Product</td><td>210000 MTPA</td></tr></table>	Particular	Type	Quantity with Unit	Electricity	Product	100 MW	Sulphuric Acid	By Product	850 TPD	Zinc	Product	210000 MTPA	Agreed and complied with the consent condition that consent is granted for manufacturing / producing mentioned products / by products or carrying out the actives or operation/processes or providing services with granted capacities.
Particular	Type	Quantity with Unit												
Electricity	Product	100 MW												
Sulphuric Acid	By Product	850 TPD												
Zinc	Product	210000 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.	Agreed with 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	<p>That the quantity of effluent generation along with mode of disposal for the treated effluent shall be as under:</p> <table><tr><th>Type of effluent</th><th>Max. effluent generation (KLD)</th><th>Recycled Qty of Effluent (KLD)</th><th>Disposed Qty of effluent (KLD) and mode of disposal</th></tr><tr><td>Domestic Sewage</td><td>82.0</td><td>82.0</td><td>NIL On Land for plantation /horticulture inside the factory premises</td></tr><tr><td>Trade Effluent</td><td>2352</td><td>2352</td><td>2352 Reuse in Process</td></tr></table>	Type of effluent	Max. effluent generation (KLD)	Recycled Qty of Effluent (KLD)	Disposed Qty of effluent (KLD) and mode of disposal	Domestic Sewage	82.0	82.0	NIL On Land for plantation /horticulture inside the factory premises	Trade Effluent	2352	2352	2352 Reuse in Process	Is being Complied.
Type of effluent	Max. effluent generation (KLD)	Recycled Qty of Effluent (KLD)	Disposed Qty of effluent (KLD) and mode of disposal											
Domestic Sewage	82.0	82.0	NIL On Land for plantation /horticulture inside the factory premises											
Trade Effluent	2352	2352	2352 Reuse in Process											
5	That the sources of air emission's along with pollution control measures and the emission standards for the prescribed parameters shall be as under:	Is being complied. Stack Monitoring results are annexed herewith the report.												

Sources of Air Emissions	Pollution Control Measures	Prescribed:	
		Parameter	Standard
One coal fired boiler( 320TPH)	Adequate stack height , ESP	SO <sub>2</sub> Particulate Matter  NO <sub>x</sub> Hg and its compounds	600 mg/NM <sup>3</sup> 50 mg/NM <sup>3</sup>  300 mg/NM <sup>3</sup> 0.03 mg/NM <sup>3</sup>
One no. of coal crusher(common for 154 MW and 100 MW CPPX 210TPH)	Adequate stack height, Bag Filter	Particulate Matter	50 mg/NM <sup>3</sup>
Pre-heater	Adequate stack height	Particulate Matter	50 mg/NM <sup>3</sup>
Roaster start up	Adequate stack height , cyclone	Particulate Matter	50 mg/NM <sup>3</sup>
Sulphuric Acid Plant	Adequate air pollution control measures , adequate stack height	SO <sub>2</sub>	2 kg/Ton of 100 percent concentrated acid production from acid plant
		Acid Mist	50 mg/NM <sup>3</sup>
Two nos of Melting induction furnaces(600 TPD each)( 1200TPD)	Adequate stack height , Bag Filter	Particulate Matter	50 mg/NM <sup>3</sup>



6	That the Hydro Phase-II and 100 MW Captive Power 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.	Complied with NAAQM Standard, Ambient air quality reports are annexed herewith.																										
7	<p>That the domestic sewage 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.</p> <table border="1"><thead><tr><th>Parameters</th><th>Standards</th></tr></thead><tbody><tr><td>Total Suspended Solids</td><td>Not to exceed 100 mg/l</td></tr><tr><td>Oil and Grease</td><td>Not to exceed 10 mg/l</td></tr><tr><td>Total Residual Chlorine</td><td>Not to exceed 1.0 mg/l</td></tr><tr><td>Ammonical Nitrogen ( as N )</td><td>Not to exceed 50 mg/l</td></tr><tr><td>Biochemical Oxygen Demand (3 days at 27°C)</td><td>Not to exceed 30 mg/l</td></tr><tr><td>pH Value</td><td>Between 6.5 to 9.0</td></tr><tr><td>Chemical Oxygen Demand</td><td>Not to exceed 250 mg/l</td></tr><tr><td>Fecal Coliform (FC). (MPN per 100 ml)</td><td>Not to exceed 1000 mg/l</td></tr></tbody></table>	Parameters	Standards	Total Suspended Solids	Not to exceed 100 mg/l	Oil and Grease	Not to exceed 10 mg/l	Total Residual Chlorine	Not to exceed 1.0 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	pH Value	Between 6.5 to 9.0	Chemical Oxygen Demand	Not to exceed 250 mg/l	Fecal Coliform (FC). (MPN per 100 ml)	Not to exceed 1000 mg/l	<p>All parameters are within limits as prescribed. Zero discharge is maintained. Sewage monitoring results are enclosed herewith the report.</p>								
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Parameters	Standards																											
Total Suspended Solids	Not to exceed 100 mg/l																											
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	Chlorides	Not to exceed 1000 mg/l	
	Sulphates	Not to exceed 1000 mg/l	
	Iron (as Fe)	Not to exceed 1.0 mg/l	
	Phosphate(as P)	Not to exceed 5.0 mg/l	
	Chemical Oxygen Demand	Not to exceed 250 mg/l	
9	That the consent to operate is valid for production of products mentioned at condition no. 2. The industry has to seek fresh consent to establish & operate for any change in product/by product/process/modification/alteration.		Complied, Last three years production data shows that all are within limit.
10	That total capital cost as per the C.A. certificate as on 31/03/2019 submitted by the unit is Rs. 1305.33 Crore which includes the cost of Land, Building & Plant & Machinery.		Complied
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.		Complied
12	That all the conditions imposed by MOE&F, New Delhi in the environmental clearance granted vide letter no. J-11011/279/2006-IA.II (I) dated 06.12.2006 shall be complied with.		Complied
13	That total water consumption for Hydro-II & 100 MW Plant shall not exceed to 11,000 KLD (Industrial purpose-1704 KLD, Domestic purpose- 108 KLD and Cooling purpose- 9188 KLD) which shall be met from Gosunda Dam and R.O. permeate.		Water consumption for plant is within granted water consumption.
14	That no ground water shall be abstracted without prior permission from the CGWA and the State Board.		Not applicable. Water source is Gosunda dam.
15	That water flow meters shall be provided and maintained at all suitable points to measure quantity of water received from Gosunda Dam and water consumption for different purposes. Record of the same shall be maintained on daily basis.		Water flow meters are provided and maintained at all suitable points to measure quantity of water received from Gosunda Dam and water consumption for different purposes. Record of the same is being maintained on daily basis.
16	That industry shall maintain sewage treatment plant (STP) of adequate capacity so as to treat the entire domestic waste water (82 KLD) up to the norms mentioned at condition no. 7 and treated domestic waste water shall be used for plantation with in the premises.		Industry is being maintaining sewage treatment plant (STP) of adequate capacity so as to treat the entire domestic waste water up to the norms mentioned at condition no. 7 and treated domestic waste water is being used for plantation with in the premises.
17	That the trade effluent (2352 KLD) shall be treated in the effluent treatment plant (ETP) of 4200 KLD capacity upto the norms mentioned at condition no. 8.		The trade effluent (2352 KLD) is being treated in the effluent treatment plant (ETP) of 4200 KLD capacity upto the norms mentioned at condition no. 8.



18	That 26 KLD treated effluent, out of total 2352 KLD, will be used for lime slurry preparation and remaining treated trade effluent will be further treated through two stage reverse osmosis (R.O.) plant and R.O. permeate will be recycled/ reused in Hydro-I and Hydro- II plants.	26 KLD treated effluent is being used for lime slurry preparation and remaining treated trade effluent is being further treated through two stage reverse osmosis (R.O.) plant and R.O. permeate is being recycled/reused in Hydro-I and Hydro-II plants.
19	That R.O. reject shall be disposed of through scientifically designed forced evaporation system of adequate capacity and no reject shall be disposed within or outside the premises on land, nallah, well etc.	Is being complied with at site. That R.O. reject is disposed of through scientifically designed forced evaporation system of adequate capacity and no reject is disposed within or outside the premises on land, nallah, well etc.
20	That the industry shall complete the work of providing MEE by 31/03/2020 and R.O. reject shall be disposed off through MEE from 01/04/2020 onwards positively.	MEE installation is completed.
21	That industry shall maintain logbook for recording the daily running hour of R.O. plant, permeate and reject generation.	Industry is being maintaining the logbook for recording the daily running hour of R.O. plant, permeate and reject generation.
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.	No waste water (domestic & trade effluent) is 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 is 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 daily record of running hours of pollution control measures and energy consumption shall be maintained in log book.	Separate energy meter & hour meter are provided and maintained at all the air pollution control measures & ETP/STP/R.O. and daily record of running hours of pollution control measures and energy consumption is maintained in log book.
24	That proper logbook of Sewage Treatment Plant (STP) and Effluent Treatment Plant (ETP) shall be maintained and record of daily consumption of chemicals and running hours of STP and ETP along with daily quantity of product shall be maintained.	Proper logbook of Sewage Treatment Plant (STP) and Effluent Treatment Plant (ETP) is being maintained and record of daily consumption of chemicals and running hours of STP and ETP along with daily quantity of product is maintained.
25	That flow meters shall be provided at inlet & outlet of STP, ETP & R.O. and on the pipeline for utilizing the treated effluent /sewage in process/ for plantation and daily record of the same shall be maintained.	Flow meters are provided at inlet & outlet of STP, ETP & R.O. and on the pipeline for utilizing the treated effluent / sewage in process / for plantation and daily record of the same is maintained.
26	That trained/skilled operators/supervisors shall be employed to operate the STP, ETP & R.O. plant.	Trained/skilled operators/ supervisors are employed to operate the STP, ETP & R.O. plant.
27	That good quality of chemicals shall be used to achieve the desired results and to minimize the quantity of hazardous waste (ETP sludge).	Good quality of chemicals are being used to achieve the desired results and to minimize the quantity of hazardous waste (ETP sludge).



28	That treated & untreated effluent carrying pipeline should be in different colors. That the guidelines of Corporate Responsibility for Environment Protection (CREP) for Lead and Zinc smelter plant shall be complied.	Treated & untreated effluent carrying pipeline is in different colors. The guidelines of Corporate Responsibility for Environment Protection (CREP) for Lead and Zinc Smelter plant is being complied.
29	That for the control of fugitive emission guidelines / code of practice as issued by CPCB will be followed.	For the control of fugitive emission guidelines / code of practice as issued by CPCB is followed.
30	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.	Industry has provided 4 fixed continuous ambient air quality monitoring stations in all directions for monitoring of gaseous emissions and particulate matter in the ambient air.
31	That SO <sub>2</sub> emissions from Zinc Smelter plant shall be taken to the sulphuric Acid plants for proper conversion and recovery as sulphuric Acid through Double Conversion Double Absorption (DCDA) system.	SO <sub>2</sub> emissions from Zinc Smelter plant is taken to the sulphuric Acid plants for proper conversion and recovery as sulphuric Acid through Double Conversion Double Absorption (DCDA) system.
32	That continuous Sulphur Di-Oxide monitoring system installed at Acid Plant shall be maintained properly and operated regularly. Daily record of Sulphur Di-Oxide emission shall be maintained.	Continuous Sulphur Di-Oxide monitoring system is installed at Acid Plant, maintained properly, and operated regularly. Daily record of Sulphur Di-Oxide emission is well maintained.
33	That adequate measures shall be taken for handling the accidental leakages of gaseous emissions (SO <sub>2</sub> ) along with interlocking arrangement for corrective action and stoppage of the plant.	Adequate measures are being taken for handling the accidental leakages of gaseous emissions (SO <sub>2</sub> ) along with interlocking arrangement for corrective action and stoppage of the plant.
34	That the industry shall maintain adequate height of stack at all the sources of air emissions and adequate air pollution control measures so as to achieve the prescribed emission standards as per condition no.5.	The industry maintained adequate height of stack at all the sources of air emissions and adequate air pollution control measures so as to achieve the prescribed emission standards as per condition no. 5.
35	That no additional source of air emission shall be installed without prior consent from the State Board.	No additional source of air emission will be installed without prior consent from the State Board.
36	That all the raw materials and products shall be stored in closed sheds. That dust suppression system shall be maintained to minimize fugitive dust emission in Zinc, Lead concentrate handling area & at various transfer points and closed conveyor belts shall be maintained for the transfer of material to reduce the fugitive emissions.	All the raw materials and products are stored in closed sheds. All fugitive dust emission control system are in place at site. Same is been complied with.
37	That in compliance of the recommendations of the inter-departmental committee formed by district Collector, the industry shall submit a proposal for the installation of water supply system ATM RO for supply of drinking water in nearby villages where concentration of NO <sub>3</sub> , Iron etc have exceeded the prescribed norms.	Installation of ATM RO is completed.



38	That the industry shall submit a bank guarantee of 100% of the total amount to be incurred on the connection of SOx and NOx parameters on the stack of CPP boiler stack to CPCB/RSPCB server within 30 days of issuance of this consent and shall also ensure that the work related to connectivity of these parameters to CPCB/RSPCB server is made within 30 days of issuance of this consent.	Bank Guarantee is already submitted to Board vide letter no. 18.2.2020 and connectivity of SOX and NOX of CPP stack to CPCB/RSPCB server is made.
39	That additional PTZ camera connected to CPCB/RSPCB server shall be installed at jarofix ponds 2 and 3 covering the boundary wall on the side of village-Putholi, SLF-3 etc. such that the sprinkling done by tankers in the area is also included in the PTZ camera to ensure that no blowing of jarofix during winds.	PTZ camera installation is completed as per condition on site and connectivity to RSPCB/CPCB server is made.
40	That the industry shall ensure that total of meter reading of reject holding pond and the reject transported through tanker should be equal to the RO reject generated and shall maintain a log book of the same which shall be submitted to R.O Chittorgarh on monthly basis.	RO Reject Log book is maintained at site and submitted Monthly to board.
41	That water sprinkling and cleaning of haul roads by vacuum cleaner shall be done regularly to control the fugitive emissions generated due to vehicular movement.	Water sprinkling and cleaning of haul roads by vacuum cleaner is being carried out regularly to control the fugitive emissions generated due to vehicular movement.
42	That installation of PTZ online cameras and fog cannon for dust suppression at the coal yard connected to the CPCB/RSPCB server covering the boundary wall as well as the mist evaporation system(Lagoon) shall be ensured and appropriate lights shall be installed at places to give a clear view during night also or two such cameras can be installed if one is found inadequate.	PTZ camera installation is completed as per condition on site and connectivity to RSPCB/CPCB server is made. Fog cannon is installed for dust suppression at the coal yard.
43	That the industry shall install piezometric well near mist evaporator site to assess the level of ground water quality.	Piezometric wells are installed near mist evaporator site to assess the level of ground water quality.
44	That the camera installed at leachate ponds should be made online and connected to CPCB/RSPCB server.	Camera installed at leachate ponds is made online and connected to CPCB/RSPCB server.
45	That the industry shall maintain dust collection and extraction system to control fugitive dust emission at all transfer point and loading/ unloading areas.	The industry is maintaining dust collection and extraction system to control fugitive dust emissions at all the transfer points & loading/unloading areas.
46	That the power supply to the production/process shall be interlocked with the pollution control equipment 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.	The power supply to the production/process is interlocked with the pollution control equipment's 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.
47	That the system made to avoid flow of pollutants along with rain water shall be maintained properly.	The system made to avoid flow of pollutants along with rain water is maintained properly.
48	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 (MoE&F), Government of India.	The industry is being carrying out effluent sampling/piezometric well 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. Enclosed herewith this report for Period {July 2022 to Sep 2022}
49	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 daily record of sludge generation and its disposal shall be maintained.	Industry is complying 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 daily record of sludge generation and its disposal maintained.
50	That the industry shall explore the possibility of identifying the real reasons for higher concentrations of sulphate, iron etc in ground water and carry out a geophysical investigation cum underground mapping and exploration study	Geophysical investigation cum underground mapping and study is completed.
51	That the industry shall install and maintain adequately designed rain water harvesting structure for recharge of ground-water in and around the area.	The industry has already installed and maintain adequately designed rain water harvesting structure for recharge of ground water in and around the area. (Zinc colony and nearby villages under its CSR activities)
52	That the plantation of local species in the 33% of total area of the project shall be carried out & maintained.	Plantation of local species in the 33% of total area of the project has been completed and being maintained at site
53	That the industry shall get policy renewed under Public Liability Insurance Act (PLIA) and submit its copy to the Board from time to time.	Renewed PLI Policy is enclosed with this report.
54	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.	Industry should 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.

55	That the industry shall submit the quarterly compliance report of all the above conditions to the State Board.	We are herewith submitting this report for July 2022 to Sep 2022.
56	That the industry shall comply with all the conditions of consent to operate order no -2016-2017/CPM/4565 dt 03/08/2016.	Agreed
57	That, notwithstanding 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.	Agreed
58	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.	Agreed
59	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 against 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).	Agreed



## Hydro Phase-II and 100 MW Captive Power Plant

Period of Compliance: July 2022 to Sep 2022

Consent to Operate Issued for Hydro Phase-II and 100 MW Captive Power plant Vide letter no. F(HDF)/Chittorgarh/(Gangrar)/2(1)/2020-2021/6120-6122 dated 26.03.2021 valid upto 28.02.2026 situated at Chanderia Lead Zinc Smelter, PO Putholi Chittorgarh Tehsil: Gangrar District: Chittorgarh

S No.	Condition	Status																		
1	That this Consent to Operate is valid for a period from 26/03/2021 to 28/02/2026.	Agreed.																		
2	<p>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.</p> <table border="1"> <thead> <tr> <th>Particular</th><th>Type</th><th>Quantity with Unit</th></tr> </thead> <tbody> <tr> <td>Calomel</td><td>By Product</td><td>20.00 MTPA</td></tr> <tr> <td>SHG Zinc/Ingot/Zn Alloy (Special High Grade)</td><td>Product</td><td>42000.00 MTPA</td></tr> <tr> <td>Sodium Chloride</td><td>By Product</td><td>250.00 MTPA</td></tr> <tr> <td>Sodium Sulphate</td><td>By Product</td><td>1250.00 MTPA</td></tr> <tr> <td>Sulphuric Acid</td><td>By Product</td><td>18774.00 MTPA</td></tr> </tbody> </table>	Particular	Type	Quantity with Unit	Calomel	By Product	20.00 MTPA	SHG Zinc/Ingot/Zn Alloy (Special High Grade)	Product	42000.00 MTPA	Sodium Chloride	By Product	250.00 MTPA	Sodium Sulphate	By Product	1250.00 MTPA	Sulphuric Acid	By Product	18774.00 MTPA	Agreed and complied with this Consent is granted for manufacturing / producing mentioned products. / by products or carrying out the activities or operation/processes or providing services with granted capacities.
Particular	Type	Quantity with Unit																		
Calomel	By Product	20.00 MTPA																		
SHG Zinc/Ingot/Zn Alloy (Special High Grade)	Product	42000.00 MTPA																		
Sodium Chloride	By Product	250.00 MTPA																		
Sodium Sulphate	By Product	1250.00 MTPA																		
Sulphuric Acid	By Product	18774.00 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.	Agreed with 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 Hydro Phase II and 100 MW Captive Power Plant will comply with the standards as prescribed vide MOEF notification No. GSR 826(E) dated 16 <sup>th</sup> November 2009 with respect to National Ambient Air Quality Standards.	Complied with NAAQM Standard Ambient air quality reports are annexed herewith.																		
5	That this consent to operate is being issued for enhancement of production capacity of Hydro II plant from 2,10,000 MTPA to 2,52,000 MTPA (20% increase) in existing plant premises by improving the current efficiency in cell house (89% to 93%) increasing current input in cell house (190 KA to 200 KA) and debottlenecking of existing equipments.	Agreed & complied.																		



6.	The industry has to seek fresh consent to establish for any change in product/by product/ process / service/activity and for any modification / alteration.	Noted & will follow as per condition.
7.	That additional plant & machinery shall not be installed for increase in production capacity and same will be achieved by improving the current efficiency in cell house and debottlenecking of existing equipment used for 2,10,000 MTPA production capacity & upgrading upto 2,52,000 MTPA.	Additional plant and machinery is not installed for increase in production capacity & same is achieved by improving the current efficiency in cell house and debottlenecking of existing equipment.
8.	That the industry shall obtain Environmental Clearance from competent authority under EIA Notification dated 14.09.2006 for taking up any such activity which attracts Environmental clearance under EIA Notification dated 14.09.2006 in future.	EC obtained from MoEF & CC vide letter no J-11011/279/2006-IA.II(M) dated 06.12.2006 and 14.10.2020
9	That the industry shall comply with all the conditions of Environmental Clearance (E.C.) issued by the Ministry of Environment, Forest & Climate Change (MoEF& CC), Government of India, vide letter no. J-11011/279/2006-IA.II(M) dated 06.12.2006 and 14.10.2020.	Complied
10	That the industry shall comply with all the revised standards for emission (SO <sub>2</sub> - 1 Kg/ Ton of Sulphuric Acid Produced, SO <sub>3</sub> / Acid Mist- 30 mg/Nm <sup>3</sup> & PM- 30 mg/Nm <sup>3</sup> ) as per Environmental Clearance (E.C.) issued by the Ministry of Environment, Forest & Climate Change (MoEF& CC), Government of India, vide letter no. J-11011/279/2006-IA.II(M) dated 14.10.2020. And, the industry shall improve /upgrade/replace the existing pollution control measures to achieve these standards, as required.	Being complied. Report is attached.
11.	That capital investment for increase in production capacity by debottlenecking of existing equipment is Rs. 69.25 Crore as per C.A. certificate submitted by the industry.	Complied
12	That the industry shall comply the revised emission standards for thermal power plants as notified by MoEF, GoI New Delhi vide gazette notification dated 07/12/2015 and for this purpose the industry shall upgrade the air pollution control measures (if required).	Complied, Planned for FGD for further improvement and action plan submitted, To be installed by 31/12/24.
13	That industry shall comply directions issued by Central Pollution Control Board, New Delhi on 01.02.2021 regarding time extension for compliance of new emission norms notified vide notification No. S.O.3305 (E) dated 07.12.2015.	Complied
14	That total water consumption and wastewater generation of the industry shall not exceed from existing as allowed under consent to operate order no 2019-2020/HDF/2818 dated 18.12.2019 due to proposed expansion in the production capacity by debottlenecking of existing equipment.	Water consumption and wastewater generation is not exceeded from existing as allowed under consent to operate order no 2019-2020/HDF/2818 dated 18.12.2019 due to proposed expansion



		in the production capacity by debottlenecking of existing equipment.
15	That the industry shall not abstract ground water without obtaining prior NOC/Permission from CGWA for withdrawal of ground water.	That the industry is not abstracting ground water. The water source is Gosunda dam.
16	That wastewater generated from various sources shall be treated to meet standards of pH : 6.5-8.5; Total Suspended Solids: 100 mg/l; Oil & Grease: 10 mg/l; Copper: 1 mg/l; Iron: 1 mg/l; Zinc: 1.0 mg/l; Free Chlorine: 0.5 mg/l; Total Chromium: 0.2 mg/l; Phosphate: 5.0 mg/l.	Complied, Zero discharge is maintained.
17	That no wastewater (domestic & trade effluent) shall be discharged inside or outside the factory premises into a stream or well or sewer or on land in any case and complete zero discharge status shall be maintained.	No wastewater (domestic & trade effluent) is discharged inside or outside the factory premises into a stream or well or sewer or on land in any case and complete zero discharge status is maintained.
18	That no additional source of Air/Water pollution shall be installed without prior consent to establish from the State Board.	No additional source of air/water pollution will be installed without prior consent from the state board.
19	That the guidelines on co-processing of hazardous waste in Cement/Power/Steel industries issued by Central Pollution Control Board shall be complied.	The guidelines on co-processing of hazardous waste in Cement/Power/Steel industries issued by Central Pollution Control Board is complied.
20	That the industry shall maintain continuous real time monitoring system at stack attached to boilers to monitor the particulate matter, Mercury & its compounds and gaseous emission levels and same shall be connected with RPCB/CPCB server.	That the industry is maintaining continuous real time monitoring system at stack attached to boilers to monitor the particulate matter, Mercury & its compounds and gaseous emission levels and same is connected with RPCB/CPCB server.
21	That regular (at least once in six months) monitoring of groundwater quality in and around the ash pond area including presence of heavy metals (Hg, Cr, As, Pb, etc.) shall be carried out as per CPCB guidelines. Surface water quality monitoring shall be undertaken for major surface water bodies as per the EMP. The data so obtained should be compared with the baseline data so as to ensure that the groundwater and surface water quality is not adversely impacted due to the project and its activities.	No ash pond area at site, Ash is being sold to cement industry from silos.
22	That the industry shall carryout effluent sampling/ stack monitoring/ambient air quality monitoring and submit half yearly analysis report from the State Board Laboratory /laboratory recognized by Ministry of Environment, Forests & Climate Change (MoEF&CC), Government of India.	That industry is being carrying out effluent sampling/stack monitoring/ ambient air quality monitoring and submitting quarterly analysis report from laboratory recognized by Ministry of Environment, Forests & Climate Change (MoEF&CC), Government of India.



23	That industry shall comply with the provisions of Hazardous Waste (Management, Handling and Trans boundary Movement) Rules, 2016 and daily record of Hazardous waste generation and its disposal shall be maintained.	Industry is complying with the provisions of Hazardous Waste (Management, Handling and Trans boundary Movement) Rules, 2016 and daily record of Hazardous waste generation and its disposal shall be maintained.
24	That industry will comply with all the guidelines, directions, orders and notifications issued by competent authorities' time to time and submit compliance report of the same under intimation to State Board.	Agreed and we are complying.
25	i. That the industry shall ensure the compliance of all the conditions of consent to operate (existing) order no. 2019-2020/HDF/2818 dated 18.12.2019 & consent to establish (expansion) order no. 2020-2021/HDF/3287 dated 23.02.2021.	Complied
	ii. That Industry shall install tail gas treatment (TGT) with Hydro-I and Hydro-II plants and for the same a time bound action plan shall be submitted to the State Board within a period of one month.	Time bound action plan submitted.
	iii. That Industry shall install online monitoring system for lead emissions at the Pyro plant and Ausmelt plant.	Online monitoring system for PM is available, No technology available for online monitoring of lead emission.
	iv. That Industry shall install meters at linkage of RO-I to RO-2 to ascertain the wastewater balance in the system and the water flow meters shall be installed at all suitable points to measure water consumption for different uses and record of the same shall be maintained on daily basis.	Complied, Water flow meters are installed, and Volumetric record is available.
	v. That with issuance of this consent to operate, emission/ effluent standards mentioned in consent to operate issued vide order no. 2019-2020/HDF/2818 dated 18.12.2019 are hereby being revised in compliance of latest Environmental Clearance dated 14.10.2021 & industry shall comply with the same.	Necessary action is being taken to comply the same.
26	That the industry shall submit the quarterly compliance report of all the above conditions to the State Board.	We are herewith submitting this report for <b>July 22 to Sep 22</b> .
27	That industry shall get done paid monitoring from Central Laboratory, RPCB within one month so as to adjudge the efficiency and adequacy of the pollution control measures to achieve new standards.	Complied.
28	That this revised consent letter shall supercede the earlier consent letter no F(HDF)/Chittorgarh(Gangrar)/2(1)/2020-21/6088-6090 dated 26/03/2021.	Agreed.

29	That, notwithstanding 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.	Agreed.
30	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.	Agreed.
	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 against you by the State Board for violation of the provisions of the Act or the Rules made thereunder.	Agreed.
	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).	Complied.
	Please note that non-compliance of any of the above stated conditions would tantamount to revocation of Consent to Operate and project/occupier shall be liable for legal action under the relevant provisions of the said Act(s).	Agreed, We are complying.



F. No. J-11011/279/2006-IA. II(I)  
Government of India  
Ministry of Environment, Forest and Climate Change  
(Impact Assessment Division)

Indira Paryavaran Bhawan  
Jor Bagh Road, Aliganj,  
New Delhi – 110003  
E-mail: r.sundar@nic.in  
Tel: 011-24695304

Dated: 6<sup>th</sup> April, 2021

To

Shri. C.Chandru,  
Factory Manager,  
M/s. Hindustan Zinc Limited  
Chanderiya Lead Zinc Smelter Complex  
PO Putholi District  
Chittorgarh, Rajasthan  
Email: [manisha.bhati@vedanta.co.in](mailto:manisha.bhati@vedanta.co.in)

**Subject:** Expansion in Chanderiya Lead Zinc Smelter by **M/s. Hindustan Zinc Limited** at villages: Putholi, Ajoliya Ka Khera&Biliya, Tehsil: Gangrar & Chittorgarh, **District: Chittorgarh, Rajasthan – Show cause Notice (SCN) issued under section 5 of the Environment (Protection) Act, 1986 for violation of provisions under EIA Notification 2006 – reg.**

Sir,

Whereas Ministry of Environment, Forest and Climate Change (MoEF&CC) accorded following Environment Clearances (ECs) to M/s. Hindustan Zinc Limited [*herein after referred to as Project Proponent*] from time to time for the zinc smelter complex of 5,04,000 TPA capacity at villages: Putholi, Ajoliya Ka Khera&Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh, Rajasthan.

Date of EC	File Number
14/10/2020	J-11011/279/2006-IA.II(I)
05/10/2015	J-11011/279/2006-IA.II(I)
06/12/2006	J-11011/279/2006-IA.II(I)
03/05/2005	J-11011/17/2005-IA.II(I)
31/03/2004	J-11011/158/2003-IA.II(I)
25/08/1980	3/29/79/HCT/ENV
03/06/1983	J-11013/29/92-EI

2. Whereas, project proponent submitted online application vide proposal no. IA/RJ/IND/192897/2021 dated 05/03/2021 seeking Terms Reference (ToR) for the expansion of zinc smelter complex capacity from 5,04,000 TPA to 6,30,000 TPA along with enhancement of captive power plant from 154 MW to 190 MW and establishment of minor metals unit with Copper, Cadmium, Cobalt, Nickel etc., under the provisions of the EIA Notification, 2006.

3. Whereas, the expansion proposal cited above was considered during the 32<sup>nd</sup> meeting of Reconstituted Expert Appraisal Committee [REAC] (Industry-1) held on 15-17<sup>th</sup> March, 2021 wherein the representatives of project proponent as well as M/s. J.M. Environet Private



Limited gave a presentation before the REAC. After deliberations, the Committee recommended that issuance of Show Cause Notice to the project proponent for deliberately suppressing the information regarding grant of Environment Clearance by MoEF&CC on 05/01/2021 for setting up of the fertilizer complex in the land adjacent to the smelter complex.

4. Whereas, as per para 8(vi) of EIA Notification, 2006, states that deliberate concealment and/or submission of false or misleading information or data which is material to screening or scoping or appraisal or decision on the application shall make the application liable for rejection, and cancellation of prior environmental clearance granted on that basis. Rejection of an application or cancellation of a prior environmental clearance already granted, on such ground, shall be decided by the regulatory authority, after giving a personal hearing to the applicant, and following the principles of natural justice.

5. Whereas, deliberate concealment of information mandate commensurate action; and

6. Now, therefore, under Section '5' of Environment (Protection) Act, 1986, you are hereby directed to show cause within **30 days** of receipt of this notice as to why the expansion proposal of M/s. Hindustan Zinc Limited vide referred at paragraph 2 above should not be summarily rejected. In your response, it may also be clearly stated whether a hearing is required by the project proponent before a final order is passed by this Ministry. It may also be noted that if no response is received within **30 days**, appropriate orders, as may be deemed fit, will be passed and issued under the circumstances of the case without any further notice to you. Also, this show cause is without prejudice to any other legal action which may be taken against you.


7. This issues with the approval of the Competent Authority.

Yours faithfully,

  
(Sundar Ramanathan)  
Scientist 'E'

**Copy to:**

1. Secretary, Department of Environment, Government of Rajasthan, Secretariat, Jaipur.
2. Deputy Inspector General of Forests (C), Ministry of Environment, Forest and Climate Change, Integrated Regional Office, A- 209 & 218, Aranya Bhawan, Mahatma Gandhi Road, Jhalana Institutional Area, Jaipur - 304002
3. Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi-110032.
4. Chief Wildlife Warden, Govt. of Rajasthan, Van Bhawan, Vaniki Path, Jaipur -302005
5. Chairman, Rajasthan State Pollution Control Board, 4, Institutional area, Jhalana, Doongri, Jaipur.
6. Member Secretary, Central Ground Water Authority, A-2, W3, Curzon Road Barracks, K.G. Marg, New Delhi-110001.
7. The District Collector, Chittorgarh District, Rajasthan.
8. Guard File/Record File/Monitoring File.
9. MoEF&CC website

  
(Sundar Ramanathan)  
Scientist 'E'

To,

IA – Division (Industry I)

Indira Paryavaran Bhawan,

Ministry of Environment, Forest & Climate Change

Jorbagh Road, New Delhi-110 003

Kind Attn.: **Mr Sundar Ramanathan, Scientist 'E'**

**Sub: Response to the Show-Cause Notice dated 06.04.2021 issued under Section 5 of the Environment (Protection) Act, 1986 for violation of provisions under EIA Notification 2006 in the project of expansion of Chanderiya Lead Zinc smelter at Villages Putholi, Ajoliya ka Khera, Biliya, Teshil :Gangrar and Chittorgarh, District : Chittorgarh, Rajasthan**

Dear Sir,

With reference to the aforesaid subject, we humbly submit that we have not concealed any information while applying for project "Expansion in existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Smelter Unit by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization, Recovery of Minor Metals & Installation of 4 DG Set]". We have already submitted a detailed representation in this regard to MOEF&CC on 23.03.2021 [**Annexure A**].

We acknowledge an inadvertent miss in providing the information about proposed fertilizer project as an interlinked project, and realized the same during discussion in EAC meeting only, as;

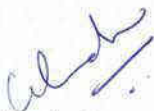


- Land parcel of 335.85 Ha (existing Chanderiya Lead Zinc Smelter and expanded capacity) and 101.45 Ha for the proposed Fertilizer Plant (Detailed layout is enclosed as **Annexure B**) are separate land parcels;
- On-ground activities for proposed fertilizer project is not started so far, as the process of land conversion as per EC Condition 12 (1) [**Annexure C**] is still under progress before the State Government of Rajasthan. And;
- Proposed fertilizer project is a downstream industry for existing smelter complex due to supply of Sulphuric Acid, Power & Water etc. and the same is not vice versa in case of above referred expansion project. These interlinkages have been part of submissions made before the ministry in the fertilizer projects [**Annexure D**].

With the above submission, we request the Ministry to drop the show cause notice dated 06.04.2021 and reconsider the proposal for Expansion in Chanderiya Lead Zinc Smelter Project [Proposal No.: IA/RJ/IND/192897/2021 & MoEFCC File No. J-11011/279/2015- IA. II (I)]; however if there is any additional clarification required, please give us an opportunity of personal or virtual hearing, before passing any order.

Thanking you,

Yours faithfully,



(C Chandru)

Factory Manager

Chanderiya Lead Zinc Smelter

**Encl: List of Annexures**

Copy to

1. Secretary, Department of Environment, Government of Rajasthan, Secretariat, Jaipur.
2. Deputy Inspector General of Forests (C), Ministry of Environment, Forest and Climate

Change, Integrated Regional Office, A- 209 & 218, Aranya Bhawan, Mahatma Gandhi Road, Jhalana Institutional Area, Jaipur - 304002

3. Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi- I I 0032.
4. Chief Wildlife Warden, Govt. of Rajasthan, Van Bhawan, Vaniki Path, Jaipur -302005
5. Chairman, Rajasthan State Pollution Control Board, 4, Institutional area, Jhalana, Doongri, Jaipur.
6. Member Secretary, Central Ground Water Authority, A-2, W3, Curzon Road Barracks, K.G. Marg, New Delhi-I 10001.
7. The District Collector, Chittorgarh District, Rajasthan.

#### List of Annexures

Annexure	Details of Document
A	Representation submitted to MOEF&CC dated 23.03.2021 as per MoM of 32nd meeting of the Re-constituted EAC (Industry-I) held on 16th March 2021.
B	Detailed Plant layout depicting Both Separate Parcel of Land.
C	Environment Clearance Letter for setting up Green Field Ammonium Phosphate Fertilizer Complex of 1.02 MTPA (2 x 0.51 MTPA) at Village Biliya, Tehsil & District Chittorgarh, Rajasthan by M/s Hindustan Zinc Limited.
D	Interlinkage Letter f submitted To Ministry for Fertilizer project.

#### Hindustan Zinc Limited

Sensitivity: Internal (C3)

Chanderiya Lead Zinc Smelter P.O. Putholi, Chittorgarh (Rajasthan) - 312 021  
T +91-1472 254 017 F +91-1472 253 016 [www.hzindia.com](http://www.hzindia.com)

Registered Office : Yashad Bhawan, Udaipur (Rajasthan) - 313 004  
CIN : L27204RJ1966PLC001208

HZL/CLZS/ENV/38/2021-22

Date 23<sup>rd</sup> March 2021

Joint Secretary

IA – Division (Industry)

Indira Paryavaran Bhawan,

Ministry of Environment, Forest & Climate Change

Jorbagh Road, New Delhi-110003

सी. आर. अनुमति द्वारा प्रेषित किया  
Received by Mr. C. R. Anand  
सूचना एवं प्रसारण विभाग, पर्यावरण, वन्य जीव और जलवायु विभाग  
Ministry of Environment, Forest & Climate Change  
भवन, इंदिरा पर्यावरण भवन  
जोर्बाग रोड, नई दिल्ली-110003  
नई दिल्ली/New Delhi-110003

23/3/21

Sub: Regarding Proposal No.: IA/RJ/IND/192897/2021 & MoEFCC File No. J-11011/279/2015- IA. II (I)

Ref: MoM of 32<sup>nd</sup> meeting of the Re-constituted EAC (Industry-I) held on 16<sup>th</sup> March 2021 for Agenda No 32.14.

Respected Sir,

With reference to the 32<sup>nd</sup> meeting of the Re-constituted EAC (Industry – I) held on 16<sup>th</sup> March, 2021, our project, “Expansion in existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Smelter Unit by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization, Recovery of Minor Metals & Installation of 4 DG Set]” was considered for obtaining ToR at agenda item no. 32.14.

In view of the Observations and Recommendations of the Committee as per MoM issued on 19<sup>th</sup> March 2021 (enclosed as Annexure 1), we would like to draw your kind attention to the following points for your records:

**Hindustan Zinc Limited**

Chanderiya Lead Zinc Smelter P.O. Putholi, Chittorgarh (Rajasthan) - 312 021  
T +91-1472 254 017 F +91-1472 253 016 www.hzindia.com

Registered Office : Yashad Bhawan, Udaipur (Rajasthan) - 313 004  
CIN : L27204RJ1966PLC001208

Sensitivity: Internal (C3)



1. We wish to humbly submit that Hindustan Zinc Limited has not deliberately suppressed the information regarding grant of EC by MoEF&CC on 05<sup>th</sup> January 2021 for setting up of the Fertilizer Complex. We had obtained an Environmental Clearance for the proposed Fertilizer Plant to be set up on 101.45 Ha. of land. This land, as adjacent to the smelter complex (CLZS Unit), was allotted to us vide Gazette Notification dated 23.03.2007 for the purpose of green belt development. Hindustan Zinc Limited is compliant with the green belt development requirement as evidenced from the detail provided in Table 1.

In consideration of future projects to be undertaken, and by ensuring compliance of the green belt development requirement, Hindustan Zinc Limited had moved an application for land conversion of the allotted land before the Government of Rajasthan on 18<sup>th</sup> December 2018. This application is pending before the Government of Rajasthan and it is hereby stated that we will ensure compliance with Condition 12 (1) of the EC dated 05<sup>th</sup> January 2021 [EC letter enclosed as **Annexure 2**]. We would like to submit that both land parcels (existing Chanderiya Lead Zinc Smelter - 335.85 Ha, as mentioned in our previous Environmental Clearances & existing ToR application and the proposed Fertilizer Plant - 101.45 Ha.) are separate [Layout is enclosed as **Annexure 3**], and more than 33% of green belt coverage is ensured in both land parcels separately. The status of green belt is summarized in Table 1, as given below for your ready reference.

**Table: 1**  
**Status of Green Belt**

Particulars	Total area [Hect.]	Total area of Green belt [Hect.]	Green Belt [%]
Existing Plant (Covered in previous ECs)	335.8	121.77	36.25
Proposed Fertilizer Plant (New Acquired Land)	101.45	49.31	49
<b>Total Land</b>	<b>437.3</b>	<b>171.08</b>	<b>39</b>

### Hindustan Zinc Limited

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Document is confidential

**Table: 2**

S. No.	Grant of Environment Clearance	Plant	Land Details [ Ha.]	% of Green Area /Green Cover [in Ha.]
1	F.No. J-11011/350/20016-IA II (I) dated 05.1.2021	Setting up Ammonium Phosphate Fertilizer Complex of 1.02 MTPA [2*0.51MTPA]	101.45	49.31

- It is herein reiterated that both land parcels (existing Chanderiya Lead Zinc Smelters - 335.85 Ha, as mentioned in our previous Environmental Clearances & existing ToR application and the proposed Fertilizer Plant - 101.45 Ha.) are separate. Sulphuric acid, by way of a pipeline, and power will be supplied from the Smelter Complex (CLZS Unit) to the proposed Fertilizer Plant.
- We are herewith enclosing the break-up of the Total Metal Quantity of Minor Metal Complex along with Concentration of Metal as **Annexure 4** for your kind records.
- We will submit the cumulative environmental impact assessment in the EIA/EMP Report including proposed expansion in Chanderiya Lead Zinc Smelter, expansion vide EC letter 14/10/2020, and Fertilizer Complex.
- A revised Form I, duly filled with project specific quantities, will be submitted by Hindustan Zinc Limited for due-diligence by the EAC.

#### Hindustan Zinc Limited

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Self-Assessment Report (SAR)

6. **Chronology of NOC and Environment Clearances Chanderiya Lead Zinc Smelter**  
Unit:

Table: 3

S. No.	Grant of Concurrence / NOC/ Environment Clearance	Plant	Land Details [ Ha.]
1	1. Concurrence Letter No. J-11013/29/92-EI dated 03.06.83 2. NOC issued by RPCB vide letter No. F. 12 (723) RPCB / NOC / 1535 dated 26th April 1991. 3. F.12 (723) RPCB / NOC / 5160 dated 29th June 1992	Pyro- Lead Zinc Smelter  Lead: 35000 MTPA Zinc: 105000 MTPA	335.8
2	EC vide no J- 11011/158/2003 -IA-II (I) dt. 31.3.2004	2,10,000 TPA Zinc Hydro-I and II x 77 MW CPP	335.8
3	EC vide no J- 11011/17/2005 – IA II (I) dt. 3.8.2005	Ausmelt Lead Smelter [60000 MTPA]	335.8
4	EC vide no J – 11011/279/2006 – IA II (I) dt. 6-12.2006	Hydro smelter Phase-2 [2,10,000 TPA Zinc Hydro-II and 100 MW CPP]	335.8
5	EC vide no. J-11011/279/2006-IA.II(I) dated 05.10.2015	Hydro Plant Zinc Smelter II (with Fumer) 2,50,000 Zinc & CPP 100 MW	335.8
6	EC vide no J-11011/279/2006-IA.II(I) dated 14.10.2020	Hydro-I & II unit on combined basis with production capacity of 5, 04,000 TPA Zinc	335.8

In view of the above, we would like to humbly share the fact that the aforesaid Environment Clearances have been accorded to Hindustan Zinc Limited by MOEF&CC, and the same were mentioned in the application submitted to MOEF&CC on 05<sup>th</sup> March 2021. This was in reference to our existing Chanderiya Lead Zinc Smelter with Land Area 335.89 Ha. and Green Area 121.77 Ha. [Approx. 36.25%] i.e. more than 33% of the area.

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Sensitivity: Internal (C)



We humbly request you to consider our above submissions and grant Terms of References for preparation of EIA/ EMP Report for the proposed expansion in existing Chanderiya Lead- Zinc Smelter Complex [Expansion in Hydro Smelter Unit by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis and Installation of 1 Lead Refinery, Expansion of CPP through Modernization, Recovery of Minor Metals & Installation of 4 DG Set] at villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan) by M/s Hindustan Zinc Limited.

Thanking you,  
Yours faithfully,



(C Chandru)

Factory Manager

Chanderiya Lead Zinc Smelter

Encl: a/a

**Hindustan Zinc Limited**

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Security Information

MoM of 32<sup>nd</sup> meeting of the Re-constituted EAC (Industry-I) held on 15<sup>th</sup> – 17<sup>th</sup> March, 2021

Attributes	Sampling		Remarks
	No. of stations	Frequency	
C. Water			
a. Surface water	5	One sample at each of the locations	Parameters Monitored: as per IS: 2296
b. Ground water	8	One sample at each of the locations	Parameters Monitored: as per IS: 10500
D. Land			
a. Soil quality	8	One sample at each of the locations	Parameters Monitored: Texture, infiltration rate, Porosity, SAR, bulk density, pH, Ca, Mg, Na, K, Zn, Mn
b. Land Use	Study area		LU map will be prepared
E. Biological	Study area	One season	
a. Aquatic			
b. Terrestrial			
F. Socio-economic parameters	Study area	One season	Socioeconomic impacts

32.13.12 The proposal was considered by the EAC (Industry 1) in its 32<sup>nd</sup> meeting of the Re-constituted EAC (Industry-I) held on 15<sup>th</sup>-17<sup>th</sup> March, 2021. The observations and recommendations of EAC is given as below.

#### Observations of the Committee

32.13.13 The EAC noted the following:

- Form I has been filled with generic information and no project specific quantities have been provided and as such no inference could be drawn for taking decision on grant of ToR.
- Action plan for dolochar utilization from DRI unit has not been furnished.
- Diversion plan for the road passing through the plant has not been furnished.

#### Recommendations of the Committee

32.13.14 In view of the foregoing and after detailed deliberations, the committee recommended to the return the proposal in its present form to address the shortcomings as enumerated above.

32.14 Expansion in Chanderiya Lead Zinc Smelter [Pyro Metallurgical Smelter: Change in Product Mix on total metal basis as 140,000 TPA (Refined Lead or Refined Zinc or Product Mix of both Metal), Installation of 1 Lead Refinery (100 KTA) and three additional DG Sets of 1500 KVA, 625 KVA & 750 KVA; Hydro Metallurgical Smelter: 630000 MTPA. [Increasing the Capacity from 504000 MTPA to 630000 MTPA through expansion in Melting and casting section by adding 1 induction furnace (24 TPH) and 1 slab casting line (175000 MTPA)] and additional One DG set of 750 KVA; Captive Power Plant: Unit 1&2 from 154 MW (2X77 MW) to 190 MW (2X95MW) and no Change in Unit 3 (100 MW) CPP; Minor Metals Unit with Copper, Cadmium, Cobalt, Nickel etc., by M/s. Hindustan Zinc Limited at villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh,



**Rajasthan** [Online Proposal No. IA/RJ/IND/192897/2021; File No. J-11011/279/2015-IA.II(I)] – **Prescribing of Terms of Reference – regarding.**

- 32.14.1 M/s. Hindustan Zinc Limited has made an application online vide proposal no. IA/RJ/IND/192897/2021 dated 05/03/2021 along with the application in prescribed format (Form-I), copy of pre-feasibility report and proposed ToRs for undertaking detailed EIA study as per the EIA Notification, 2006 for the project mentioned above. The proposed project activity is listed at S. No. 3(a) Metallurgical industries (ferrous & non-ferrous) under Category "A" of the schedule of the EIA Notification, 2006 and appraised at Central Level.

**Details submitted by Project proponent**

- 32.14.2 The project of M/s. Hindustan Zinc Limited located in Putholi, Ajoliya Ka Khera & Biliya Villages, Gangrar & Chittorgarh Tehsil, Chittorgarh District, Rajasthan State is for Expansion in existing Chanderiya Lead Zinc Smelter Complex [Pyro Metallurgical Smelter: Change in Product Mix on total metal basis as 140,000 TPA (Refined Lead or Refined Zinc or Product Mix of both Metal), Installation of 1 Lead Refinery (100 KTA) and three additional DG Sets of 1500 KVA, 625 KVA & 750 KVA; Hydro Metallurgical Smelter: 630000 MTPA. [Increasing the Capacity from 504000 MTPA to 630000 MTPA through expansion in Melting and casting section by adding 1 induction furnace (24 TPH) and 1 slab casting line (175000 MTPA)] and additional One DG set of 750 KVA; Captive Power Plant: Unit 1&2 from 154 MW (2X77 MW) to 190 MW (2X95MW) and no Change in Unit 3 (100 MW) CPP; Minor Metals Unit with Copper, Cadmium, Cobalt, Nickel etc.
- 32.14.3 Environmental site settings

S No.	Particulars	Details								
i.	Total land	335.89 ha The present land use of the plant site is industrial & will remain the same after proposed expansion.								
ii.	Existence of habitation & involvement of R&R, if any.	No and R&R is not applicable								
iii.	Latitude and Longitude of the project site	Chanderiya Lead Zinc Smelter <table><tr><td>A</td><td>24°57'21.29"N, 74°38'34.39"E</td></tr><tr><td>B</td><td>24°58'21.03"N, 74°40'43.43"E</td></tr><tr><td>C</td><td>24°57'20.33"N, 74°38'37.46"E</td></tr><tr><td>D</td><td>24°58'35.69"N, 74°39'16.22"E</td></tr></table>	A	24°57'21.29"N, 74°38'34.39"E	B	24°58'21.03"N, 74°40'43.43"E	C	24°57'20.33"N, 74°38'37.46"E	D	24°58'35.69"N, 74°39'16.22"E
A	24°57'21.29"N, 74°38'34.39"E									
B	24°58'21.03"N, 74°40'43.43"E									
C	24°57'20.33"N, 74°38'37.46"E									
D	24°58'35.69"N, 74°39'16.22"E									
iv.	Elevation of the project site	154 m – 175m								
v.	Involvement of Forest land if any.	Nil								
vi.	Water body exists within the project site as well as study area	<ul style="list-style-type: none"><li>• Putholi Nala (Passing through the Plant site)</li><li>• Berach River (Adjacent in East direction)</li><li>• Gambhir Nadi (3.5 km in SSW direction)</li><li>• Nagdika Nala (8.5 km in NNE direction)</li><li>• Canal (8 km in WNW direction)</li></ul>								
vii.	Existence of ESZ/ESA/national park/wildlife	Nil								

S No.	Particulars	Details
	sanctuary/biosphere reserve/tiger reserve/elephant reserve etc. if any within the study area	

32.14.4 The existing project was accorded Concurrence letter initially for Pyro Plant vide no. J-11013/29/92-EI dated 03/06/1983; Production capacity of Pyro Plant was increased from 105000 TPA (Zn - 70,000 TPA + Pb - 35,000 TPA) to 140000 TPA (Zn - 105000 TPA + Pb - 35000 TPA) vide NOC obtained from RSPCB vide no. F.12 (Chittor-60)RPCB/Gr. III/19418 dated 05/03/2004. The Environmental Clearance for {Hydro Plant } Zinc Smelter I (1,70,000 Zinc Production) & CPP (154MW) vide F.No.J-11011/158/2003-IA.II(I) 31/03/2004; The Environmental Clearance for Ausmelt Lead Smelter Plant (60,000 TPA) vide F.No.J-11011/17/2005-IA.II (I) 3/8/2005; The Environmental Clearance for {Hydro Plant } Zinc Smelter II (2,10,000 TPA) and expansion of {Hydro Plant } Zinc Smelter I (From 1,70,000 TPA to 2,10,000 TPA) vide vide no J-11011/279/2006-IA.II(I) dated 06/12/2006; The Environmental Clearance for Inclusion of Fumer Plant within the {Hydro Plant } Zinc Smelter II vide F.No.J-11011/279/2006-IA.II(I) 5/10/2015; The Environment Clearance for Capacity Expansion in Hydro I & Hydro II Zinc Smelters (from 4,20,000 TPA to 5,04,000 TPA) through debottlenecking vide letter no. J-11011/279/2006-IA.II (I) dated 14/10/2020.

32.14.5 CTO for Pyro Plant was accorded by Rajasthan State Pollution Control Board (RSPCB) vide Order no. 2020-2021 / HDF /3070 dated 08/06/2020 (valid upto 29/02/2024). CTO for Hydro -I Plant and CPP (154 MW) was accorded by RSPCB vide Order No. 2019-2020/HDF/2859 dated 16/01/2020 (valid upto 31/08/2023). CTO for Hydro- II Plant & CPP (100 MW) was accorded by RSPCB vide Order no. 2019-2020/HDF/2818 dated 18/12/2019 (valid upto 31/01/2024). CTO for Fumer Plant within existing Hydro -II plant was accorded by RSPCB vide Order no. 2020-2021/HDF/3009 dated 08/05/2020 (valid upto 31/03/2025). CTO for Ausmelt Lead Plant was accorded from RSPCB vide Order no. 2020-2021/HDF/3069 dated 05/06/2020 (valid upto 31/08/2023). CTO for installation of 2 D.G. Sets (2 x 8MW) was obtained from RSPCB vide Order no. 2016-2017 / CPM / 4789 dated 23/02/2017 (valid up to 30/04/2019). CTO for Township was obtained vide Order no. 2018-2019/CPM/5201 dated 23/05/2018.

32.14.6 Implementation status of the existing EC:

S. No.	Facilities	Unit	As per existing ECs	Implementation status as on 31/12/2020	Production as per CTOs
<b>A. Lead Zinc Smelter Plant (Pyro Plant)</b>					
1.	Refined Lead	TPA	35,000	35,000	35,000
2.	Refined Zinc	TPA	105,000	105,000	105,000
	Total	TPA	140,000	140,000	140,000
3.	Captive Power Plant	MW	90	Not installed	NA
<b>B. Hydro-I + Hydro-II (Incl. Fumer plant)</b>					



S. No.	Facilities	Unit	As per existing ECs	Implementation status as on 31/12/2020	Production as per CTOs
4.	Zinc (Hydro- I + II) / Zinc Alloys and its Compounds	TPA	5,04,000	5,04,000	5,04,000
5.	Captive Power Plant with Hydro- I	MW	154 (2x77)	154 (2x77)	154 (2x77)
6.	Captive Power Plant with Hydro- II	MW	100	100	100
7.	WHRB	MWH	34.7 (9.4) (4.3) (21)	34.7 (9.4) (4.3) (21)	34.7 (9.4) (4.3) (21)
<b>C. Aasmelt Lead Smelter Plant</b>					
8.	Lead	TPA	60, 000	60, 000	60, 000

32.14.7 The unit configuration and capacity of existing and proposed project is given as below:

S. No.	Products	Unit	Production capacity										Remarks
			Existing granted					Total after expansion					
			Pyro Plant	Hydro – I	Hydro – II	Ausmelt Plant	Total	Pyro Plant	Hydr o – I	Hydr o – II	Ausmel t Plant	Total	
Products													
1.	Refined Lead/Lead	TPA	35,000	-	-	60,000	95,000	140,000	-	-	60,000	2,00,000	Additional melting capacity by adding 1 furnace and 1 slab casting line in Hydro-I and Max Production achieved in Pyro will be 1,40,000 TPA
2.	Refined Zinc/ Zinc	TPA	105,000	5,04,000		-	6,09,000		6,30,000		-	7,70,000	
3.	Total	TPA	140,000	5,04,000		60,000	7,04,000		6,30,000		60,000	8,30,000	
Power													
4.	CPP	MW	90#	154	100	NIL	254	90#	190	100	NIL	290	#Not Installed
5.	WHRB	MW	Nil	9.4	4.3 21	Nil	34.7	Nil	9.4	5.3 21	Nil	35.7	No Change
6.	DG Sets	KVA	NIL	1 x 750 1 x 1000	1 x 625 2 x 1250 1 x 125 2 x 9265	NIL	23530	1 x 625 1 x 1500 1 x 750	1 x 750 1 x 1000	1 x 625 2 x 1250 1 x 125 2 x 9265 1 x 750	NIL	27155	4 additional DG proposed
By Products													
7.	Sulphuric Acid	TPA	176,000	307774	307774	50500	8,42,048	223505	307774	307774	50500	8,89,553	Increase in acid production in Pyro

8.	Zn-Cd Alloy /Cadmium Metal /Cadmium Sponge (on equivalent cadmium basis) (By-product)	TPA	375	680	680	NIL	1,735	574	680	680	NIL	1,934	
9.	Copper Matte / Cu residue/ Copper cement / Copper Compounds / Copper (on equivalent copper basis)	TPA	2100	510	510	Nil	3120	3338	510	510	Nil	4,358	
10.	Copper Sulphate (By-product)		Nil	Nil	Nil	7920	7920	Nil	Nil	Nil	7920	7,920	
11.	Silver High Grade Metal (HGM)/ Anode Slime (on equivalent silver basis) (By-product)	TPA	74	NIL	NIL	94.71	168.71	802.29	NIL	NIL	94.71	897	
12.	Antimony Slag / Antimony Compounds/ Antimony Trioxide( Sb <sub>2</sub> O <sub>3</sub> ) (on equivalent Antimony basis)	TPA	NIL	NIL	NIL	NIL	NIL	992	NIL	NIL	NIL	992	
13.	Zinc Rich dust	TPA	NIL	NIL	NIL	6600	6600	NIL	NIL	NIL	6600	6600	-
14.	Calomel/ Mercury Chloride/ Mercury Compounds (By-Product)	TPA	NIL	20	20	NIL	40	14.8	20	20	NIL	54.8	-
15.	Low Grade Lead Concentrate /	TPA	NIL	30,000	NIL	NIL	30,000	NIL	30,000	NIL	NIL	30,000	-
16.	Lead Silver Cake	TPA	NIL	NIL	16,000	NIL	16,000	NIL	NIL	32000	NIL	32000	-
17.	Copper Speiss/ Copper Residue (By-product)	TPA	NIL	NIL	700	NIL	700	NIL	NIL	1200	NIL	1200	
18.	Lead Oxide Concentrate	TPA	NIL	NIL	NIL	NIL	NIL	20000	NIL	NIL	NIL	20000	
19.	Sodium Chloride	TPA	NIL	250	250	NIL	500	NIL	250	250	NIL	500	
20.	Sodium Sulphate	TPA	NIL	1250	1250	NIL	2500	NIL	1250	1250	NIL	2500	
21.	Zinc Sulphate (Crystalline)	TPA	NIL	NIL	NIL	NIL	NIL	NIL	2400	2400	NIL	4800	
<b>Minor Metal Unit</b>													
22.	Lead Bullion/Lead Cake/Low Grade Lead/Lead Silver cake (On eq Metal Basis)	TPA	NIL	NIL	NIL	NIL	NIL	NIL	79.2	79.2	8578	8736.4	The products of the Minor Metal Complex will be reprocessed at Chanderiya Lead Zinc Complex in Pyro and Hydro Metallurgical Smelter Unit without increasing overall Metal capacity proposed herewith in this proposal. Thus overall reducing the Waste generation and disposal.
23.	CUSO <sub>4</sub> Solution/ Copper Slag /Copper Cement /Copper Compounds (On eq Metal Basis)	TPA	NIL	NIL	NIL	NIL	NIL	NIL	310.5	310.5	875	1496	
24.	Zn So <sub>4</sub> Solution (On eq Metal Basis)	TPA	NIL	NIL	NIL	NIL	NIL	NIL	1390	1390	NIL	2780	
25.	Cadmium Sponge/Cadmium Sponge filter cake/ Cadmium Ingot /Cadmium (On eq Metal Basis)	TPA	NIL	NIL	NIL	NIL	NIL	NIL	1235	1235	NIL	2470	

26.	Cobalt Cake/Cobalt Compounds/Cobalt Filter Cake (on Equivalent metal basis)	TPA	NIL	NIL	NIL	NIL	NIL	NIL	25	25	NIL	50
27.	Ni cake / Ni Compounds (On eq Metal Basis)	TPA	NIL	NIL	NIL	NIL	NIL	NIL	15	15	NIL	30
28.	Copper Matte/Residue /Copper Cement (On eq Metal Basis)	TPA	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	960	960
29.	Cadmium Alkali Slag/Cadmium Slag. (On eq Metal Basis)	TPA	NIL	NIL	NIL	NIL	NIL	NIL	225	225	NIL	450
30.	Lead Rich Dust from Bag House	TPA	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	300	300

32.14.8 The details of the raw material requirement for the existing and proposed project along with its source and mode of transportation is given as below:

S. No.	Particular	UNIT	Quantity		Total After expansion	Probable transportation	
			Existing	Additional		Source	Distance and mode
Zinc Lead Smelter Plant (Pyro Plant+ Ausmelt)							
1.	Zinc concentrate	TPA	199500	58000	257500	HZL mines-RA, SK & Zawar mines	<150 km Through Trucks
2.	Lead concentrate	TPA	138500	196500	335000	HZL mines-RA, SK & Zawar mines	<150 km Through Trucks
3.	Coke	TPA	100000	NIL	100000	Indigenous /imported	Approx. 1500kms Through Trucks
4.	Lime Stone	TPA	45000	NIL	45000	Nearby Mines	Approx. 250 km
5.	Iron ore /Iron Oxide	TPA	30000	NIL	30000	Mines Jabalpur	Approx. 1000 km
6.	Zinc Oxide /Zinc Dust /Zinc Bearing material/ Zinc Dross	TPA	NIL	50000	50000	Market/ HZL Smelters Approx. / From authorised recyclers	<150 km Through Trucks/ within 200 km.
7.	Lead Oxide /Lead Bearing Secondaries/Lead Dross /Lead Cake /Lead Bearing Outsourced Secondaries	TPA	Nil	50000	50000	Market/ HZL Smelters Approx. / From authorised recyclers	<150 km Through Trucks/ within 200 km.
8.	Silica	MT	3600	NIL	3600	Nearby Mines	<150 km Through Trucks
9.	Coal/ Coke	MT	1500	NIL	1500	Indigenous /imported	Approx. 1500kms Through Trucks
10.	Dolomite	MT	1700	NIL	1700	Nearby Mines	<150 km Through



S. No.	Particular	UNIT	Quantity			Probable transportation	
			Existing	Additional	Total After expansion	Source	Distance and mode
							Trucks
<b>Hydro I &amp; Hydro-II (Incl. Fumer plant) and CPP</b>							
1.	Zinc concentrate	TPA	698458	NIL	698458	HZL mines-RA, SK & Zawar mines	<150 km Through Trucks
2.	Calcine (ZnO)	TPA	337990	NIL	337990	HZL Smelters	-
3.	Zinc Dross/ Ash/ Zinc bearing waste/Zinc Oxide	TPA	15000	NIL	15000	Market/ HZL Smelters Approx./ From authorised recyclers	<150 km Through Trucks/ within 200 km.
4.	Aluminium Metal	TPA	4800	NIL	4800	Market	<150 km Through Trucks/ within 200 km.
5.	Magnesium Metal	TPA	60	NIL	60	Market	<150 km Through Trucks/ within 200 km.
6.	Copper Metal	TPA	600	NIL	600	Market	<150 km Through Trucks/ within 200 km.
7.	Limestone for FGD	TPA	NIL	131465	131465	Nearby Mines	Approx. 250 km
8.	Zinc Cathode*	TPA	NIL	140000	140000	HZL Smelter	-
<b>Minor Metal Unit</b>							
9.	PF Cake	TPA	NIL	8800	8800	HZL Smelter	Captive
10.	Cadmium Sponge	TPA	NIL	4000	4000	HZL Smelter	Captive
11.	Copper Matte	TPA	NIL	3500	3500	HZL Smelter	Captive
12.	Cobalt Cake	TPA	NIL	2000	2000	HZL Smelter	Captive
13.	Copper Dross	TPA	NIL	12000	12000	HZL Smelter	Captive
14.	Coal	TPA	NIL	1480	1480	HZL Smelter	Coal Yard
15.	Zinc Dust	TPA	NIL	2210	2210	HZL Smelter	Captive
16.	Sulphuric Acid	TPA	NIL	6500	6500	HZL Smelter	Captive

- 32.14.9 No additional fresh water is required for proposed expansion. After the expansion project, 500 KLD additional water will be required for the Minor Metal Unit which will be sourced from RO permeate water from ETP. The fresh water requirement for the existing project is 38570 KLD, which is obtained from the Gosunda Dam (Fresh Water) & Proposed STP Chittorgarh/ Bhilwara/ other proposed STP's (Recycled Water). The Permission for withdrawal of 1500 MCFT of surface water from Gosunda Dam has been obtained from Special Secretary, Energy Department, GOR vide letter no. F 2 (28) Energy /86-IV dated 19/11/1994.
- 32.14.10 The power requirement for the project is estimated as 308 MW, which will be available from the captive power plant/WHRB/Captive Solar Power Plant/ Rooftop Solar Panels / Floating Solar Panels /AVVNL.

- 32.14.11 The capital cost of the project is Rs. 773 Crores and the capital cost for environment protection measures is proposed as Rs. 38.65 Crores and recurring cost of Rs. 1.5 Crore /annum. The total employment generation after the proposed expansion project will be 360.
- 32.14.12 Name of the EIA consultant: M/s J.M. Enviro Net Pvt. Ltd. [S.No. 41, List of ACOs with their Certificate / Extension Letter no. Rev. 08, Mar. 15, 2021]
- 32.14.13 The proposal was considered by the EAC (Industry I) in its 32<sup>nd</sup> meeting of the Re-constituted EAC (Industry-I) held on 15<sup>th</sup>-17<sup>th</sup> March, 2021. The observations and recommendations of EAC is given as below.

**Observations of the Committee**

- 32.14.14 The EAC noted the following:
- Project proponent as well as the consultant deliberately suppressed the information regarding grant of EC by MoEF&CC on 05/01/2021 for setting up of the fertilizer complex in the land adjacent to the smelter complex wherein the green belt development for the existing zinc smelter was envisaged.
  - No details have been mentioned about the Fertilizer complex neither in the Form I nor in the Pre-feasibility report as there is an involvement of inter-movement of materials between the smelter complex and fertilizer complex.
  - Neither the proponent nor the consultant was unable to explain the products envisaged under the minor metal production.
  - Consultant made contradicting statements on the baseline data collected during Oct to December, 2020 with respect to the prevailing meteorological conditions, location of sampling stations and parameters monitored for the different environmental components.
  - Implementation status of the EC dated 14/10/2020 has not been furnished.
  - Scoping for carrying out the cumulative impact assessment including fertilizer complex has not been considered.
  - Form I has been filled with generic information and no project specific quantities have been provided which are essentially required for due-diligence by the EAC.

**Recommendations of the Committee**

- 32.14.15 In view of the foregoing and after detailed deliberations, the committee recommended the following:
- Proposal shall be returned in present form to address the concerns of the Committee as enumerated above.
  - Show Cause Notice may be issued to the project proponent for deliberately suppressing the information regarding grant of EC by MoEF&CC on 05/01/2021 for setting up of the fertilizer complex in the land adjacent to the smelter complex.
  - Show Cause Notice may be issued to the EIA consultant - M/s J.M. Enviro Net Pvt. Ltd. for deliberately suppressing the information regarding grant of EC by MoEF&CC on 05/01/2021 for setting up of the fertilizer complex in the land adjacent to the smelter complex. Further, contradicting statements have been made on the baseline data



collected during Oct to December, 2020 with respect to the prevailing meteorological conditions, location of sampling stations and parameters monitored for the different environmental components. Besides, Form I has been filled with generic information and no project specific quantities have been provided which are essentially required for due-diligence by the EAC.

- 32.15 Proposed Green field Project -34.5 MTPA throughput Iron Ore Beneficiation Plant by **M/s Thriveni Earthmovers Private Ltd.** at Deojhar, Tehsil: Barbil, **Dist: Keonjhar, Odisha** [Online Proposal No. IA/OR/IND/202015/2021; File No. IA-J-11011/87/2021- IA-II(I)] – **Prescribing of Terms of Reference** – regarding.

- 32.15.1 M/s Thriveni Earthmovers Pvt. Ltd. has made an application online vide Proposal No. IA/OR/IND/202015/2021 dated 05/03/2021 along with the application in prescribed format (Form-I), copy of pre-feasibility report and proposed ToRs for undertaking detailed EIA study as per the EIA Notification, 2006 for the project mentioned above. The proposed project activity is listed at S. No. 2(b) Mineral beneficiation under Category “A” of the schedule of the EIA Notification, 2006 and attracts general condition due to presence of inter-state boundary between Jharkhand and Odisha (1.1 km north) being appraised at Central Level.

**Details submitted by Project proponent**

- 32.15.2 The project of M/s Thriveni Earthmovers Pvt. Ltd. is located in Village Deojhar, Tehsil Barbil, District Keonjhar, State Odisha is setting up of a new Iron Ore Beneficiation Plant for throughput capacity of 34.5 Million Tons Per Annum.

- 32.15.3 Environmental site settings

S. No.	Particulars	Details				
i.	Total Land	144.962 ha [Govt: 138.962 ha and Grazing land: - 6.0 Ha]. Land Use: Barren land with tree cover in patches				
ii.	Existence of habitation & involvement of R&R, if any	None				
iii.	Latitude and Longitude of the Project site	Latitudes: 22°05'30"N to 22°07'30"N Longitudes: 85°27'30" to 85°29'30"E				
iv.	Elevation of the Project Site	520 to 620 meters aMSL				
v.	Involvement of Forest land if any	Not applicable.				
vi.	Water body exists within the project site as well as study area	None within the Project site  Study Area <table><tr><th>Name</th><th>Distance</th></tr><tr><td>Baitarini River</td><td>7.9 km</td></tr></table>	Name	Distance	Baitarini River	7.9 km
Name	Distance					
Baitarini River	7.9 km					
vii.	Existence of ESZ/ESA/National Park/Wildlife Sanctuary/biosphere reserve/tiger reserve/elephant reserve etc. if any within the study area	None within 10 km radius				



F.No.J-11011/350/2016- IA II(I)  
Government of India  
Ministry of Environment, Forest and Climate Change  
(Impact Assessment Division)

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By Speed Post/Online

Vayu Wing, 3<sup>rd</sup> Floor  
Indira Paryavaran Bhawan  
Jorbagh Road, New Delhi - 3

Dated: 5<sup>th</sup> January, 2021

To

**M/s Hindustan Zinc Limited**  
Yashad Bhawan, Near SwaroopSagar  
Girwa, Udaipur, Rajasthan-313004

Email: [subhendu.mishra@vedanta.co.in](mailto:subhendu.mishra@vedanta.co.in)

**Sub: Setting up Ammonium Phosphate Fertilizer Complex of 1.02 MTPA (2 x 0.51 MTPA) at Village Biliya, Tehsil & District Chittorgarh, Rajasthan by M/s Hindustan Zinc Limited-Environmental Clearance - reg.**

Sir,

This has reference to your proposal No.IA/RJ/IND2/60077/2016 dated 23<sup>rd</sup> August 2019 and further letter dated 18.12.2020, submitting the EIA/EMP report on the above subject matter.

2. The Ministry of Environment, Forest and Climate Change has examined the proposal for environmental clearance to the project for setting up Ammonium Phosphate Fertilizer Complex of 1.02 MTPA (2 x 0.51 MTPA) by M/s Hindustan Zinc Limited in an area of 101.45 ha located at Village Biliya, Tehsil & District Chittorgarh, Rajasthan.

3. The details of products and by-products are as under:

S. No.	Product	Capacity (TPA)		
		Phase I	Phase II	Total
1	Di-Ammonium Phosphate (DAP)	5,10,000	5,10,000	1.02 MTPA
2	Nitrogen Phosphorous Potash			
3	Ammonium Phosphoric Sulphate			
4	Phosphoric acid (100% P <sub>2</sub> O <sub>5</sub> basis)	2,40,000	2,40,000	4,80,000
5	Aluminium Fluoride	9,000	9,000	18,000
<b>By products</b>				
1	Hydro Fluosilicic Acid	10,500	10,500	21,000
2	Phosphogypsum	13,50,000	13,50,000	27,00,000

4. The project shall be installed in two phases in an area of 10,14,500 m<sup>2</sup> (101.45 Ha). Industry has developed greenbelt in an area of 4,93,100 m<sup>2</sup> (49.31 Ha) covering 48.60 of total project area. The estimated project cost is Rs 2700 crores. Total capital cost

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earmarked towards environmental pollution control measures is Rs 185 crores and the recurring cost (O&M) will be about Rs 37 crores per annum. The project will provide employment for 250 persons. Industry proposes to allocate Rs. 25 crores cost towards Corporate Environmental Responsibility (CER).

5. There are no National parks, Wildlife sanctuaries, Biosphere Reserves, Tiger/ Elephant Reserves, Wildlife Corridors etc. within 10 km distance from the project site. Seasonal Berach river, Putholinalla, Gambhiri river are passing at 680 m (SE), 250 m (S) and 5.5 km (S) respectively from the project site.

6. Total water requirement is estimated to be 14,100 cum/day, which includes fresh water requirement of 10100 cum/day (5050 cum/day in each phase), proposed to be met from Gosunda dam/STP Udaipur/ proposed STP at Chittorgarh town. The fresh water requirement shall be reduced to 9600 cum/day by adopting industrial best practices. Effluent of 4220 cum/day quantity will be treated in ETP of capacity 4800 cum/day and recycled back in the system. Domestic Sewage water will be treated in sewage treatment plant (120 cum/day) and treated water will be utilized for plantation purpose and other uses. There will be no discharge of treated/untreated waste water from the unit, and thus ensuring Zero Liquid Discharge.

Power requirement will be 35MW and will be met from State grid/ existing CPP of Chanderia Zinc Lead smelter. Unit proposes four DG sets of 2500 KVA capacity each (2 DGs in each phase), as standby during power failure. Stack (height 10m above building height) will be provided as per CPCB norms to the proposed DG sets. Phosphoric acid (100%  $P_2O_5$  basis) & Hydro Fluosilicic Acid will be consumed within the process and surplus quantity shall be sold. Phosphogypsum will be utilized for cement manufacturing.

7. The project/activities are covered under category A of item 5(a) 'Chemical fertilizers' of the Schedule to the Environment Impact Assessment Notification, 2006, and requires appraisal at central level by the sectoral Expert Appraisal Committee (EAC) in the Ministry.

8. The terms of references (ToR) for the project was issued by the Ministry vide letter dated 29<sup>th</sup> May 2017. Public hearing for the proposed project has been conducted by the State Pollution Control Board on 12<sup>th</sup> February, 2019 under the Chairmanship of Additional District Magistrate. The main issues raised during the public hearing are related to employment to local, pollution, land conversion from greenbelt to industrial use etc.

9. The proposal was considered by the Expert Appraisal Committee (Industry-2) in its meetings held on 23-25 October, 2019 and 30-31 December, 2019 & 1<sup>st</sup> January, 2020 in the Ministry, wherein the project proponent and their accredited consultant M/s EQMS India Pvt Ltd. presented the EIA/EMP report as per the ToR. The Committee found the EIA/EMP report complying with the ToR and recommended the project for grant of environmental clearance.

10. The EAC, constituted under the provision of the EIA Notification, 2006 and comprising of Experts Members/domain experts in various fields, have examined the proposal submitted by the Project Proponent in desired form along with EIA/EMP report prepared and submitted by the Consultant accredited by the QCI/ NABET on behalf of the



## Project Proponent.

The Committee deliberated the action plan on the issues raised during the public hearing. The Committee found the detailed action plan submitted by the project proponent with budgetary provisions to be satisfactory and addressing the concerns raised during public hearing/consultation.

The EAC noted that the Project Proponent has given undertaking that the data and information given in the application and enclosures are true to the best of his knowledge and belief and no information has been suppressed in the EIA/EMP report and public hearing process. If any part of data/information submitted is found to be false/misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.

The Committee noted that the EIA/EMP report is in compliance of the ToR issued for the project, reflecting the present environmental concerns and the projected scenario for all the environmental components. Issues raised during the public hearing has been properly addressed in the EIA/EMP report. Additional information submitted by the project has been found to be in order. The EAC has deliberated the proposal and has made due diligence in the process as notified under the provisions of the EIA Notification, 2006, as amended from time to time and accordingly made the recommendations to the proposal.

11. Based on the recommendation of EAC, the proposal was examined in the Ministry. The Ministry, vide letter dated 17.02.2020, has sought updated land conversion status to industrial purpose. In this context, M/s HZL vide letter, dated 18.12.2020, has inter-alia, submitted that land conversion application was submitted by Project Proponent on 18.12.2018 which is still under process with the State Government. PP has also submitted the affidavit vide letter dated 18.12.2020, mentioned that the project activities will be carried out only after required permission from the State Government for land conversion to industrial purpose.

12. Based on the proposal submitted by the project proponent and recommendations of the EAC (Industry-2), Ministry of Environment, Forest and Climate change hereby accords environmental clearance to the project for **Setting up Ammonium Phosphate Fertilizer Complex of 1.02 MTPA (2 x 0.51 MTPA) by M/s Hindustan Zinc Limited at Village Biliya, Tehsil & District Chittorgarh, Rajasthan**, under the provisions of the EIA Notification, 2006, subject to the compliance of terms and conditions as under:-

- (i) M/s HZL vide letter, dated 18.12.2020, has mentioned that land conversion application was submitted on 18.12.2018 to State Government which is still under process with the State Government. Project Proponent shall start the project activities only after taking necessary permission/approval from the State Government for land conversion to industrial purpose.
- (ii) The project proponent shall start project/activities after obtaining necessary clearances from the various authorities of Central Government and State Government.
- (iii) As already committed by the project proponent, Zero Liquid Discharge shall be ensured and no waste/treated water shall be discharged outside the premises.

 for M/s Hindustan Zinc Limited

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- (iv) Necessary authorization required under the Hazardous and Other Wastes (Management and Trans-Boundary Movement) Rules, 2016, Solid Waste Management Rules, 2016 shall be obtained and the provisions contained in the Rules shall be strictly adhered to.
- (v) The gaseous emissions ( $\text{SO}_2$ ,  $\text{NO}_x$ ,  $\text{NH}_3$  and HC) and particulate matter from various process units shall conform to the norms prescribed by the CPCB/SPCB from time to time. At no time, the emission levels 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. Stack emissions shall be monitored regularly.
- (vi) To control source and the fugitive emissions, suitable pollution control devices shall be installed to meet the prescribed norms and/or the NAAQS. The gaseous emissions shall be dispersed through stack of adequate height as per CPCB/SPCB guidelines. Fugitive emissions shall be controlled at 99.5% with effective chillers.
- (vii) Total fresh water requirement shall not exceed 9600 cum/day, proposed to be met from Gosunda dam/STP Udaipur/ STP Chittorgarh. Prior permission in this regard shall be obtained from the concerned regulatory authority, and shall be renewed time to time.
- (viii) Process effluent/any wastewater shall not be allowed to mix with storm water. The storm water from the premises shall be collected and discharged through a separate conveyance system.
- (ix) Hazardous chemicals shall be stored in tanks, tank farms, drums, carboys etc. Flame arresters shall be provided on tank farm, and solvent transfer through pumps.
- (x) The Company shall strictly comply with the rules and guidelines under Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules, 1989 as amended time to time. All transportation of Hazardous Chemicals shall be as per the Motor Vehicle Act, 1989.
- (xi) Fly ash, if any, should be stored separately as per CPCB guidelines so that it may not adversely affect the air quality. Direct exposure of workers to fly ash & dust should be avoided.
- (xii) The company shall undertake waste minimization measures as below (a) Metering and control of quantities of active ingredients to minimize waste; (b) Reuse of by-products from the process as raw materials or as raw material substitutes in other processes. (c) Use of automated filling to minimize spillage. (d) Use of Close Feed system into batch reactors. (e) Venting equipment through vapour recovery system. (f) Use of high pressure hoses for equipment clearing to reduce wastewater generation.
- (xiii) The green belt of at least 5-10 m width shall be developed in nearly 33% of the total project area, mainly along the plant periphery. Selection of plant species shall be as per the CPCB guidelines in consultation with the State Forest Department. Records of tree canopy shall be monitored through remote sensing map. PP shall plant 1 Lakhs trees around the transportation route in one year. These plantations shall be other than green belt development. The implementation report shall be submitted to the RO of MoEFCC.



- (xiv) Rain water harvesting system shall be developed inside the complex and fresh water requirement shall be reduced by utilizing the collected water.
- (xv) All commitments made during public hearing/consultation shall be satisfactorily implemented. Preference shall be provided to local people for employment in the unit.
- (xvi) The activities and the action plan proposed by the project proponent to address the public hearing and socio-economic issues in the study area, shall be completed as per the schedule presented before the Committee and as described in the EMP report in letter and spirit. All the commitments made during public hearing shall be satisfactorily implemented. Preference shall be given to local villagers for employment in the unit. The project proponent shall utilize the amount mainly for addressing the issues.
- (xvii) Safety and visual reality training shall be provided to employees.
- (xviii) For the DG sets, emission limits and the stack height shall be in conformity with the extant regulations and the CPCB guidelines. Acoustic enclosure shall be provided to DG set for controlling the noise pollution.
- (xix) The unit shall make the arrangement for protection of possible fire hazards during manufacturing process in material handling. Fire-fighting system shall be as per the norms.
- (xx) Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.
- (xxi) Continuous online (24x7) monitoring system for stack emissions shall be installed for measurement of flue gas discharge and the pollutants concentration, and the data to be transmitted to the CPCB and SPCB server. For online continuous monitoring of effluent, the unit shall install web camera with night vision capability and flow meters in the channel/drain carrying effluent within the premises.
- (xxii) Transportation of raw material/product shall be in GPS enabled trucks/authorize source only. Parking facility shall be provided inside the complex and no vehicles bound for industry shall be parked outside the complex.
- (xxiii) Process safety and risk assessment studies shall be further carried out using advanced models, and the mitigating measures shall be undertaken accordingly.
- (xxiv) The company shall comply with all the environmental protection measures and safeguards proposed in the documents submitted to the Ministry. All the recommendations made in the earlier EIA/EMP report and updated in respect of environmental management, and risk mitigation measures relating to the project shall be implemented.

**12.1** The grant of environmental clearance is further subject to compliance of other general conditions as under:-

- (i) The Project Proponent shall obtain all other statutory/necessary permissions/recommendations/NOCs prior to start of construction/operation of the project, which *inter alia* include, permission/approvals under the Forest (Conservation) Act, 1980; the Wildlife (Protection) Act, 1972; the Coastal Regulation Zone Notification, 2019,

✓ EC for M/s Hindustan Zinc Limited

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as amended from time to time, and other Office Memoranda/Circular issued by the Ministry of Environment, Forest and Climate Change from time to time, as applicable to the project.

- (ii) The project proponent shall ensure compliance of 'National Emission Standards', as applicable to the project, issued by the Ministry from time to time. The project proponent shall also abide by the rules/regulations issued by the CPCB/SPCB for control/abatement of pollution.
- (iii) The project authorities shall adhere to the stipulations made by the State Pollution Control Board/Committee, Central Pollution Control Board, State Government and any other statutory authority.
- (iv) The project proponent shall prepare a site specific conservation plan and wildlife management plan in case of the presence of Schedule-1 species in the study area, as applicable to the project, and submit to Chief Wildlife Warden for approval. The recommendations shall be implemented in consultation with the State Forest/Wildlife Department in a time bound manner.
- (v) No further expansion or modifications in the plant, other than mentioned in the EIA Notification, 2006 and its amendments, shall be carried out without prior approval of the Ministry of Environment, Forest and Climate Change. In case of deviations or alterations in the project proposal from those submitted to this Ministry for clearance, a fresh reference shall be made to the Ministry to assess the adequacy of conditions imposed and to add additional environmental protection measures required, if any.
- (vi) The energy source for lighting purpose shall be preferably LED based, or advance having preference in energy conservation and environment betterment.
- (vii) The locations of ambient air quality monitoring stations shall be decided in consultation with the State Pollution Control Board (SPCB) and it shall be ensured that at least one station each is installed in the upwind and downwind direction as well as where maximum ground level concentrations are anticipated.
- (viii) The National Ambient Air Quality Emission Standards issued by the Ministry vide G.S.R. No. 826(E) dated 16<sup>th</sup> November, 2009 shall be followed.
- (ix) The overall noise levels in and around the plant area shall be kept well within the standards by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels shall conform to the standards prescribed under Environment (Protection) Act, 1986 Rules, 1989 viz. 75 dBA (day time) and 70 dBA (night time).
- (x) The Company shall harvest rainwater from the roof tops of the buildings and storm water drains to recharge the ground water and to utilize the same for process requirements.
- (xi) Training shall be imparted to all employees on safety and health aspects of chemicals handling. Pre-employment and routine periodical medical examinations for all employees shall be undertaken on regular basis. Training to all employees on handling of chemicals shall be imparted.
- (xii) The company shall also comply with all the environmental protection measures and safeguards proposed in the documents submitted to the Ministry. All the recommendations made in the EIA/EMP in respect of environmental management, and risk mitigation measures relating to the project shall be implemented.



- (xiii) The company shall undertake all relevant measures for improving the socio-economic conditions of the surrounding area. CER activities shall be undertaken by involving local villages and administration and shall be implemented.
- (xiv) The company shall undertake eco-developmental measures including community welfare measures in the project area for the overall improvement of the environment.
- (xv) A separate Environmental Management Cell (having qualified person with Environmental Science/Environmental Engineering/specialization in the project area) equipped with full fledged laboratory facilities shall be set up to carry out the Environmental Management and Monitoring functions.
- (xvi) The company shall earmark sufficient funds towards capital cost and recurring cost per annum to implement the conditions stipulated by the Ministry of Environment, Forest and Climate Change as well as the State Government along with the implementation schedule for all the conditions stipulated herein. The funds so earmarked for environment management/ pollution control measures shall not be diverted for any other purpose.
- (xvii) A copy of the clearance letter shall be sent by the project proponent to concerned Panchayat, Zilla Parishad/Municipal Corporation, Urban local Body and the local NGO, if any, from whom suggestions/ representations, if any, were received while processing the proposal.
- (xviii) The project proponent shall also submit six monthly reports on the status of compliance of the stipulated Environmental Clearance conditions including results of monitored data (both in hard copies as well as by e-mail) to the respective Regional Office of MoEF&CC, the respective Zonal Office of CPCB and SPCB. A copy of Environmental Clearance and six monthly compliance status report shall be posted on the website of the company.
- (xix) The environmental statement for each financial year ending 31<sup>st</sup> March in Form-V as is mandated shall be submitted to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental clearance conditions and shall also be sent to the respective Regional Offices of MoEF&CC by e-mail.
- (xx) 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 SPCB/Committee and may also be seen at Website of the Ministry and at <https://parivesh.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 concerned Regional Office of the Ministry.
- (xxi) 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 start of the project.
- (xxii) This Environmental clearance is granted subject to final outcome of Hon'ble Supreme Court of India, Hon'ble High Court, Hon'ble NGT and any other Court of Law, if any, as may be applicable to this project.

 EC for M/s Hindustan Zinc Limited

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13. The Ministry reserves the right to stipulate additional conditions, if found necessary at subsequent stages and the project proponent shall implement all the said conditions in a time bound manner. The Ministry may revoke or suspend the environmental clearance, if implementation of any of the above conditions is not found satisfactory.

14. Concealing factual data or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of the Environment (Protection) Act, 1986.

15. Any appeal against this environmental clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

16. 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, Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 and the Public Liability Insurance Act, 1991 along with their amendments and Rules and any other orders passed by the Hon'ble Supreme Court of India / High Courts and any other Court of Law relating to the subject matter.

17. This issues with approval of the competent authority.

05/01/2021  
(Dr. R. B. Lal)

Scientist E/Additional Director

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(डा. आर. बी. लाल)  
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पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय  
Min. of Environment, Forest and Climate Change  
भारत सरकार, नई दिल्ली  
Govt. of India, New Delhi

**Copy to: -**

1. The Deputy DGF (C), MoEF&CC Regional Office (CZ), Kendriya Bhawan, 5<sup>th</sup> Floor, Sector H, Aliganj, Lucknow - 20
2. The Secretary, Environment Department, Government of Rajasthan, Jaipur
3. The Secretary, Revenue Department, Government of Rajasthan, Jaipur
4. The Secretary, Forest Department, Government of Rajasthan, Jaipur
5. The Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi - 32
6. The Member Secretary, Rajasthan Pollution Control Board, 4, Jhalana Institutional Area, Jhalana Doongri, Jaipur (Rajasthan) - 302 004
7. The Member Secretary, Central Ground Water Authority, 18/11, Jamnagar House, Man Singh Road, New Delhi-110011

8. The District Collector, District Chittorgarh (Rajasthan)
9. Guard File/Monitoring File/Website/Record File/Parivesh Portal

  
(Dr. R. B. Lal)  
Scientist E/Additional Director



# Chanderiya Lead Zinc Smelter (PLANT LAYOUT)



# ANNEXURE 5 : MINOR METAL COMPLEX

## [Break of quantity with concentration of metal]

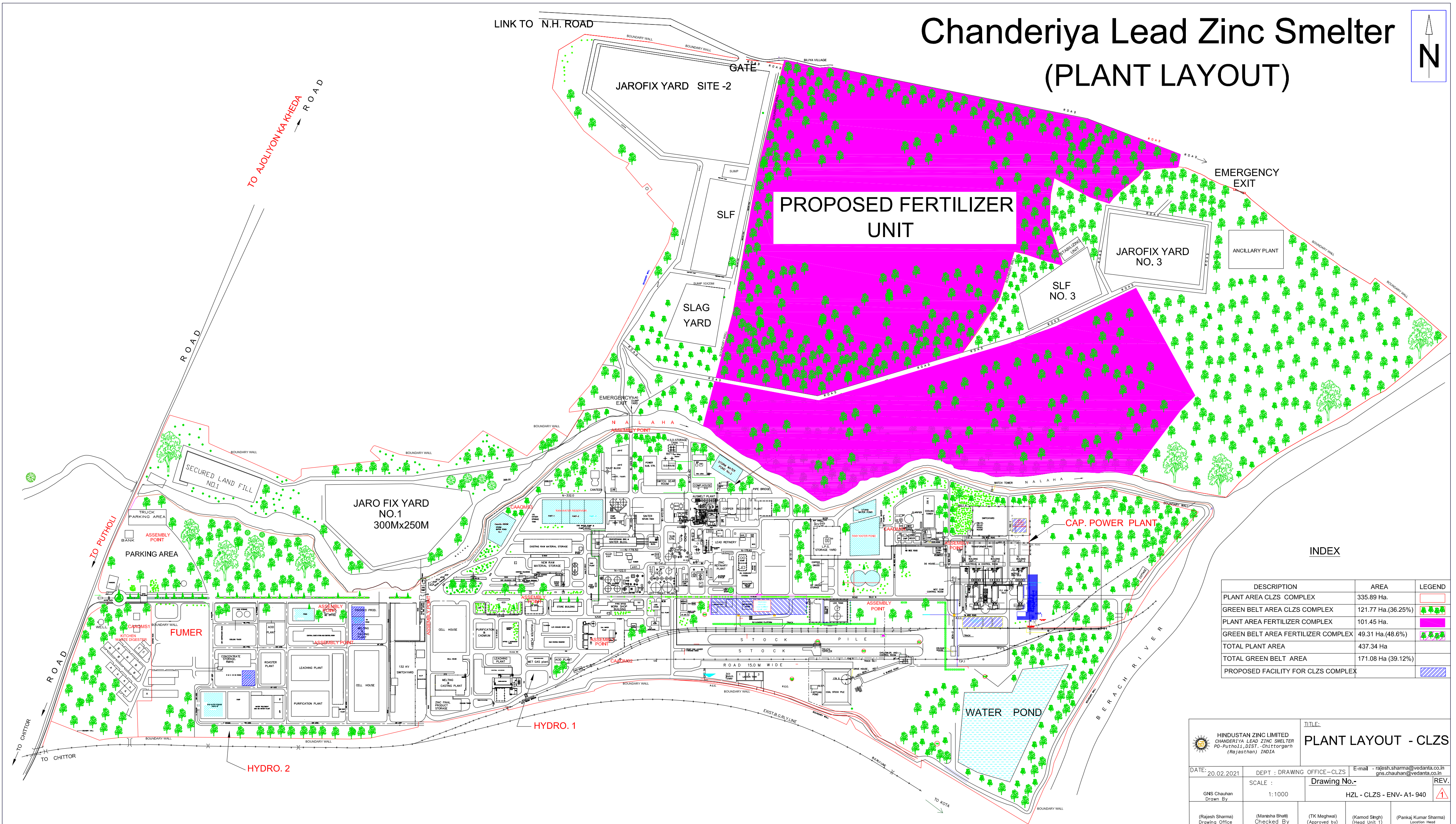
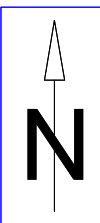
S.No.	PRODUCT	UNIT	EXISTING	ADDITIONAL	Break up of Quantity with Concentration of Metal	TOTAL AFTER EXPANSION
Minor Metal Recovery						
1	Lead Bullion/Lead Cake/Low Grade Lead / Lead Silver Cake (on Equivalent metal basis )	TPA	NIL	8736	1. Lead Bullion, 99.9% Pb : 8300 MTPA 2. Lead Silver Cake, 15-20% Pb : 2200 MTPA	8736
2	CUSO4 Solution/ Copper Slag /Copper Cement /Copper Compounds (on Equivalent metal basis )	TPA	NIL	1460	1. CuSO4, 60 gpl Cu : 24000 m3 Per Annum 2. Copper slag, 25- 35% Cu: 112 MT,	1460
3	Zn So4 Solution (on Equivalent metal basis )	TPA	NIL	2780	1. ZnSO4 , 140 gpl : Zn 26815 m3 Per Annum	2780
4	Cadmium Sponge/Cadmium Sponge filter cake/ /Cadmium Ingot (on Equivalent metal basis )	TPA	NIL	2470	1. Cd sponge, 60-65% Cd : 4000 MTPA Cd metal, 99.995% Cd: 2470 MTPA	2470



S.No.	PRODUCT	UNIT	EXISTING	ADDITIONAL	Break up of Quantity with Concentration of Metal	TOTAL AFTER EXPANSION
5	Cobalt Cake/Cobalt Compounds/Cobalt Filter Cake (on Equivalent metal basis )	TPA	NIL	50	1. Co-Ni cake, 1- 1.5% Co: 3300 MTPA 2. Cobalt Concentrate, 30% Co : 167 MTPA	50
6	Ni cake / Ni Compounds (on Equivalent metal basis )	TPA	NIL	30	Nickel Cake, Ni 15- 20 % : 200 MTPA	30
7	Copper Matte/ Residue /Copper Cement (on Equivalent metal basis )	TPA	NIL	960	Copper matte, 20- 30 % Cu : 4500 MTPA	960
8	Cadmium Alkali Slag/Cadmium Slag (on Equivalent metal basis )	TPA	NIL	450	Cadmium alkali slag, 15-20% Cd : 2550 MTPA	450
9	Lead Rich Dust from Bag House	TPA	NIL	300	Lead Rich Bag House Dust , 40- 50% Pb : 300 MTPA	300




# Chanderiya Lead Zinc Smelter (PLANT LAYOUT)

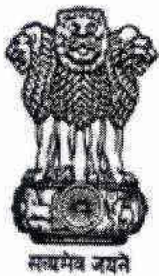


## INDEX

DESCRIPTION	AREA	LEGEND
PLANT AREA CLZS COMPLEX	335.89 Ha.	
GREEN BELT AREA CLZS COMPLEX	121.77 Ha.(36.25%)	
PLANT AREA FERTILIZER COMPLEX	101.45 Ha.	
GREEN BELT AREA FERTILIZER COMPLEX	49.31 Ha.(48.6%)	
TOTAL PLANT AREA	437.34 Ha	
TOTAL GREEN BELT AREA	171.08 Ha (39.12%)	
PROPOSED FACILITY FOR CLZS COMPLEX		

 <b>HINDUSTAN ZINC LIMITED</b> CHANDERIYA LEAD ZINC SMELTER PO-Putholi, DIST. - Chittorgarh (Rajasthan) INDIA		TITLE: <b>PLANT LAYOUT - CLZS</b>	
DATE: 20.02.2021	DEPT : DRAWING OFFICE-CLZS	E-mail - rajesh.sharma@vedanta.co.in gns.chauhan@vedanta.co.in	
GNS Chauhan Drawn By	SCALE : 1:1000	Drawing No.- HZL - CLZS - ENV-A1-940	REV. 1
(Rajesh Sharma) Drawing Office	(Manisha Bhatti) Checked By	(TK Meghwal) (Approved by)	(Kamod Singh) (Head Unit 1)
			(Pankaj Kumar Sharma) Location Head





**F.No.J-11011/350/2016- IA II(I)**  
**Government of India**  
**Ministry of Environment, Forest and Climate Change**  
**(Impact Assessment Division)**

\*\*\*

**By Speed Post/Online**

Vayu Wing, 3<sup>rd</sup> Floor  
Indira Paryavaran Bhawan  
Jorbagh Road, New Delhi - 3

**Dated: 5<sup>th</sup> January, 2021**

To

**M/s Hindustan Zinc Limited**  
Yashad Bhawan, Near SwaroopSagar  
Girwa, Udaipur, Rajasthan-313004

Email: [subhendu.mishra@vedanta.co.in](mailto:subhendu.mishra@vedanta.co.in)

**Sub: Setting up Ammonium Phosphate Fertilizer Complex of 1.02 MTPA (2 x 0.51 MTPA) at Village Biliya, Tehsil & District Chittorgarh, Rajasthan by M/s Hindustan Zinc Limited-Environmental Clearance - reg.**

Sir,

This has reference to your proposal No.IA/RJ/IND2/60077/2016 dated 23<sup>rd</sup> August 2019 and further letter dated 18.12.2020, submitting the EIA/EMP report on the above subject matter.

2. The Ministry of Environment, Forest and Climate Change has examined the proposal for environmental clearance to the project for setting up Ammonium Phosphate Fertilizer Complex of 1.02 MTPA (2 x 0.51 MTPA) by M/s Hindustan Zinc Limited in an area of 101.45 ha located at Village Biliya, Tehsil & District Chittorgarh, Rajasthan.

3. The details of products and by-products are as under:

S. No.	Product	Capacity (TPA)		
		Phase I	Phase II	Total
1	Di-Ammonium Phosphate (DAP)	5,10,000	5,10,000	1.02 MTPA
2	Nitrogen Phosphorous Potash			
3	Ammonium Phosphoric Sulphate			
4	Phosphoric acid (100% P <sub>2</sub> O <sub>5</sub> basis)	2,40,000	2,40,000	4,80,000
5	Aluminium Fluoride	9,000	9,000	18,000
<b>By products</b>				
1	Hydro Fluosilicic Acid	10,500	10,500	21,000
2	Phosphogypsum	13,50,000	13,50,000	27,00,000

4. The project shall be installed in two phases in an area of 10,14,500 m<sup>2</sup> (101.45 Ha). Industry has developed greenbelt in an area of 4,93,100 m<sup>2</sup> (49.31 Ha) covering 48.60 of total project area. The estimated project cost is Rs 2700 crores. Total capital cost

*EC for M/s Hindustan Zinc Limited*

Page 1 of 9



earmarked towards environmental pollution control measures is Rs 185 crores and the recurring cost (O&M) will be about Rs 37 crores per annum. The project will provide employment for 250 persons. Industry proposes to allocate Rs. 25 crores cost towards Corporate Environmental Responsibility (CER).

5. There are no National parks, Wildlife sanctuaries, Biosphere Reserves, Tiger/ Elephant Reserves, Wildlife Corridors etc. within 10 km distance from the project site. Seasonal Berach river, Putholinalla, Gambhiri river are passing at 680 m (SE), 250 m (S) and 5.5 km (S) respectively from the project site.

6. Total water requirement is estimated to be 14,100 cum/day, which includes fresh water requirement of 10100 cum/day (5050 cum/day in each phase), proposed to be met from Gosunda dam/STP Udaipur/ proposed STP at Chittorgarh town. The fresh water requirement shall be reduced to 9600 cum/day by adopting industrial best practices. Effluent of 4220 cum/day quantity will be treated in ETP of capacity 4800 cum/day and recycled back in the system. Domestic Sewage water will be treated in sewage treatment plant (120 cum/day) and treated water will be utilized for plantation purpose and other uses. There will be no discharge of treated/untreated waste water from the unit, and thus ensuring Zero Liquid Discharge.

Power requirement will be 35MW and will be met from State grid/ existing CPP of Chanderia Zinc Lead smelter. Unit proposes four DG sets of 2500 KVA capacity each (2 DGs in each phase), as standby during power failure. Stack (height 10m above building height) will be provided as per CPCB norms to the proposed DG sets. Phosphoric acid (100%  $P_2O_5$  basis) & Hydro Fluosilicic Acid will be consumed within the process and surplus quantity shall be sold. Phosphogypsum will be utilized for cement manufacturing.

7. The project/activities are covered under category A of item 5(a) 'Chemical fertilizers' of the Schedule to the Environment Impact Assessment Notification, 2006, and requires appraisal at central level by the sectoral Expert Appraisal Committee (EAC) in the Ministry.

8. The terms of references (ToR) for the project was issued by the Ministry vide letter dated 29<sup>th</sup> May 2017. Public hearing for the proposed project has been conducted by the State Pollution Control Board on 12<sup>th</sup> February, 2019 under the Chairmanship of Additional District Magistrate. The main issues raised during the public hearing are related to employment to local, pollution, land conversion from greenbelt to industrial use etc.

9. The proposal was considered by the Expert Appraisal Committee (Industry-2) in its meetings held on 23-25 October, 2019 and 30-31 December, 2019 & 1<sup>st</sup> January, 2020 in the Ministry, wherein the project proponent and their accredited consultant M/s EQMS India Pvt Ltd. presented the EIA/EMP report as per the ToR. The Committee found the EIA/EMP report complying with the ToR and recommended the project for grant of environmental clearance.

10. The EAC, constituted under the provision of the EIA Notification, 2006 and comprising of Experts Members/domain experts in various fields, have examined the proposal submitted by the Project Proponent in desired form along with EIA/EMP report prepared and submitted by the Consultant accredited by the QCI/ NABET on behalf of the



## Project Proponent.

The Committee deliberated the action plan on the issues raised during the public hearing. The Committee found the detailed action plan submitted by the project proponent with budgetary provisions to be satisfactory and addressing the concerns raised during public hearing/consultation.

The EAC noted that the Project Proponent has given undertaking that the data and information given in the application and enclosures are true to the best of his knowledge and belief and no information has been suppressed in the EIA/EMP report and public hearing process. If any part of data/information submitted is found to be false/misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.

The Committee noted that the EIA/EMP report is in compliance of the ToR issued for the project, reflecting the present environmental concerns and the projected scenario for all the environmental components. Issues raised during the public hearing has been properly addressed in the EIA/EMP report. Additional information submitted by the project has been found to be in order. The EAC has deliberated the proposal and has made due diligence in the process as notified under the provisions of the EIA Notification, 2006, as amended from time to time and accordingly made the recommendations to the proposal.

**11.** Based on the recommendation of EAC, the proposal was examined in the Ministry. The Ministry, vide letter dated 17.02.2020, has sought updated land conversion status to industrial purpose. In this context, M/s HZL vide letter, dated 18.12.2020, has inter-alia, submitted that land conversion application was submitted by Project Proponent on 18.12.2018 which is still under process with the State Government. PP has also submitted the affidavit vide letter dated 18.12.2020, mentioned that the project activities will be carried out only after required permission from the State Government for land conversion to industrial purpose.

**12.** Based on the proposal submitted by the project proponent and recommendations of the EAC (Industry-2), Ministry of Environment, Forest and Climate change hereby accords environmental clearance to the project for **Setting up Ammonium Phosphate Fertilizer Complex of 1.02 MTPA (2 x 0.51 MTPA) by M/s Hindustan Zinc Limited at Village Biliya, Tehsil & District Chittorgarh, Rajasthan**, under the provisions of the EIA Notification, 2006, subject to the compliance of terms and conditions as under:-

- (i) **M/s HZL vide letter, dated 18.12.2020, has mentioned that land conversion application was submitted on 18.12.2018 to State Government which is still under process with the State Government. Project Proponent shall start the project activities only after taking necessary permission/approval from the State Government for land conversion to industrial purpose.**
- (ii) The project proponent shall start project/activities after obtaining necessary clearances from the various authorities of Central Government and State Government.
- (iii) As already committed by the project proponent, Zero Liquid Discharge shall be ensured and no waste/treated water shall be discharged outside the premises.



- (iv) Necessary authorization required under the Hazardous and Other Wastes (Management and Trans-Boundary Movement) Rules, 2016, Solid Waste Management Rules, 2016 shall be obtained and the provisions contained in the Rules shall be strictly adhered to.
- (v) The gaseous emissions ( $\text{SO}_2$ ,  $\text{NO}_x$ ,  $\text{NH}_3$  and HC) and particulate matter from various process units shall conform to the norms prescribed by the CPCB/SPCB from time to time. At no time, the emission levels 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. Stack emissions shall be monitored regularly.
- (vi) To control source and the fugitive emissions, suitable pollution control devices shall be installed to meet the prescribed norms and/or the NAAQS. The gaseous emissions shall be dispersed through stack of adequate height as per CPCB/SPCB guidelines. Fugitive emissions shall be controlled at 99.5% with effective chillers.
- (vii) Total fresh water requirement shall not exceed 9600 cum/day, proposed to be met from Gosunda dam/STP Udaipur/ STP Chittorgarh. Prior permission in this regard shall be obtained from the concerned regulatory authority, and shall be renewed time to time.
- (viii) Process effluent/any wastewater shall not be allowed to mix with storm water. The storm water from the premises shall be collected and discharged through a separate conveyance system.
- (ix) Hazardous chemicals shall be stored in tanks, tank farms, drums, carboys etc. Flame arresters shall be provided on tank farm, and solvent transfer through pumps.
- (x) The Company shall strictly comply with the rules and guidelines under Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules, 1989 as amended time to time. All transportation of Hazardous Chemicals shall be as per the Motor Vehicle Act, 1989.
- (xi) Fly ash, if any, should be stored separately as per CPCB guidelines so that it may not adversely affect the air quality. Direct exposure of workers to fly ash & dust should be avoided.
- (xii) The company shall undertake waste minimization measures as below (a) Metering and control of quantities of active ingredients to minimize waste; (b) Reuse of by-products from the process as raw materials or as raw material substitutes in other processes. (c) Use of automated filling to minimize spillage. (d) Use of Close Feed system into batch reactors. (e) Venting equipment through vapour recovery system. (f) Use of high pressure hoses for equipment clearing to reduce wastewater generation.
- (xiii) The green belt of at least 5-10 m width shall be developed in nearly 33% of the total project area, mainly along the plant periphery. Selection of plant species shall be as per the CPCB guidelines in consultation with the State Forest Department. Records of tree canopy shall be monitored through remote sensing map. PP shall plant 1 Lakhs trees around the transportation route in one year. These plantations shall be other than green belt development. The implementation report shall be submitted to the RO of MoEFCC.



- (xiv) Rain water harvesting system shall be developed inside the complex and fresh water requirement shall be reduced by utilizing the collected water.
- (xv) All commitments made during public hearing/consultation shall be satisfactorily implemented. Preference shall be provided to local people for employment in the unit.
- (xvi) The activities and the action plan proposed by the project proponent to address the public hearing and socio-economic issues in the study area, shall be completed as per the schedule presented before the Committee and as described in the EMP report in letter and spirit. All the commitments made during public hearing shall be satisfactorily implemented. Preference shall be given to local villagers for employment in the unit. The project proponent shall utilize the amount mainly for addressing the issues.
- (xvii) Safety and visual reality training shall be provided to employees.
- (xviii) For the DG sets, emission limits and the stack height shall be in conformity with the extant regulations and the CPCB guidelines. Acoustic enclosure shall be provided to DG set for controlling the noise pollution.
- (xix) The unit shall make the arrangement for protection of possible fire hazards during manufacturing process in material handling. Fire-fighting system shall be as per the norms.
- (xx) Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.
- (xxi) Continuous online (24x7) monitoring system for stack emissions shall be installed for measurement of flue gas discharge and the pollutants concentration, and the data to be transmitted to the CPCB and SPCB server. For online continuous monitoring of effluent, the unit shall install web camera with night vision capability and flow meters in the channel/drain carrying effluent within the premises.
- (xxii) Transportation of raw material/product shall be in GPS enabled trucks/authorize source only. Parking facility shall be provided inside the complex and no vehicles bound for industry shall be parked outside the complex.
- (xxiii) Process safety and risk assessment studies shall be further carried out using advanced models, and the mitigating measures shall be undertaken accordingly.
- (xxiv) The company shall comply with all the environmental protection measures and safeguards proposed in the documents submitted to the Ministry. All the recommendations made in the earlier EIA/EMP report and updated in respect of environmental management, and risk mitigation measures relating to the project shall be implemented.

**12.1** The grant of environmental clearance is further subject to compliance of other general conditions as under:-

- (i) The Project Proponent shall obtain all other statutory/necessary permissions/recommendations/NOCs prior to start of construction/operation of the project, which *inter alia* include, permission/approvals under the Forest (Conservation) Act, 1980; the Wildlife (Protection) Act, 1972; the Coastal Regulation Zone Notification, 2019,



as amended from time to time, and other Office Memoranda/Circular issued by the Ministry of Environment, Forest and Climate Change from time to time, as applicable to the project.

- (ii) The project proponent shall ensure compliance of 'National Emission Standards', as applicable to the project, issued by the Ministry from time to time. The project proponent shall also abide by the rules/regulations issued by the CPCB/SPCB for control/abatement of pollution.
- (iii) The project authorities shall adhere to the stipulations made by the State Pollution Control Board/Committee, Central Pollution Control Board, State Government and any other statutory authority.
- (iv) The project proponent shall prepare a site specific conservation plan and wildlife management plan in case of the presence of Schedule-1 species in the study area, as applicable to the project, and submit to Chief Wildlife Warden for approval. The recommendations shall be implemented in consultation with the State Forest/Wildlife Department in a time bound manner.
- (v) No further expansion or modifications in the plant, other than mentioned in the EIA Notification, 2006 and its amendments, shall be carried out without prior approval of the Ministry of Environment, Forest and Climate Change. In case of deviations or alterations in the project proposal from those submitted to this Ministry for clearance, a fresh reference shall be made to the Ministry to assess the adequacy of conditions imposed and to add additional environmental protection measures required, if any.
- (vi) The energy source for lighting purpose shall be preferably LED based, or advance having preference in energy conservation and environment betterment.
- (vii) The locations of ambient air quality monitoring stations shall be decided in consultation with the State Pollution Control Board (SPCB) and it shall be ensured that at least one station each is installed in the upwind and downwind direction as well as where maximum ground level concentrations are anticipated.
- (viii) The National Ambient Air Quality Emission Standards issued by the Ministry vide G.S.R. No. 826(E) dated 16<sup>th</sup> November, 2009 shall be followed.
- (ix) The overall noise levels in and around the plant area shall be kept well within the standards by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels shall conform to the standards prescribed under Environment (Protection) Act, 1986 Rules, 1989 viz. 75 dBA (day time) and 70 dBA (night time).
- (x) The Company shall harvest rainwater from the roof tops of the buildings and storm water drains to recharge the ground water and to utilize the same for process requirements.
- (xi) Training shall be imparted to all employees on safety and health aspects of chemicals handling. Pre-employment and routine periodical medical examinations for all employees shall be undertaken on regular basis. Training to all employees on handling of chemicals shall be imparted.
- (xii) The company shall also comply with all the environmental protection measures and safeguards proposed in the documents submitted to the Ministry. All the recommendations made in the EIA/EMP in respect of environmental management, and risk mitigation measures relating to the project shall be implemented.



- (xiii) The company shall undertake all relevant measures for improving the socio-economic conditions of the surrounding area. CER activities shall be undertaken by involving local villages and administration and shall be implemented.
- (xiv) The company shall undertake eco-developmental measures including community welfare measures in the project area for the overall improvement of the environment.
- (xv) A separate Environmental Management Cell (having qualified person with Environmental Science/Environmental Engineering/specialization in the project area) equipped with full fledged laboratory facilities shall be set up to carry out the Environmental Management and Monitoring functions.
- (xvi) The company shall earmark sufficient funds towards capital cost and recurring cost per annum to implement the conditions stipulated by the Ministry of Environment, Forest and Climate Change as well as the State Government along with the implementation schedule for all the conditions stipulated herein. The funds so earmarked for environment management/ pollution control measures shall not be diverted for any other purpose.
- (xvii) A copy of the clearance letter shall be sent by the project proponent to concerned Panchayat, Zilla Parishad/Municipal Corporation, Urban local Body and the local NGO, if any, from whom suggestions/ representations, if any, were received while processing the proposal.
- (xviii) The project proponent shall also submit six monthly reports on the status of compliance of the stipulated Environmental Clearance conditions including results of monitored data (both in hard copies as well as by e-mail) to the respective Regional Office of MoEF&CC, the respective Zonal Office of CPCB and SPCB. A copy of Environmental Clearance and six monthly compliance status report shall be posted on the website of the company.
- (xix) The environmental statement for each financial year ending 31<sup>st</sup> March in Form-V as is mandated shall be submitted to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental clearance conditions and shall also be sent to the respective Regional Offices of MoEF&CC by e-mail.
- (xx) 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 SPCB/Committee and may also be seen at Website of the Ministry and at <https://parivesh.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 concerned Regional Office of the Ministry.
- (xxi) 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 start of the project.
- (xxii) This Environmental clearance is granted subject to final outcome of Hon'ble Supreme Court of India, Hon'ble High Court, Hon'ble NGT and any other Court of Law, if any, as may be applicable to this project.



13. The Ministry reserves the right to stipulate additional conditions, if found necessary at subsequent stages and the project proponent shall implement all the said conditions in a time bound manner. The Ministry may revoke or suspend the environmental clearance, if implementation of any of the above conditions is not found satisfactory.

14. Concealing factual data or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of the Environment (Protection) Act, 1986.

15. Any appeal against this environmental clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

16. 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, Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 and the Public Liability Insurance Act, 1991 along with their amendments and Rules and any other orders passed by the Hon'ble Supreme Court of India / High Courts and any other Court of Law relating to the subject matter.

17. This issues with approval of the competent authority.

05/01/2021

(Dr. R. B. Lal)

Scientist E/Additional Director

Email: [rb.lal@nic.in](mailto:rb.lal@nic.in)

Tele-fax: +91-11-24695362

(डा. आर. बी. लाल)

(Dr. R. B. Lal)

वैज्ञानिक 'ई' / Scientist 'E'

पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय  
Min. of Environment, Forest and Climate Change

भारत सरकार, नई दिल्ली  
Govt. of India, New Delhi

**Copy to: -**

1. The Deputy DGF (C), MoEF&CC Regional Office (CZ), Kendriya Bhawan, 5<sup>th</sup> Floor, Sector H, Aliganj, Lucknow - 20
2. The Secretary, Environment Department, Government of Rajasthan, Jaipur
3. The Secretary, Revenue Department, Government of Rajasthan, Jaipur
4. The Secretary, Forest Department, Government of Rajasthan, Jaipur
5. The Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi - 32
6. The Member Secretary, Rajasthan Pollution Control Board, 4, Jhalana Institutional Area, Jhalana Doongri, Jaipur (Rajasthan) - 302 004
7. The Member Secretary, Central Ground Water Authority, 18/11, Jamnagar House, Man Singh Road, New Delhi-110011

8. The District Collector, District Chittorgarh (Rajasthan)
9. Guard File/Monitoring File/Website/Record File/Parivesh Portal

  
(Dr. R. B. Lal)  
Scientist E/Additional Director

05<sup>th</sup> Jan 2019

To,

Mr. Subhendu Mishra,  
Head - Projects,  
Hindustan Zinc Limited,

Subject: Supply of Power, Steam, Water and Sulphuric Acid for 1.02 MTPA Fertilizer  
Plant at HZL - Reg

Sir,

We have understood that the 1.02 MTPA Fertilizer requires 35 MW of Power, 60 MTPH Steam, 10100 KLD of Water and 1.4 MTPA Sulphuric Acid. We shall be supplying the above said utilities for the Phase - 1 (0.51 MTPA) requirement from our Zinc lead smelting complex. However, the adequate material transfer facility shall be provided by the Projects. Please note that the water requirement for the Phase-2 (5050 KLD) shall be arranged from the Chittorgarh STP by Projects. Balance utilities shall be provided from existing Zinc-Lead Smelting complex. Please carry out the required route survey etc for the facilities required for the material transfer. This is for information and necessary actions.

Thanking You



**(Pankaj Sharma)**  
Director - Chanderia SBU  
M/s. Hindustan Zinc Limited



**F. No. J-11011/279/2006-IA. II (I)**  
 Government of India  
 Ministry of Environment, Forest and Climate Change  
 (Impact Assessment Division)

Indira Paryavaran Bhawan  
 Jor Bagh Road, Aliganj,  
 New Delhi – 110003  
 E-mail: r.sundar@nic.in  
 Tel: 011-24695304  
 Dated: 31<sup>st</sup> August, 2021

**Sub:** Expansion in Chanderiya Lead Zinc Smelter by **M/s. Hindustan Zinc Limited** at Villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, **District: Chittorgarh, Rajasthan – Withdrawal of Show Cause Notice (SCN) issued under section 5 of the Environment (Protection) Act, 1986 – reg.**

**Ref:** (i) **Proposal no. IA/RJ/IND/192897/2021 dated 05/03/2021**  
 (ii) **MoEF&CC show cause notice (SCN) dated 06/04/2021**  
 (iii) **Reply dated 19/04/2021 of M/s. Hindustan Zinc Limited**  
 (iv) **IRO Jaipur report dated 06/07/2021**  
 (v) **Letter dated 16/08/2021 of M/s. HZL**

Sir,

Whereas, M/s. Hindustan Zinc Limited (HZL) [herein after referred as Project Proponent] is operating a zinc smelter complex of capacity 5,04,000 TPA and 154 MW Captive Power Plant at villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District Chittorgarh, Rajasthan for which Environment Clearances have been obtained from MoEF&CC during 06/12/2006, 05/10/2015 and 14/10/2020.

2. Whereas, M/s. HZL engaged the service of M/s. J.M. Environet Private Limited for undertaking scoping process for the proposal cited above followed by preparation of EIA/ EMP report.

3. Whereas, project proponent submitted online application vide proposal no. IA/RJ/IND/192897/2021 dated 05/03/2021 seeking Terms of Reference (ToR) for the expansion of zinc smelter complex capacity from 5,04,000 TPA to 6,30,000 TPA along with enhancement of captive power plant from 154 MW to 190 MW and establishment of minor metals unit with Copper, Cadmium, Cobalt, Nickel etc., under the provisions of the EIA Notification, 2006.

4. Whereas, the expansion proposal cited above was considered during the 32<sup>nd</sup> meeting of Reconstituted Expert Appraisal Committee [REAC] (Industry-1) held on 15-17<sup>th</sup> March, 2021 wherein the representatives of project proponent as well as M/s. J.M. Environet Private Limited gave a presentation before the REAC. After deliberations, the Committee recommended that issuance of Show Cause Notice to the project proponent for deliberately suppressing the information regarding grant of Environment Clearance by MoEF&CC on 05/01/2021 for setting up of the fertilizer complex in the land adjacent to the smelter complex.

5. Whereas, as per para 8(vi) of EIA Notification, 2006, states that deliberate concealment and/or submission of false or misleading information or data which is material to screening or

(10)



scoping or appraisal or decision on the application shall make the application liable for rejection, and cancellation of prior environmental clearance granted on that basis. Rejection of an application or cancellation of a prior environmental clearance already granted, on such ground, shall be decided by the regulatory authority, after giving a personal hearing to the applicant, and following the principles of natural justice.

6. Whereas, deliberate concealment of information mandate commensurate action; and

7. Whereas, in view of the above, Ministry has issued a show cause notice to M/s. Hindustan Zinc Limited dated 06/04/2021 as to why the expansion proposal of M/s. Hindustan Zinc Limited vide referred at paragraph 2 above should not be summarily rejected.

8. Whereas, M/s. Hindustan Zinc Limited has submitted reply vide letter dated 19/04/2021 wherein M/s. HZL admitted that they have inadvertently missed the opportunity to provide the information regarding Fertilizer complex and realized the same during discussions with the EAC. Further, stated that activities related to Fertilizer complex is yet to be started at the site and the details of interlinked projects have been reported as part of submission during the consideration of grant of EC for the fertilizer complex project.


9. Whereas, based on your request, personal hearing in the matter took place on 05/08/2021 at 11.30 hrs wherein the following course of action was decided:

- i. The project proponent will submit an undertaking in the form of an affidavit admitting the non-disclosure of essential information by them to consultant as well as to Ministry and commitment that such mistakes will not be repeated in the future.
- ii. The EIA consultant should carry out the due diligence properly at the time of preparation of the ToR proposal so as to facilitate the addressal of all environmental concerns.

10. Whereas, the project proponent has submitted the document cited above vide letter dated 16/08/2021. PP, further, assured that revised expansion ToR application will contain all necessary details of interlinked projects and cumulative impact assessment will be carried out.

11. Now, therefore based on the response submitted by you on 19/04/2021 in response to the SCN dated 06/04/2021, personal hearing held on 05/08/2021 and additional documents submitted vide letter dated 16/08/2021, matter has been examined and it has been decided by the Competent Authority in the Ministry to withdraw the Show Cause Notice dated 06/04/2021. However, you are warned not to conceal or submit false or misleading information or data which may be material to scoping or appraisal by the Expert Appraisal Committee.

12. This issues with the approval of the Competent Authority.


  
(Sundar Ramanathan)  
31/8/21  
Scientist 'E'

To,

**Shri. C. Chandru,**  
Factory Manager,  
M/s. Hindustan Zinc Limited  
Chanderiya Lead Zinc Smelter Complex  
PO Putholi District, Chittorgarh, Rajasthan  
Email: [manisha.bhati@vedanta.co.in](mailto:manisha.bhati@vedanta.co.in)

**Copy to:**

1. Secretary, Department of Environment, Government of Rajasthan, Secretariat, Jaipur.
2. Deputy Inspector General of Forests (C), Ministry of Environment, Forest and Climate Change, Integrated Regional Office, A- 209 & 218, Aranya Bhawan, Mahatma Gandhi Road, Jhalana Institutional Area, Jaipur - 304002
3. Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi-110032.
4. Chief Wildlife Warden, Govt. of Rajasthan, Van Bhawan, Vaniki Path, Jaipur -302005
5. Chairman, Rajasthan State Pollution Control Board, 4, Institutional area, Jhalana, Doongri, Jaipur.
6. Member Secretary, Central Ground Water Authority, A-2, W3, Curzon Road Barracks, K.G. Marg, New Delhi-110001.
7. The District Collector, Chittorgarh District, Rajasthan.
8. Guard File/Record File/Monitoring File.
9. MoEF&CC website.

  
(Sundar Ramanathan)  
Scientist 'E'

GOVERNMENT OF RAJASTHAN  
ENERGY DEPARTMENT

No. E. 2(28)Energy/86-IV/

Dated November 19, 1994

Sri A.C. Wadhawan,  
Chairman & Managing Director,  
Rajasthan Zinc Ltd.,  
Jaipur

Sub-Setting up of Thermal Power Station at Chittorgarh by M/s  
CTIL.

Dear Sir,

The State Government has taken following decisions regarding setting up of Thermal Power Station of 500 MW capacity at Chittorgarh by M/s Century Textile and Industries Ltd. (CTIL).

The allocation of water from Gosunda Dam would be as follows :-

HZL	=	1500 MCFT
CTIL	=	1500 MCFT
PHED	=	300 MCFT
Reserved	=	300 MCFT

In case CEA indicates that the water requirement of CTIL for 1X500 MW Coal Based TPS is more than 1500 MCFT, the reserved portion or a part thereof, would be allotted to CTIL.

The Dam would be constructed beyond the point upto which the work has been done by HZL, by the Irrigation Department.

The total cost of the Dam including the cost already incurred by HZL (present day cost) and the cost required for acquiring the land in sub-mergence and rehabilitation etc., due to raising of the Dam upto full reserve level would be borne by HZL. CTIL and PHED in proportion to allocation of water. The cost already incurred by HZL would be proportionately increased for arriving at the present day cost.



4. It was decided that the present capacity of the dam i.e. 400 MCFT would be captive to HZL. HZL would have first charge on 400 MCFT of water and to the extent thereof would pay for the proportionate cost of construction of 400 MCFT capacity in full. The sharing of cost mentioned at point 3 above would be after deducting the cost calculated for 400 MCFT capacity.
5. In case of deficiency in storage of water due to inadequate rainfall etc., first 400 MCFT water in the dam would be reserved and allocated to HZL. Excess water over and above 400 MCFT would be allocated proportionately amongst HZL, CTIL and PHED as per allocation mentioned at point 1.
6. The Gosunda Dam shall be handed over by HZL to the Irrigation Department at appropriate time so that further construction could be started by Irrigation Department.
7. Land has been acquired upto EL 420 m level and is being acquired upto EL 422 m level by Mines Department for HZL. Land would be acquired by Energy Department beyond EL 422 m for construction of dam by Irrigation Department.
8. Irrigation Department would undertake the survey and investigation work for acquisition of land and properties likely to come under sub-mergence and rehabilitation of oustees either departmentally or through WAPCOS. Suitable staff would be provided to Irrigation Department for this purpose.
9. Irrigation Department would also undertake construction of piers and gates of the dam. Immediate action in this regard would be initiated by the Irrigation Department. PERT Chart would be prepared by the Irrigation Department by 15.11.94 regarding items 8&9.
10. The only governmental Department which would share water from the Gosunda dam being PHED. PHED would make suitable budget provision during the current financial year to take care of the initial expenditure to be incurred by the Irrigation Department.
11. CTIL would deposit a sum of Rs. 25 crores an advance towards the construction/completion of Gosunda dam with the State Government as soon as the project is cleared by CEA.

12. The maintenance and operation of the Dam would be done by the Irrigation Department, each party making its own arrangement for pumping its requirements. The cost of operation and maintenance of the Dam will also be shared by the user organisations in the proportion of allocation, mentioned at point 1 above.

13. The Irrigation Department would furnish the required data to CWC/CEA for clearance of the project.

14. RSEB would ensure that the proposals for transmission system for evacuation and utilisation of power to be generated at Chittorgarh TPS are cleared by the Central Electricity Authority (CEA) immediately.

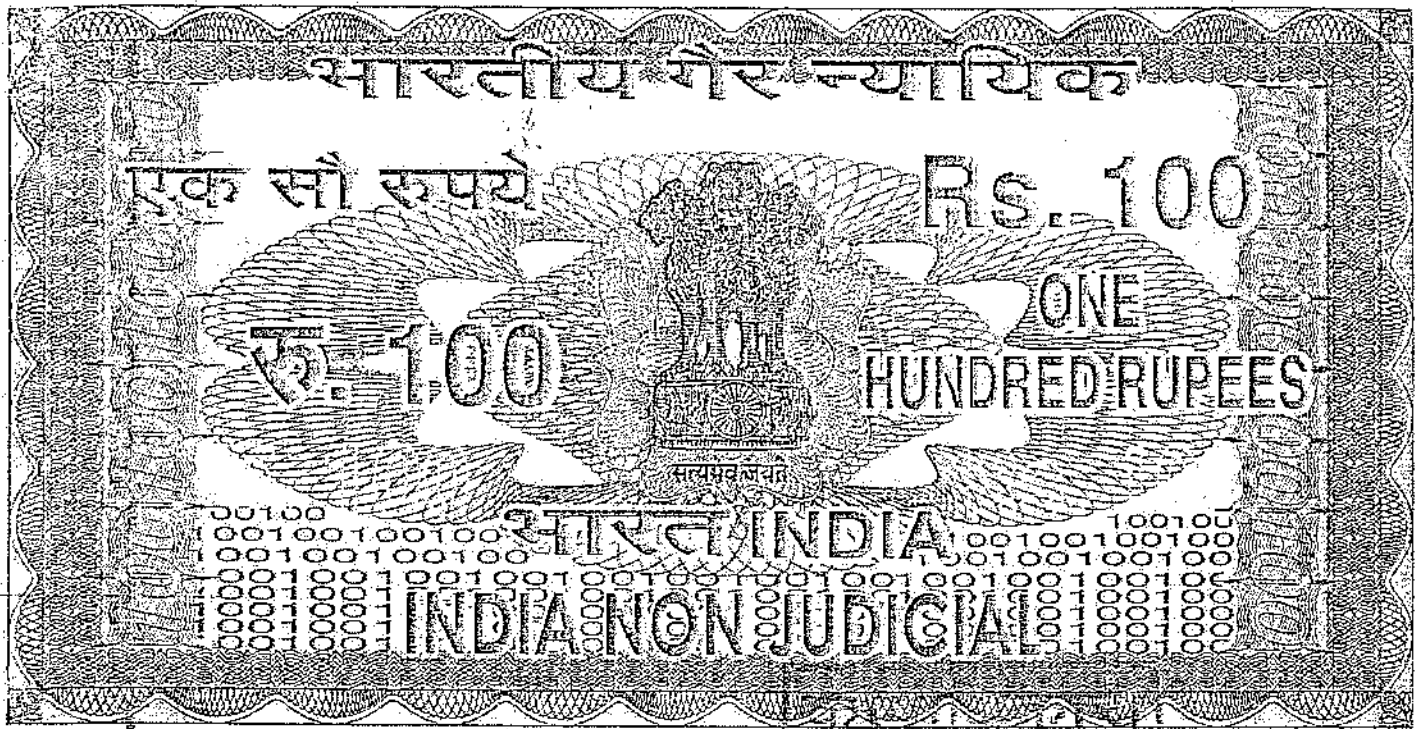
15. Coal linkage: CTIL would immediately tie up with Government of India for development of dedicated mine in north Karanpura for Coal linkage for the project.

16. Issue of Notification under section 29 of the Electricity (supply) Act, 1948:- Notification under Section 29 of the Electricity (supply) Act, 1948 saying that the Chittorgarh TPS would now be set up by CTIL instead of RSEB and that the capacity of the power station would be 1X500 MW instead of 2X210 MW notified earlier may be issued by the Energy Department.

17. Immediate action may kindly be taken regarding the points concerning your Department Organisation so that this long pending power project can be established.

Yours faithfully,

Sd/-  
(R.K. Agarwal)  
Spl. Secretary to Govt.



राजस्थान RAJASTHAN

राजस्थान

R 599432

24 APR. 2012

उदयपुर (राज.)

This agreement is made on this Wednesday, 9<sup>th</sup> 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.

9.5.12

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नगर विकास प्रन्यास

उदयपुर (राज.)

(R. PANDWAL)

COMPANY SECRETARY  
HINDUSTAN ZINC LTD.  
YASHAD BHAWAN, UDAIPUR 1

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.

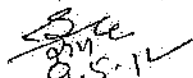
"Effective date" means the date on which this agreement is formally signed.

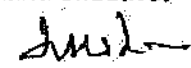
"Sewage Treatment Plant or STP" means STP with MBBR Technology with facilities including equipments and civil work created by HZL for treatment of 20 MLD of Sewage at Manwa Khera (Technology details at ANNEXURE - I.)

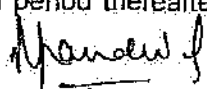
"Force Majeure Event" means any event which prevents or delays the performance of obligations under this agreement in whole or in part by either party by reasons of public agitation, civil disturbances, riots, war, hostilities, acts of public enemies civil commotion, sabotage, fire, flood, earthquake, 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

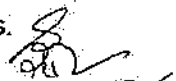
3.1 HZL has agreed to construct 20 MLD STP facilities at Manwa Khera. The plant will be designed to take peak load and seasonal fluctuations with an average treatment capacity of 20 MLD based on MBBR technology as per annexure -I. The plant will meet all standards and norms prescribed by the pollution 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.

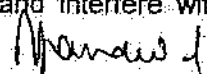
3.3 UMC hereby agrees that it will ensure delivery of whatsoever sewage generated through its collection network at the input point of STP up to 20 MLD. However, 20 MLD sewage to STP can only be assured after completion of sewerage network proposed to be done under NLCP in the STP catchment. Maintenance 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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(R. PANDWAL)  
COMPANY SECRETARY  
HINDUSTAN ZINC LTD.  
VADAN 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 existing 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.

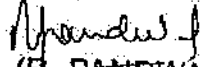
3.8 The STP with its operating infrastructure, tertiary and additional treatment plants, if any, fixed asset, equipments, land etc situated within the premises of the land made available to the HZL or alternate land purchased by HZL, excluding the treated water conveyance system developed by HZL for 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

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(R. PANDWAL)  
COMPANY SECRETARY  
HINDUSTAN ZINC LTD. 4

## 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 then 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.

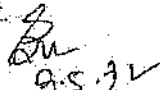
## 9. Term

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.

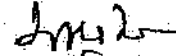
## 10. Miscellaneous

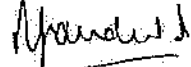
10.1 The parties hereto represent that this Agreement has been duly executed in accordance with the applicable law, regulations and bye-laws governing them and that it is valid, binding and legally enforceable upon them.

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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(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.

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(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 or 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 khara 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.

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(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 in case 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 whichever 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 or 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

*(Signature)*

*(Signature)*

*(Signature)*

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.

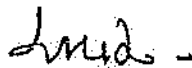
This Agreement bears the approval of the State Government vide letter no F550/PA/SE/DLB/10/STP/Udaipur/12664 dated 16.8.2011 and No 2077 dated 01.05.2012.

IN WITNESS whereof the parties have executed this Agreement on the date and month aforementioned in the presence of witness named hereunder:

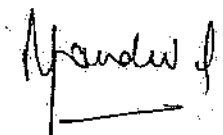
For and on Behalf of:

UMC   
Name S. N. Noregen  
Mayor

Designation आयुक्त  
Date नगर परिषद, उदयपुर  
Place


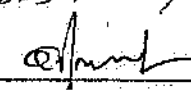
UIT   
Name Dr. R. P. Sharma

Designation \_\_\_\_\_  
Date 09-05-2012  
Place Udaipur  
सचिव


HZL   
Name (R. PANDWAL)  
COMPANY SECRETARY  
HINDUSTAN ZINC LTD.  
YASHAD BHAWAN, UDAIPUR  
Designation \_\_\_\_\_

In witness hereof:

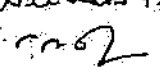
नगर विकास प्रन्यास  
उदयपुर (राज.)

1.   
(R. S. Kothari)  
2.   
(B. L. Kothari)

Witness 3

  
(B. L. Kothari)

Witness 4

  
(A. M. K. Kothari)

CIN:U75144RJ2016SGC049591

**UDAIPUR SMART CITY LIMITED**

Municipal Corporation, Udaipur, Town Hall, Udaipur

Tel: 0294-2421255 ; Fax: 0294-2421255

Website: [www.udaipursmartcity.in](http://www.udaipursmartcity.in), E-mail: [mc\\_udaipur@rediffmail.com](mailto:mc_udaipur@rediffmail.com)

F. No. { } USCL//2017-18/ 7)

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** -HZZ 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, HZZ has agreed that "in case USCL provides more than 25 MLD raw sewerage at the inlet of STP, HZZ 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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**UDAIPUR SMART CITY LIMITED**

Municipal Corporation, Udaipur, Town Hall, Udaipur

Tel: 0294-2421255 ; Fax: 0294-2421255

Website: [www.udaipursmartcity.in](http://www.udaipursmartcity.in), E-mail: [mc\\_udaipur@rediffmail.com](mailto: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



**UDAIPUR SMART CITY LIMITED**

Municipal Corporation, Udaipur, Town Hall, Udaipur

Tel: 0294-2421255 ; Fax: 0294-2421255

Website: [www.udaipursmartcity.in](http://www.udaipursmartcity.in), E-mail: [mc\\_udaipur@rediffmail.com](mailto: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.

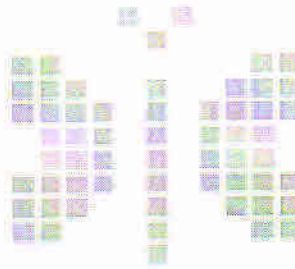


Chief Executive Officer  
Udaipur Smart City Limited

**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

1/  
Superintending Engineer  
Udaipur Smart City Limited



Smart City

HOUSTON TRANSFORMATION

Agreement

Year 2017-18



# UDAIPUR SMART CITY LIMITED

AGREEMENT NO. ....

Year ~~2016-17~~ 2017-18

Division UDAIPUR

Name of work :

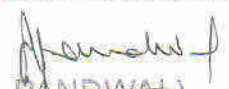
Name of Contractor.....

Hindustan Zinc Limited

## CONTRACT FOR WORK

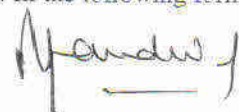
### GENERAL RULES AND DIRECTIONS FOR THE GUIDANCE OF CONTRACTORS

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 office 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 announce 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 delist 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





## 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.NID. 170392IBUP00028 Rs 7,99,99.00/-**
- (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 (ACC + SCC) shall be part of this agreement.**

Letter no 70 dt 17/6/2017 USCL Letter no 42/140/BG/2017-18 dt 19/6/17 shall be part of this agreement.

Signature of Witness

Witness's address & occupation


Date .....

The above tender is hereby accepted by me on behalf of the USCL.

Dated the

  
Superintending Engineer  
USCL

  
Chief Executive Officer  
USCL

  
Signature of Contractor  
Address of Contractor  
(R. PANDWAL)  
COMPANY SECRETARY  
HINDUSTAN ZINC LTD.  
YASHAD BHAWAN, UDAIPUR





राजस्थान RAJASTHAN

आपसी समझौता इकरार पत्र

R 284848

नगरपरिषद चित्तौड़गढ़ जरिये आयुक्त श्रीमती रिकल गुप्ता पत्नी श्री डॉ० अखिल अग्रवाल  
 उम्र 40 निवासी चित्तौड़गढ़

प्रथम पक्ष

हिन्दुस्तान जिंक लिमिटेड चन्देरिया लेड जिंक स्मेल्टर चित्तौड़गढ़ जरिये अधिकृत प्रतिनिधि

श्री ऋषिराज सिंह शेखावत पिताश्री नरेन्द्र सिंह शेखावत उम्र 35

निवासी जिंक नगर, चित्तौड़गढ़

द्वितीय पक्ष

उपर्युक्त प्रथम पक्ष एवं द्वितीय पक्ष के मध्य STP प्लांट अभिमन्यु पार्क एवं भोई खेड़ा प्लांट का पानी हिन्दुस्तान जिंक लिमिटेड द्वारा लेने के लिए जिला कलेक्टर महोदय एवं उपरोक्त प्रथम पक्ष एवं द्वितीय पक्ष के साथ दिनांक 13/10/2020 को आयोजित मितिग में विस्तृत चर्चा उपरान्त बैठक कार्यवाही विवरण अनुसार पानी द्वितीय पक्ष को प्लांट के संचालन हेतु दिये जाने बाबत सहमति हुई जिनकी शर्तें निम्नानुसार हैं:-

- यह कि STP का पानी 2500 KL से 3000 KL प्रतिदिन उपलब्ध होगा जिसकी मासिक भुगतान रु० 6,00,000/- मात्र अक्षरे छह लाख रुपए होगी, जिसका भुगतान द्वितीय पक्ष के द्वारा प्रथम पक्ष को किया जावेगा । यदि STP का पानी उत्पादन उक्त वर्णित रेंज से कम/ज्यादा होगा तो समानुपातिक दर (Proportionate Rate) की गणना 3000 KL को आधार मानकर राशि का भुगतान कम/ज्यादा किया जाएगा । जिस पर दोनों पक्ष सहमत होकर पाबन्द रहेंगे ।

अधिकृत  
 नगरपरिषद चित्तौड़गढ़

लगातार-2-



- 02 यह कि उक्त STP के पानी को प्रथम पक्ष शान्तिपूर्वक तरीके से द्वितीय पक्ष को आपूर्ति करेंगे तथा द्वितीय पक्ष अभिमन्यु-पार्क से पानी के परिवहन का मार्ग कोतवाली के पीछे से संगम मार्ग होते हुए कीर खेड़ा होते हुए सिंचाई नगर से मुख्य मार्ग भीलवाड़ा रोड़, चन्देरिया हाते हुए हिन्दुस्तान जिंक लिमिटेड प्लांट तथा भोई खेड़ा STP प्लांट से कीर खेड़ा, सिंचाई नगर होते हुए मुख्य मार्ग भीलवाड़ा रोड़ चन्देरिया होकर हिन्दुस्तान जिंक लिमिटेड प्लांट तक द्वितीय पक्ष के संसाधनों से परिवहन करेंगे । उक्त मार्ग पर दिन के समय भारी वाहन परिवहन निषेध से मुक्त रहेंगे एवं द्वितीय पक्ष भी वाहनों को सुगमतापूर्वक धीमी गति से जन सुरक्षा को ध्यान में रखते हुए परिवहन करेंगे ।
- 03 STP प्लांट अभिमन्यु पार्क एवं भोई खेड़ा प्लांट पर प्रथम पक्ष का विद्युत कनेक्शन वर्तमान में चालू हैं जिसका उपयोग पानी को भरने हेतु द्वितीय पक्ष उपयोग में लेंगे जिससे दोनों पक्ष सहमत हैं ।
- 04 यह कि पानी की आपूर्ति होने पर द्वितीय पक्ष उपरोक्त तय शुदा दर से पानी की राशि का मासिक भुगतान प्रथम पक्ष को करने के लिए उत्तरदायी होकर पाबन्द रहेंगे ।
- 05 यदि उक्त समझौते से भविष्य में किसी भी प्रकार का विवाद उत्पन्न होता है तो अधिकार क्षेत्र जिला कलेक्टर महोदय, चित्तौड़गढ़ रहेगा ।
- 06 उक्त आपसी समझौता इकरार की अवधि 05-जनवरी, 2021 से 05-अगस्त, 2021 तक प्रभावी रहेगी ।

उक्त आपसी समझौता इकरार दोनों ही पक्षों के मध्य आज दिनांक 05/01/2021 को निम्न साक्षियों के समक्ष निष्पादित किया गया है जिससे दोनों पक्ष सहमत होकर पाबन्द रहेंगे ।

दिनांक 05/01/2021

हस्ताक्षर — प्रथम पक्ष  
नगरपरिषद चित्तौड़गढ़

हस्ताक्षर — द्वितीय पक्ष

साक्षी 1 सुनील कुमार साबुला  
जि. नगर पित्तौड़गढ़ H24

साक्षी 2 [Signature]

हस्ताक्षर — प्रथम पक्ष  
नगरपरिषद चित्तौड़गढ़

हस्ताक्षर — द्वितीय पक्ष



राजस्थान राज-पत्र

विशेषांक

शासक प्रकाशित

Regd. No. RJ. 2539.

RAJASTHAN GAZETTE

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भाग 1 (ख)

महत्वपूर्ण सरकारी आज्ञाएं ।

खान (ग्रुप-1) विभाग

अधिसूचना

जयपुर, जून 8, 1983

संख्या प. 5 (34) खान(ग्रुप-1) 183:—चूंकि राजस्थान सरकार को ऐसा प्रतीत होता है कि निम्न वर्णित भूमि को सार्वजनिक प्रयोजनाय अर्थात् हिन्दुस्तान जिक लिमिटेड (भारत सरकार का उपक्रम) के नये लेड जिक स्मेल्टर चित्तौडगढ़ के लिये भूमि की आवश्यकता है, इस लिये सरकार घोषणा करती है कि नीचे वर्णित भूमि उपरोक्त सार्वजनिक प्रयोजनाय अवाप्त की जाती है ।

इस सम्बन्ध में जिलाधीश, चित्तौडगढ़ के प्रतिवेदन से संतुष्ट होकर राज्य सरकार भूमि अवाप्ति अधिनियम, 1953 की धारा 17(4) के प्रावधानों के अन्तर्गत निर्देश देती है कि उक्त अधिनियम 5 ए के प्रावधान पूर्वक भूमि के लिये लागू नहीं होगा ।

अतः भूमि अवाप्ति अधिनियम की धारा 4 (1) और 6(1) के अन्तर्गत विज्ञप्ति जारी करती है ।

यह घोषणा राजस्थान भूमि अवाप्ति अधिनियम, 1953 की धारा 6 के प्रावधानों के अन्तर्गत उन समस्त व्यक्तियों के लिये जारी की गई जिसका इससे सम्बन्ध है और राज्य सरकार भूमि अवाप्ति अधिकारी (एस. डी. ओ.) चित्तौडगढ़ को उसके द्वारा उक्त भूमि को अवाप्त करने की आज्ञा देने के लिये प्राधिकृत करती है ।

भूमि के नक्शे का निरीक्षण भूमि अवाप्ति अधिकारी, चित्तौडगढ़ के कार्यालय में किया जा सकता है ।

हिन्दुस्तान जिक लिमिटेड

(भारत सरकार का उपक्रम)

हिन्दुस्तान जिक लिमिटेड के नये स्मेल्टर प्रोजेक्ट के लिए ग्राम पूठोली, तहसील गंगारार, जिला चित्तौडगढ़ की प्रस्तावित भूमि का विवरण जो कि अवाप्त की जाती है ।

क्र. सं.	नाम खातेदार	खसरा नम्बर	क्षेत्रफल जो किस्म जमीन अवाप्त करना है	विशेष विवरण
			बीघा बिस्वा]	
1	2	3	4	5
				6
1.	श्री हीरालाल, मयूरालाल गोकल पिता मादू ब्राह्मण सा. आजोलिया का खेडा	493 494 495 496	0 07 0 14 1 09 1 19	वाडा भू. बीड क. ॥ 1-5 भू. 0-03 भू. बी. 01] क. ॥ 1-18 भू. बी. 0-01



1	2	3	4	5	6
		504	2 04	क.ए. 1-02	चाही।
				क. 11 0-10	
				मु. बी. 0-02	
		508	2 17	चाही।	
		510	1 04	कु. 11	
		511	0 12	मु. रे. बी.	
		8	11 06		
2. श्री कन्हैयालाल पिता जीवराज ब्राह्मण सा. आ. खे.		49711	1 02	क। ए	
		49712	0 11	"	
		498	2 07	"	
		499	0 10	मु. रे. बी.	
		500	0 04	मे. मु. बाडा	
		501	0 01	खेडा	
		50211	1 08	क. 1 ए.	
		50212	0 19	"	
		503	2 07	"	
		51413	0 02	मु. बी.	
		51414	0 01	"	
		11	9 14		
3. श्री देवीलाल पिता नन्दा ब्राह्मण		505	0 15	कु. 11	
		506	0 14	कु. 11	
		2	1 09		
4. श्री सोयर बेवा गिरवारी 114 तारु पिता देवा 114 उदी बेवा कालू		507	0 14	कु. 111	
114 बन्सी पिता देवा 114 ब्राह्मण सा. आ. खेडा					
5. श्री माधो पिता सवाईराम 213 सोराम पिता खेसा 113 ब्राह्मण आ.		509	0 05	खा. चाह	
खेडा					
6. श्री माधो पिता सवाईराम 113 हीरा, मथुरा, गोकुल, पिता माधू 116		512	0 02	आ. चाह	
कन्हैयालाल पिता जीवराज 114 सोसर बेवा गिरवारी उदी बेवा कालू		513	1 02	रे. क.	
नारु बन्सी पिता देवा देवीलाल पिता नन्द राम, काना पिता भियाचन्द					
114 ब्राह्मण		2	1 04		
7. श्री कानमल पिता कजोडीमल महाजन		51412	0 02	रास्ता	
		53612	0 12	कु. 11	
		537	0 05	मु. का. बी.	
		539	1 19	कु. 111	
		540	1 01	कु. 11	
		5	3 19		
8. श्री मोहन पिता डोगा ब्राह्मण सा. आ. खेडा		51511	0 01	मु. रे. बी.	
		51611	0 02	कु. 11	
		519	0 04	कु. 11	
		521	1 00	कु. 1 ए.	
		522	0 06	मु. बी.	
		523	0 03	मु. रे. बी.	
		52411	0 02	"	
		526	1 12	कु. 11	
		52812	0 16	मु. बी.	
		53211	0 13	कु. 11	
		84711	3 00	मु. रे. क.	
		84712	6 10	"	
		85312	3 05	रे. क.	
		13	17 14		

1	2	3	4	5	6
9.	श्री उदयराम पिता मोडा ब्राह्मण सा. आ. खेडा	51512 51612 518 52712 52813 52912 533 85313	0 01 0 02 0 03 0 16 0 15 0 01 1 03 3 07	मू. रे. बी. कु. ॥ कु. ॥ कु. ॥ मू. बी. " कु. ॥ ए मू. रे. बी.	
		8	6 08		
10.	श्री केला, श्यामा पिता होकमा ब्राह्मण सा. आ. खेडा	51513 51613 517 52711 52811 52911 52912 530 531 53212 85314	0 04 0 04 0 08 0 17 1 12 0 05 0 01 1 08 1 05 0 13 6 13	मू. रे. बी. कु. ॥ कु. ॥ कु. ॥ मू. बी. " " कु. ॥ " " मू. रे. बी.	
		11	13 12		
11.	श्री मोहनलाल पिता कजोडीमल महाजन सा. देह	520 534 535 53611	0 04 0 04 1 15 1 17	मू. रे. बी. मू. बी. मू. रे. बी. कु. ॥	
		4	4 00		
12.	श्री मोहन पिता छोगा 113 केला, श्यामा पिता होकमा 113 चान्दी वेवा हरलाल 113 ब्राह्मण सा. आ. खेडा	52412	0 05	मू. रे. बी.	
13.	श्री केला, श्यामा पिता होकमा 112 मोहन पिता छोगा 114 उदयराम पिता मोला 114 ब्राह्मण सा. आ. खेडा	525	0 05	आ. चा.	
14.	श्री गोपी पिता एकलिंग जाट सा. आ. खेडा	541 542 543 544 545 546 547 548 549	0 03 0 06 2 01 0 03 0 07 0 05 1 00 3 07 1 19	हा. आ. मू. रे. बी. कु. ॥ 1-17 मूकावी. 0-4 खेडा मू. बी. मू. रे. बी. कु. ॥ कु. ॥ मू. बी.	
		9	9 11		
15.	श्री माधो पिता सोला जाट	550 553	0 11 1 01	मू. रे. बी. मू. बी.	
		2	1 12		
16.	श्री अर्जुन, चाम्पू, डाल, संकर, प्रभु पिता महादेव जाट	551 552	1 08 2 15	मू. रे. बी. मू. बी.	
		2	4 03		



1	2	3	4	5	6
17.	श्री मूरा पिता सुरजमल जाट, सा. आ. खेडा	554 555  556 557  4	0 12 4 19  0 04 1 00  6 15	म. बी. कु. 1 1-10 कु. 11 3-05 म. बी. 0-04 अ. चाह मू. रे. बी.	
18.	श्री मोडसिंह पिता फूलसिंह	559 560 561 562 563 564 565 566 557 568  569 570 571 572 573 574  16	0 15 2 03 0 06 0 08 1 02 0 06 2 04 3 19 0 14 3 02  0 02 0 11 2 05 1 18 2 07 2 07  24 09	मू. रे. बी. कु. 1 आ. चाह मू. बी. " " कु. 1 कु. 1 2-00 कु. 11 1-19 मू. बी. मू. रे. बी. 1-12 मू. बी. 1-10 खेडा मू. रे. बी. " कु. 11 1-15 मू. बी. 0-03 कु. 11 रे. बी.	
19.	श्री कहैयालाल पिता जीवराज 112 वरदा पिता मोती 112 सा. आ. खेडा	577 11	0 06	आ. चाह	
20.	श्री नारदास पिता रुधनाथदास 113 बालूदास पिता चन्दुदास 113 हगामी, धूली, गोपीदास 113 बैरागी	578 579 606 609  4	0 04 0 09 0 07 0 19  1 13	मू. रे. बी. 0-02 बाडा 0-02 कु. 1 कु. 1 कु. 11	
21.	श्री सांगीदास पिता भागीरथ दास बैरागी सा. देह	580 581 583 584  4	0 03 0 05 0 06 0 01  0 15	कु. 1 कु. 1 कु. 1 मू. रे. बी.	
22.	श्री रामदास पिता गुलाबदास बैरागी	582	0 04	कु. 1	
23.	श्री कालू मूरा पिता हजारो गाडरी, सा. देह. हि. ब.	585 588 589 590 591 592 593 594 595 597  10	0 09 1 06 0 03 0 02 1 05 0 07 0 03 0 03 0 02 0 08  4 08	कु. 1 ए कु. 1 ए मू. रे. क. " कु. 1 म. क. बाडा बाडा बाडा मू. रे.	

1	2	3	4	5	6
24.	श्री महादेव पिता भगा जाट सा. आ. खेडा	840 84212 854 855	4 7 4 6 4 17 3 16	मू. क. " मू. रे. बी. कु. ॥	
		4	17 06		
25.	श्री ऊंकार पिता नन्दा जाट सा. आ. खेडा	841 849 850 852	4 00 0 05 3 18 4 17	मू. क. छाक कु. ॥ मू. रे. क.	
		4	13 00		
26.	श्री महादेव पिता भीषा जाट सा. आ. खेडा	84211 848	1 9 14 3	मू. रे. क. "	
		2	15 12		
27.	श्री अमरा पिता नाथू 113 ऊंकार पिता दलीचन्द 113 देवजी पिता रूपा 113 जाट सा. आ. खेडा	843 845 846	2 19 5 5 18 11	रे. क. रे. बी. छ. मू. रे. बी.	
		3	26 15		
28.	श्री भारत विजय सिंह पिता राम प्रतापसिंह राजपूत	847 मी	0 15	रे. क.	
29.	श्री महादेव पिता भगा ऊंकार पिता नन्दा, जाट सा. आ. खेडा	851	0 04	आ. चाह	
30.	श्री कन्हैयालाल पिता जीवराज ब्राह्मण सा. आ. खेडा	85311	13 5	मू. रे. क.	
31.	श्री फूलचन्द शंकर, हजारी पिता गुला 112 गिरधारी माधू पिता कालू 113 रामचन्द्र पिता हजारी 116 ब्राह्मण	870 871	0 4 0 4	रा. मा. आ. चाह	
		2	0 8		
32.	श्री रामचन्द्र पिता हजारी ब्राह्मण	880 881 882 883	1 7 1 10 0 09 2 18	कु. ॥ मू. रे. बी. मू. रे. बी. कु. ॥	
		4	6 04		
33.	श्री गोपीलाल, लहर, अम्बालाल पिता गिरधारी जाट सा. आ. खेडा	884	0 16	मू. रे. बी.	
34.	श्री हीरा पिता माधू ब्राह्मण	88511	4 00	मू. रे. बी.	
35.	श्री रामचन्द्र पिता हजारी 112 शम्भू पिता उदयलाल 112 ब्राह्मण	885 मी.	6 13	रे. क.	
36.	श्री चुन्नीलाल लहर पिता नारायण 113 कंकु पिता लाला 113 नन्दा, चुन्नीलाल, छगना मोहन लहर पिता नारायण खाजी नि. बिल्या	886 887	0 11 2 17	मू. रे. बी. कु. ॥	
		2	3 8		
37.	श्री मंवर बनक, प्रभु हीरा खाती नि. बिलीया	888 889 890	0 7 1 13 2 4	मू. बी. कु. ॥ मू. रे. बी.	
		3	4 4		
38.	श्री शंकर जगन्नाथ, देवजी लहर पिता गोरी जाट सा. आ. खेडा	913	29 3	रे. क.	
39.	श्री गुमान कुंवर पत्नी विजय सिंह राजपूत	959	3 1	कु. ॥	



1	2	3	4	5	6
40.	श्री मोडा पिता उदा 112 रुपा पिता गुलाब 112 गाडरी	583 587 2	0 01 0 09 0 10	भू. रे. बी. कु. ए	
41.	श्री भूरा, गैरु, गिरधारी पिता छेजा चपार सा. आ. खेड़ा	596	0 08	बाड़ा	
42.	श्री ईश्वर लाल, मांगीलाल, बंसीलाल, पिता कजोड़ीमल, रूपलाल मु. रामचन्द्र महाजन	599 600 625	0 06 3 09 1 09	भू. बी. कु. 1 कु. ए	
		3	5 04		
43.	श्री नारूदास पिता रुधनाथदास 112 हगामी, धूली बेवा गोपीदास 112	601	2 18	कु. ए	
44.	श्री रामचन्द्र, मोहन पिता लाला मोडा पिता दूदा, रुपा पिता दलाब ति. मुगावो का खेड़ा, हजारी पिता नोला मु. वाली जोजे रामनाथ किशना केला पिता अमरा हजारी गोपी पिता छिपा नारूदास पिता रुधनाथ कजोड़ीमल पिता मोडीराम, रामचन्द्र पिता रामनाथ जाट	602	0 06	आ. चाह.	
45.	श्री वाली जोजे, रामनाथ तेली सा. देह	603 622 2	0 05 1 03 1 08	कु. ए कु. ए	
46.	श्री मांगिया, बालू पिता रामा 115 गोपी, धूकल, गुलाब, खुसाणा पिता केला 415 गाडरी	604 775 621 3	0 06 1 19 1 05 3 10	क. 1 ए भू. रे. बी. कु. 1 ए	
47.	श्री रामदास पिता गुलाबदास बैरागी	607 615 616 3	0 14 0 10 2 19 4 03	कु. 1 भू. बी. कु. 1 ए कु. 11	1-10 1-09
48.	श्री कजोड़दास, हीरादास रतन दास पिता गोपालदास बैरागी	608 610 614 619 4	0 13 0 10 2 11 0 04 3 18	कु. 1 कु. 1 कु. 1 भू. बी. ड	
49.	श्री मेरूदास पिता मागीरथ दास बैरागी	605 611 2	0 08 0 09 0 17	कु. 1 कु. 1	
50.	श्री कजोड़दास, हीरादास, रतन दास पिता गोपालदास 112 रामदास पिता गुलाबदास, नरुदास पिता रुधनाथदास, चन्द्रदास पिता धूलदास हमागी धूली बेवा गोपीदास, मांगीदास पिता मेरूदास 112 बैरागी	612	0 07	आ. चाह	
51.	श्री मांगीदास, मेरूदास पिता मागीरथदास बैरागी	613	0 01	भू. रे. क.	
52.	श्री शंकर, पृथ्वीराज, रणजीत सिंह पिता खुसाणा दरोगा	617 618 633 3	0 02 5 12 0 09 6 03	भू. क. कु. 1 0 आ. चा.	

1	2	3	4	5	6
53.	श्री उंकार पिता कजोड रतनलाल, तुलसीराम पिता जयराम 112 गाडरी	620	1 18	कु. 1	
54.	श्री रामचन्द्र पिता मोहन लाल 213 मांगी बेवा सुखदेव 113 गाडरी	623 624	2 08	कु. 1	
55.	श्री भारत, विजयसिंह पिता राम प्रताप सिंह राजपूत	627 628 629 630 631 632 634 635 636 637 6381 63812 639 640 641 642	0 12 2 14 0 10 0 06 1 13 0 08 1 04 3 17 4 09 1 05 0 17 0 03 1 08 2 11 3 07 2 07	मू. रे. बी. कु. 1 मू. क. आ. चाह कु. 1 कु. 1 मू. बी. कु. 1 कु. 1 मू. क. मू. बी. मू. बी. कु. 1 कु. III कु. 1 मू. रे. क.	
		16	27 11		
56.	श्री महोराम, नानू, सवाईराम पिता कालू तेली	644	0 07	मू. बी.	
57.	श्री महाराम, नानू, सवाईराम 213 सुखलाल पिता रामकरण 116 गोगा जीतमल फूला पिता पोखर रामा पिता गुलाब, जगतनारायण पिता रूपा 113 डालू मांगीलाल, रतन पिता गोकल 116 तेली	646	0 01	चबूतरा	
58.	श्री गोगा, जीतमल पिता पोखर तेली	64711	1 02	कु. 1 ए	
59.	श्री गंगाराम जीतमल, फूला पिता पोखर तेली हि. ब.	64712 651 65511 697 699 703 704	0 05 0 19 0 10 3 05 2 10 2 15 0 04	कु. 1 कु. 1 हुरा. रो. बी. र. क. म. रे. क. म. रे. बी. आ. चाह.	
		7	10 08		
60.	श्री महाराम, नानू, सवाईराम पिता कालू 213 सुखलाल पिता रामकरण 116 गोगा, जीतमल पिता पोखर	648	0 04	आ. चाह	
61.	श्री डालू, मांगीलाल, रतनलाल पिता गोकल तेली	649 65512 656 657	1 14 0 03 2 15 1 15	कु. 1, II मू. रे. बीड म. बी. कु. 1 ए	
		4	6 07		
62.	श्री महाराम, नानू, सवाईराम पिता कालू तेली	650 653 1037	1 19 1 02 26 12	कु. 1 म. बी. म. रे. क. रे. क. खेडा	15-00 11-11 0-01
		3	30 13		



1	2	3	4	5	6
63.	श्री रामा पिता गुलाब तेली, सा. देह	652	1 01	कु. I ए	
64.	श्री गोपा, जीतमल पिता पोखर 112, रामा पिता गुलाब 112 तली	654	1 12	मू. बी.	
65.	श्री मुखलाल पिता रामकरण महाजन	658	1 15	कु. II, III	
66.	श्री जुवारा पिता वरदा कलाल	659	1 04	कु. I	
		660	0 02	म. रे. क.	
		662	2 01	कु. II	
		663	0 19	म. रे. बी.	
		664	1 09	कु. I	
		665	0 11	म. बी.	
		666	2 07	कु. II	
		667	0 16	म. रे. बी.	2-10
		670	5 00	म. रे. बी.	2-10
		9	14 09		
67.	श्री जुवारा मू. वरदा 416, मुखलाल पिता रामकरण, कैलाश, सीताराम, रामकुमार पिता रामचन्द्र महाजन 116	661	0 03	आ. चाह	
68.	श्री नन्दा पिता जोरावर 1118, मेरु पिता रामा, जयचन्द पिता गोकल, मोहन पिता चूना 671231 हि. व., हुक्मा पिता पोखर 101231, गाडरी	671	2 18	म. रे. बी.	
		675	6 11	म. रे. बी.	
		676	1 14	म. बी.	
		677	3 11	कु. II	0-11
				कु. III	3-00
		686	4 09	कु. I	
		689	2 15	मू. बी.	
		776	3 09	मू. बी.	
		7	19 08		
69.	श्री मांग्या, बापू पिता रामा, गोपी, धूकल, गुलाब, खुमाण पिता केला 415, गाडरी	678	0 13	मू. बी.	
		679	1 07	कु. I	0-15
				कु. II	0-11
		2	3 00		
70.	श्री उंकार पिता कजोड़ 112, रतनलाल, तुलसीराम पिता जयराम गाडरी	680	0 11	कु. III	
		681	0 03	मू. बी. डू	
		687	2 03	म. रे. बी.	
		688	0 04	रे. क.	
		690	1 08	रे. क.	
		5	4 9	रास्ता	0-06
71.	श्री मेरु पिता रामा 115, नन्दा, हुक्मा पिता पोखर 115, मोहन पिता चूना 115, खुरान 115, जयचन्द 115 पिता गोकल गाडरी	682	0 07	म. रे. गो.	
		683	4 05	कु. I, II, III	
		684	0 08	मू. रे. बी.	
		697	0 07	रे. क.	
		774	3 03	मू. बी.	
		5	8 10		
72.	श्री नन्दा, मुखा पिता तोला 112 गोकल पिता मणा 114, उंकार पिता कजोड़, रतनलाल, तुलसीराम पिता जयराम 114	685	0 13	आ. चाह	

भाग 1 (ख)

राजस्थान राज-पत्र, अगस्त 3, 1983

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1	2	3	4	5	6
73.	श्री जगन्नाथ पिता राधू दरोगा	694 695 696 700 701 702 <hr/> 6	0 17 0 17 0 05 0 05 1 17 1 11 <hr/> 6 15	छा. क. रे. क. रास्ता रास्ता मू. रे. मू. रे. बी.	
74.	श्री रामचन्द्र पिता छोगालाल, जगन्नाथ पिता घीसा घोबी	705	1 11	मू. रे.	
75.	श्री मोहनलाल पिता कजोडीमल महाजन	51412क 706 <hr/> 2	0 07 1 00 <hr/> 1 07	मू. रे. बी. मू. रे.	
76.	श्री मैरू, श्रीकिशन, बंशीलाल पिता बरदा गुरु	707	1 12	कु. III	
77.	श्री रामप्यारा, हजारी पिता फूलचन्द गुरु	708 709 <hr/> 2	1 00 0 18 <hr/> 1 18	कु. III कु. III	
78.	श्री चन्द्रदास पिता धूलदास	735 736 <hr/> 2	3 14 2 07 <hr/> 6 01	कु. II, III मू. रे. बी.	
79.	श्री उदयराम, लालू पिता चुन्नीलाल लखारा	727 728 729 <hr/> 3	2 03 1 19 3 09 <hr/> 7 11	मू. का. बी. मू. बी. कु. II	
80.	श्री मैरू, मोहन, भगत पिता केशा दरोगा	737 738 739 741 <hr/> 4	2 10 1 08 1 08 0 03 <hr/> 5 09	मू. रे. बी. कु. III कु. III कु. II	
81.	श्री केला पिता भगा, जगन्नाथ, रामचन्द्र, गोपी, गजानन्द पिता राधू दरोगा	740 74211	0 07 1 01	आ.चाह. कु. III	
82.	श्री नाथू, रतन पिता जगन्नाथ, रामचन्द्र, गोपी, गजानन्द पिता राधू दरोगा	74212 74311 74312 745 746 <hr/> 6	0 18 0 09 0 02 1 00 1 07 <hr/> 4 17	कु. III मू. रे. क. " कु. III मू. रे. बी.	
83.	श्री किशनलाल, बालचन्द, गुलामचन्द, मनोहरलाल, लालचन्द, मागचन्द, पिता नाथूराम कलाल	74911	3 16	मू. बी.	
84.	श्री रामचन्द्र, मोहन पिता लाल 213, मांगी बेवा सुखदेव गाडरी	755	2 19	मू. रे. क. मू. रे.	1-19 1-00



1	2	3	4	5	6
85.	श्री कालू, भूरा पिता हजारि गाडरी	756	2 03	मू. रे. बी.	
86.	श्री कजोड पिता किशना डोली	76212	9 00	रे. क.	
87.	श्री किशनलाल, बालचन्द, गुलाबचन्द, मनोहरलाल, लालचन्द, भागचन्द पिता नानूराम कलाल	76213	2 12	रे. क.	
88.	श्री शिवनारायण, रमेशचन्द, गोपाल पिता बंशीलाल महाजन 112 बालू पिता गमेर तेली 112	777	28 12	मू. बी.	
89.	श्री भूरा पिता कजोड दरोगा	778/क/1 778/1क/2	2 00 2 00	मू. रे. बी. मू. रे. बी.	
		2	4 00		
90.	श्री भवाना, लछमन पिता जोष जाट	7781ख	13 15	मू. रे. बी.	
91.	श्री रमेशचन्द पिता नर्वदाशंकर	7781मो.	1 05	का. क.	
92.	श्री हगामी बेवा गंगा 114 तन्दा पिता बालू 116 देवजी पिता जयचन्द 116 जाट	783 785	9 01 15 08	मू. रे. बी. "	
		2	24 09		
93.	श्री रामा, जयचन्द, भूरा पिता किशना चमार	78812	1 03	मू. रे. बी.	
94.	श्री उंकार पिता बालू 112 बालू पिता हुक्मा 112 जाट	785 मी.	0 17	मू. रे. बी.	
95.	श्री गोपी पिता एकलिंग जाट	784	17 03	मू. बी.	
96.	श्री अमरा पिता नाथू 113 उंकार पिता बलीचन्द 113 देवजी पिता रूपा 113 जाट	78511	12 00	मू. रे. बी.	
97.	श्री किशना, देवा पिता ब्या राम 112 मेरू पिता प्रताप 114 हीरा लेहरा पिता अमरा 114 चमार	787 78811	14 00 6 10	मू. रे. बी. मू. रे. बी.	
98.	श्री मोहन पिता छोगा ब्राह्मण	7891	11 05	मू. रे. बी.	
99.	श्री चमना पिता दलीचन्द जाट	7892	3 00	मू. रे. क.	
100.	श्री भागीरथ पिता मोतीदास बैरागी	789 मी	1 07	मू. रे. क.	
		2	4 07		
101.	श्री शक्ति सिंह पिता मोहसिंह राजपूत	792	2 03	रे. बी.	
102.	श्री भूरा पिता सूरजमल जाट	793	3 03	मू. रे. बी.	
103.	श्री उंकार पिता लालू जाट	795	5 17	मू. रे. बी.	
		796	2 06	"	
		798	1 17	मू. रे. क.	
		799	2 00	मू. रे.	
		800	14 12	मू. रे. बी.	
		5	26 12		
104.	श्री भारत, विजयसिंह पिता रामप्रताप सिंह 113, दुलहसिंह पिता महताबसिंह 213 राजपूत	797 802	0 02 10 00	ओ. बी. मू. रे. बी.	
105.	श्री अमरा पिता नाथू 116 उंकार पिता दलीचन्द, देवजी पिता रूपा 116, गुरुप्यारा, नाना पिता अर्जुन 116 हीरा 116 गोकल पिता सोला 116	804 805 812	0 17 1 07 0 03	का. क. मू. रे. आ. चाह.	
		4	12 07		
106.	श्री चमना पिता दलीचन्द 112 जीतू पिता हीरा 112 जाट	803	5 16	मू. बी.	
107.	श्री मेहरू, नाना, प्यारा पिता अर्जुन 113 हीरा, गोकल पिता सोला जाट	807 808 809 810 814	0 02 2 01 0 03 4 07 2 18	मू. मू. बी. कु. 11 रे. बी.	
		5	9 11		

1	2	3	4	5	6
108.	श्री अमरा पिता नाथू 113, उंकार पिता दलीचन्द 113, देवजी पिता रूपा 113, जाट	806 811 815 843 845 846 <hr/> 6	1 19 4 14 3 08 2 19 5 05 18 11 <hr/> 35 06	मू. कु. ॥ मू. रे. बी. रे. क. बीड मू. रे. बी.	
109.	श्री गोपी पिता एकलिंग जाट	813 818 820 821 822 823 824 825 826 827 <hr/> 10	14 11 1 08 1 10 1 12 1 03 0 07 3 12 2 10 1 16 0 18 <hr/> 29 07	रे. क. मू. रे. क. छा. क. मू. रे. बी. कु. ॥ आ. चाह रे. क. कु. ॥ मू. रे. छा. क.	
110.	श्री किशना, रामा पिता डालू जाट	816 817 819 <hr/> 3	0 05 3 08 3 10 <hr/> 7 03	मू. रे. बी. म. खा. मू. रे.	
111.	श्री हजारी, सुखदेव, महादेव पिता चम्पा 314, मांगू पिता हरलाल 114 जाट	828	4 15	मू. बी.	
112.	श्री गिरधारी पिता भगा, रामा पिता भूरा जाट	83111 832 <hr/> 2	2 03 4 05 <hr/> 6 08	मू. रे. क. छा. क.	
113.	श्री चुनिया, छोगा पिता भगना जाट	83112	6 09	मू. रे. क.	
114.	श्री लहरू पिता भागीरथ जाट	83312 83312 <hr/> 2	2 15 3 06 <hr/> 6 00	छा. क. ,,	
115.	श्री छोगा, चुना पिता भगना जाट	83314	2 05	छा. क.	
116.	श्री फूलचन्द, शंकर, हजारी पिता मूला ब्राह्मण	835	6 00	मू. रे. क.	
117.	श्री गोपीलाल, लेहरू, अम्बालाल पिता गिरधारी जाट	836	20 15	मू. रे. बी.	
118.	श्री रामचन्द्र पिता हजारी ब्राह्मण	83711	3 12	रे. क.	
119.	श्री गिरधारी, माधू पिता कालू 112 रामचन्द्र पिता हजारी 112	83712 83811 <hr/> 2	1 10 2 06 <hr/> 3 16	छा. क. का. क.	
120.	श्री फूलचन्द, शंकर, हजारी पिता गुला ब्राह्मण	83811 ख 83812 865 866 867 868 869 874 876	3 15 1 07 5 18 1 12 1 12 0 05 2 07 0 18 1 14	का. क. का. क. मू. रे. बी. कु. ॥ कु. ॥ मू. कु. ॥ मू. रे. बी. छा. क.	



1	2	3	4	5	6
		877	0 06	वाड़ा	
		878	2 00	भू.	
		879	1 09	कु. II	
		12	23 03		
121.	श्री लंकार पिता बुला चमार	839	6 01	का. क.	
		856	0 19	रे. क.	
		857	2 12	भू. रे. क.	
		858	2 14	भ. क.	
		859	0 02	भू. रे. क.	
		860	1 06	भू. रे. क.	
		6	13 14		
122.	श्री गिरवारी, माधू पिता कालू ब्राह्मण	862	19 00	भू. रे. बी.	
		863	0 09	छा. क.	
		864	1 08	भू. रे. बी.	
		872	2 10	कु. II	
		873	0 03	भू. बी. ड.	
		875	4 19	छा. क.	
		891	0 11	भू. बी.	
		892	6 01	कु. III	
		893	0 03	का. चाह	
		894	2 06	कु. III	
		895	6 05	भू. रे. बी.	
		11	43 15		
123.	श्री हजारी पिता लाला 116, कूकाजी पिता लाला 116, नन्दा, चुन्नीलाल, 89611	12 13	भू. रे. बी.		
	छगना, मोहन, लहरू पिता नारायण 116, भवरीया दत्तक पुत्र हीरा 112, 901	0 05	आ. चाह		
	खाती	2	12 18		
124.	श्री चुन्नीलाल, लहरू पिता नारायण 113, कूकाजी पिता लाला 113, 897	1 18	भू. रे. बी.		
	नन्दा, चुन्नीलाल, छगना, मोहन, लहरू, नारायण 113 खाती	902	2 01	कु. II	
		903	0 10	भू. रे. क.	
		3	4 09		
125.	श्री गोपी पिता जीवा, भुवाना पिता नन्दा जाट	89612	7 10	भू. बी. ड.	
126.	श्री भवरीया पिता हीरा खाती	898	0 07	भू. रे. बी.]	
		899	1 18	कु. II	
		900	0 07	कु. III	
		3	2 12		
127.	श्री चुन्नीलाल, लहरू पिता नारायण खाती,	90411	1 10	भू.	
		91011 क	2 08	भू. रे. बी.	
		2	3 18		
128.	श्री प्रभुलाल, जमनालाल, भगवानलाल पिता हजारी ब्राह्मण	90412	0 08	भू.	
		905	1 12	भू.	
		2	2 00		

1	2	6	4	5	6
129.	श्री भारत विजयसिंह पिता रामप्रतापसिंह राजपूत	904 मी. 907 908 12 ख 909 910 1 मी. 910 मी. 911 मी.	0 05 0 02 0 05 0 01 0 02 2 00 2 06	मू. ओडी मू. रे. बी. खड्डा मू. रे. बी. " छा. क.	
		7	5 01		
130.	श्री श्यामा, रमेश गोठू पिता भंवरलाल सुथार	908 1 910 12 क	4 10 0 11	मू. रे. बी. "	
		2	5 01		
131.	श्री रामा, जयचन्द पिता किसाना चमार	908 12 क 911 12	0 18 1 02	मू. रे. बी. छा. क.	
		2	2 00		
132.	श्री कंकूजी पिता लालूजी खाती	910 1 ख 910 12 ख	0 16 0 04	मू. रे. बी. "	
		2	1 00		
133.	श्री लेहरू पिता हमरचन्द चमार	911 13	2 00	छा. क.	
134.	श्री भवाना, गोपी, जीवा जाट	911 11	7 00	छा. क.	
135.	श्री चम्पा पिता महादेव 518 गिरधारी, गेहरू पिता धूकल 3116 अम्बा लाल पिता जगा गोपी 3116 जाट सा. आ. खेडा	912 11	14 08	मू. रे. बी.	
136.	श्री गेहरू, गिरधारी पिता धूकल 318 चंपा पिता महादेव 114 हीरा पिता भवाना 114 गोपी पिता जयचन्द	914	81 08	छा. क.	
137.	श्री गोपी पिता जयचन्द, हूजा पिता हीरा, नन्दा पिता चम्पा शंभू पिता गिरधारी जाट	916 1 916 2 917 918 12 920 921 922 923 924 934	3 12 1 12 2 18 0 05 0 12 2 06 3 11 0 03 3 06 4 08	छा. क. छा. क. कु. ॥ मू. क. कु. ॥ कु. ॥ मू. क. ओडी कु. ॥ कु. ॥	
		10	22 11		
138.	श्री गोपी पिता जयचन्द, फूला पिता हीरा, शंभू पिता गिरधारी, नन्दा पिता चम्पा जाट	925 1 926 1	0 12 0 17	कु. ॥ मू. रे. क.	
		2	1 09		
139.	श्री गुलाबकुंवर पत्नी श्री भारत विजय सिंह राजपूत	925 2 926 2 959	0 18 0 18 3 01	कु. ॥ मू. रे. क. कु. ॥	
		3	4 17		
140.	श्री भूरा पिता सुरजमल, गोपी पिता वरदा जाट	928 1 929	9 10 20 12	मू. रे. क. मू. रे. बी.	
		2	30 02		



1	2	3	4	5	6
141.	श्री शंकरलाल पिता गोपी जाट	92812	9 14	मू. रे. बी.	
142.	श्री गोपी पिता जीवा, सुबाना पिता नन्दा जाट	930	25 03	मू. रे. बी.	
143.	श्री डालू, मूरा पिता हजारी जाट	931	5 12	मू. बी.	
		932	4 15	मू. बी.	
		2	10 07		
144.	श्री अम्बालाल पिता जगा जाट	933	8 05	मू. रे. बी.	
145.	श्री देवजी पिता रूपा, अमरा पिता नाथू, उंकार पिता दली चन्द, हीरा पिता सोला, गोकल पिता सोला, मेहरा, प्यारा, नाता पिता अजुन जाट	935	15 10	मू. रे. क.	
146.	श्री गिरधारी, मेहरू पिता भुकल जाट	936	10 00	मू. रे. बी.	
		93911 मी.	15 05	मू. रे. बी.	
		2	25 05		
147.	श्री छोगा पिता जयकिशन, गिरधारी पिता गोकल जाट	937	4 15	मू. रे. क.	
		93913	2 16	रे. बी.	
		2	7 11		
148.	श्री छोगा पिता जयकिशन जाट	93811	7 16	रे. बी.	
		93912 क	4 04	रे. बी.	
		2	12 00		
149.	मु. रामी बेवा हीरा जाट	938 मी.	5 19	रे. क.	
150.	श्री सारत, विजयसिंह	93911का1	1 19	मू. रे. बी.	
151.	श्री हीरा, जीवा पिता नन्दा	93911का2	4 00	मू. रे. बी.	
152.	मु. रामी बेवा हीरा, छोगा, गिरधारी पिता गोकल जाट	93911ख	12 15	मू. रे. बी.	
153.	श्री कृष्ण मगवान स्थान पूठोली	93912 ख	3 04	रे. बी.]	
154.	श्री उदयराम पिता भोला ब्राह्मण	94011	1 15	मू. रे. क.	
155.	श्री केला, श्याम पिता हुवमा ब्राह्मण	94012	3 00	मू. रे. क.	
156.	श्री लेहरू पिता अमर चन्द चमार	940 मी.	1 17	रे. क.	
157.	श्री नन्दा मु. अमरा नावा. व. वि. गोपी, गोपी वरदा पिता लक्ष्मण जाट	942	7 14	मू. रे. बी.	
158.	श्री मंगल सिंह पिता सारत विजयसिंह	957	3 04	कु. ॥	
		959	3 01	कु. ॥	
		96012	0 07	छा. क.	
		961	3 01	कु. ॥	
		962	0 15	मू. रे. क.	
		963	0 08	श्रीडी	
		96011	3 09		
		7	14 05		
		454	1283 15		





1	2	3	4	5	6
8.	श्री जीतू पिता हीरा जाट, सा. देह	510/1	0 5	मू. बीड़	
9.	मू. रामी बेवा हीरा जाट, सा. देह	511	2 6	कु. ॥	
10.	श्री गोपीलाल, लेहरू, अम्बालाल पिता गिरधारी जाट, सा. देह	512	1 18	कु. I	
		524	1 11	कु. ॥	
		549	1 1	मू. बी.	
		3	4 10		
11.	श्री माधू लेहरू पिता उदा 114 भगवानिया, भंवरिया पिता रामा 114 हि. व. सुखदेव नाना, प्रभु पिता गिरधारी 112 जाट	513	0 4	आ. चाह.	
		517/1	7 2	मू. रे. क.	
		517/2	0 3	आ. चाह.	
		3	7 9		
12.	श्री वरदा पिता पीया जाट सा. देह	514	1 4	कु. ॥	
13.	श्री लक्ष्मण, लेहरू पिता हरलाल जाट, सा. देह	515	1 13	कु. ॥	
14.	श्री माधू लेहरू पिता उदा जाट, सा. देह	516	0 13	मू.	
15.	श्री माधू लेहरू पिता उदा 112 भगवानिया भंवरिया पिता रामा 112 हि. व.	518	1 12	मू.	
		520	1 5	कु. III	
		521	1 7	कु. III	
		3	4 4		
16.	श्री सुख देव, नाना, प्रभु पिता गिरधारी जाट सा. देह	519	0 18	मू. बीड़	
		522	2 10	कु. III	
		2	3 8		
17.	श्री नन्दा पिता गमेर, नन्दा, सुखदेव पिता पोखर जाट, सा. देह	534/1	1 15	मू. रे. बी.	
		536	6 2	कु. III	
		537	0 8	मू. रे. बी.	
		553/1	2 18	मू. रे. क.	
		4	11 03		
18.	श्री गंगाराम पिता पोखर जाट	539	1 17	मू. बी.	
		540	4 18	कु. I	
		541	0 3	मू. क.	
		542	0 5	आ. चाह.	
		543	0 6	मू. बीड़	
		544	0 6	मू. बी.	
		546	0 11	मू. बी.	
		7	8 6		
19.	श्री रुक्माथ, भगवानिया परधु गंगा पिता रामा तेली, सा. देह	545	0 5	मू. बीड़	
		547	0 18	"	
		548/1	2 17	कु. ॥	
		3	4 00		
20.	श्री हजारी पिता देवा 112 लाडू भंवर लाल पिता जयचन्द 112 जाट, सा. देह	534/2	1 18	मू. रे. बी.	
		535	2 15	कु. III	
		2	4 13		

1	2	3	4	5	6
21.	श्री लक्ष्मण चम्पा, गेहलू पिता भैरू तेली, सा. देह	54812	2 17	कु. II	
22.	श्री किशना, राधा पिता लालू जाट, सा. देह	554	6 16	मू. रे. बी.	
		55511	3 8	"	
		55512	3 7	"	
		3	13 11		
23.	श्री गणेश पिता ऊंकार जाट	556	7 6	मू. रे. बी.	
24.	श्री नाथू पिता जोधा, ब्राह्मण, सा. देह	55812 क	0 7	मू. क.	
		55812 ख	0 2	आ. चाह	
		55813	2 5	कु. II	
		562	0 5	मू. रे. क.	
		563	0 19	म.	
		5	3 18		
25.	श्री सुखानन्द, रामेश्वर, रतनलाल, शंकरलाल पिता जीवराज 112 नाथू पिता जोधा 112 ब्राह्मण	559	0 4	आ. चाह.	
26.	श्री सुखानन्द, रामेश्वर, रतनलाल, शंकरलाल पिता जीवराज ब्राह्मण सा. देह	560	0 12	मू.	
		561	0 14	मू. रे. क.	
		569	3 15	कु. II	
		3	5 1		
27.	श्री मीटू पिता कालू, लालू पिता दुरजन, 112 नूरखां पिता फकीरखां 112 मुसलमान, सा. देह	564	1 00	मू. रे. बी.	
		565	0 19	"	
		568	2 18	कु. III	
		3	4 17		
28.	श्री अलाउद्दीन, साबुद्दीन पिता हमेर मुसलमान, सा. देह, हि. ब.	566	1 1	मू. बी.	
		567	1 6	मू. रे.	
		570	2 12	कु. III	
		3	5 19		
29.	श्री अलाउद्दीन, साबुद्दीन पिता हमेर 112 मीटू पिता कालू, लालू पिता मोहम्मद 114 नूरखां पिता फकीर खां 114 मुसलमान	571	0 3	आ. चाह.	
30.	श्री हीरा पिता एकलिंग जाट, सा. देह, हि. ब.	573	0 14	कु. II	
		57512	1 00	कु. III	
		2	1 14		
31.	श्री रामा, छोगा, महादेव पिता रूपा जाट, सा. देह	574	0 14	कु. II	
		581	1 2	कु. III	
		636	0 6	कु. I	
		637	0 13	कु. I	
		648	1 4	मू. रे. ख. I.	
		5	3 19		
32.	मु. चम्पा बेवा सेवा 112 गिरधारी हीरा पिता एकलिंग, छोगा, माधू पिता रूपा 112 जाट, सा. देह	57511	0 4	आ. चाह.	
33.	श्री हीरा पिता चतरभुज 112, भगवानलाल, लक्ष्मण, मंरु, गोपी पिता सुखदेव, सा. देह	576	0 3	आ. चाह.	
		577	5 2	कु. II	
		2	5 5		
34.	श्री भुवाना, लक्ष्मण पिता जोधा जाट, सा. देह	578	2 12	कु. II	



1	2	3	4	5	6
35.	श्री लक्ष्मण, चतरमुज छोपा रामा पिता चमना जाट, सा. देह	579 582 <hr/> 2	3 7 कु. II 8 7 कु. II <hr/> 11 14		
36.	श्री लक्ष्मण, छोपा, प्रताप, रामा पिता चमना, हीरा पिता चतरमुज, मुवाना, लक्ष्मण पिता जोधा	580	0 7 आ. चाह.		
37.	श्री महादेव पिता सोला जाट	583 58411 58412 <hr/> 3	3 10 कु. II 1 15 कु. III 0 4 आ. चाह. <hr/> 5 09		
38.	श्री उकार पिता नन्दा जाट सा. देह	585 586 587 <hr/> 3	3 13 कु. III 0 4 आ. चाह. 3 09 मू. रे. बी. <hr/> 7 6		
39.	श्री हीरा पिता भुवाना 114 चम्पा पिता महादेव 114 गिरधारी गहर पिता धुकल 112 हि. व.	588 591 <hr/> 2	7 4 मू. रे. 1 12 मू. रे. बी. <hr/> 8 16		
40.	श्री उदयराम पिता भूरा सा. देह	5891 590 <hr/> 2	0 17 कु. II 2 4 मू. रे. बी. <hr/> 3 01		
41.	श्री मेगा पिता उदयराम गोपी पिता सुख देव जाट	589मी.	3 00 कु. II		
42.	मू. अमरकुं बेवा कालू जीवा हीरा पिता नन्दा, कालू मथुरा पिता केशा जाट, सा. देह	59311	7 14 छ. क.		
43.	श्री लेहरु, रंगलाल, प्रभू, भीमा पिता कालू जाट	59312	2 10 छ. क.		
44.	श्री चम्पा पिता महादेव, हीरा पिता भवाना जाट	594 607 <hr/> 2	4 11 का. क. 12 00 मू. रे. बी. <hr/> 16 11		
45.	श्री नारायण पिता भागीरथ जाट	595	3 12 छा. क.		
46.	श्री प्रभू मुतवना जयराज 112 मुवाना पिता वरदा 112 जाट, सा. देह	596 597 59811 59812 600 601 602 <hr/> 7	0 4 वाड़ा 4 1 कु. I 0 3 आ. चाह. 1 19 रे. बी. 6 16 मू. रे. बी. 0 3 आ. चाह. 5 00 कु. III <hr/> 18 06		
47.	श्री अमरा पिता नाथ, उंकार पिता दलीचन्द मू. मूल बीवा देवजी, लेहरु, नाना, प्यारा पिता अर्जुन हीरा गोकल पिता सोला जाट हि. व.	599	8 00 मू. रे. बी.		

1	2	3	4	5	6
48.	श्री रामचन्द्र उंकार पिता छोगा जाट	60311क 60311ख 2	2 9 2 10 4 19	मू. रे. बी. मू. रे. कु. II	
49.	श्री गिंसा, परशु पिता उंकार गंगा बेवा छोगा चमार सा. देह	60911	4 00	कु. II	
50.	श्री गोपी डालू पिता लाला चमार सा. देह	60912	2 19	कु. III	
51.	मु. जमनी बेवा सोला चमार सा. देह	610 61112 614 3	0 5 0 13 1 1 1 19	मू. रे. बी. मू. रे. कु. III	
52.	श्री हीरा लक्ष्मण चम्पा पिता भुवाना चमार, सा. देह	61111 612 613 3	1 1 1 17 1 2 4 00	मू. रे. क. कु. III कु. III	
53.	श्री गिंसा, परशु पिता उंकार मु. गंगा बेवा छोगा 114 गोपी डालू पिता लाला 114 मु. जमनी बेवा सोला 114 हीरा लक्ष्मण चम्पा पिता भुवाना 114 चमार	615	0 02	आ. चाह.	
54.	श्री गिरधारी, गेहू पिता धुकल जाट सा. देह	616 619 2	3 1 1 6 4 7	मु. खा. मू. रे. बी.	
55.	श्री उंकार पिता धुला चमार सा. देह	61711	2 3	कु. III	
56.	श्री गोपी, नन्दा, रामा पिता कजोड़ चमार सा. देह	61712	2 3	कु. II	
57.	श्री उंकार पिता धुला, गोपी, नन्दा, रामा पिता कजोड़ चमार, सा. देह	618	0 3	आ. चाह.	
58.	श्री मोहन पिता छोगा ब्राह्मण	620 621 2	0 13 4 02 4 15	आ. चाह. कु. III	
59.	श्री मोहन लाल पिता हरलाल ब्राह्मण सा. देह	622	2 12	मू.	
60.	श्री कैलाश, श्यामा पिता होक्मा ब्राह्मण	623	3 15	मू.	
61.	श्री बालू पिता होक्मा जाट	625	0 3	मू. क.	
62.	श्री गोपी पिता जीवा जाट सा. देह	629 626 627 628 630 631 633 7	5 13 0 6 0 7 0 5 3 18 1 6 4 13 16 08	मू. क. मू. क. मू. क. आ. चाह. मू. बीड. मू. रे. बी. कु. II	



1	2	3	4	5	6
63.	श्री छोगा पिता मोती प्रताप पिता महादेव जाट	632	0	2	खड्वा
64.	श्री मूरा पिता सूरज मल गोपी पिता वरदा जाट, सा. देह	634	2	3	कु. II
		640	4	6	कु. III
		64111	1	10	मू. रे. बी.
		64112	0	6	आ. चाह
		642	2	00	मू. रे.
		5	10	5	
65.	श्री सुवाना, लक्ष्मण पिता जोधा 113 होक्मा, उंकार पिता लाला महादेव पिता सोला गोपी पिता वरदा मूरा पिता सूरजमल 116 गिरधारी पिता एकलिंग रामा छोगा महादेव पिता रूपा 116 सा. देह जाट	635	0	3	आ. चाह
66.	श्री हीरा पिता एकलिंग जाट, सा. देह	638	1	3	कु. I
67.	श्री बालू पिता होक्मा 112 महादेव पिता सोला 112 जाट, सा. देह	639	2	11	कु. II
68.	श्री रामा पिता दोला 112 होक्मा, उंकार पिता लालू भेंरू देवजी पिता मूरा गोपी पिता वरदा 112 जाट, सा. देह	643	0	4	आ. चाह
69.	श्री होक्मा, उंकार पिता लालू जाट सा. देह	644	3	19	कु. III
70.	श्री सुवाना, लक्ष्मण पिता जोधा जाट	645	2	18	कु. II
71.	श्री लक्ष्मण पिता जोधा जाट, सा. देह	64611	1	00	कु. III
72.	श्री नन्दा सुखदेव पिता पोखर जाट, सा. देह	64612	1	14	कु. III
		65512	0	13	कु. III
		2	2	7	
73.	श्री मेगा, छोगा पिता नंगा 113 हीरा पिता तोला 113 मेरा रतनलाल पिता कालू 113 जाट, सा. देह	658	0	3	आ. चाह
74.	श्री छोगा पिता मगना जाट, सा. देह	647	0	12	मू. रे. I
		65511	0	12	कु. III
		2	1	4	
75.	श्री कालू पिता देवा मेरा नगजी पिता जयचन्द मू. रापी बेवा एकलिंग 112 छोगा पिता मगना 118 लक्ष्मण पिता जोधा 118 नन्दा पिता गमेर नन्दा सुखदेव पिता पोखर 114 जाट, सा. देह	650	0	01	आ. चाह
76.	श्री रामा छोगा महादेव पिता रूपा 112 लहू पिता मेगा 116 नन्दा सुखदेव पिता पोखर 116 नन्दा पिता गमेर 116 जाट, सा. देह	653	0	19	मू. रे. क.
		654	0	07	"
		2	1	06	
77.	श्री हजारी, सुखदेव, महादेव पिता चम्पा, मांगीया पिता हरलाल जाट, सा. देह	659	1	6	कु. I
		66211 क	1	00	"
		2	2	06	
78.	श्रीमती मू. कंकु बेवा पोखर जाट	660	1	7	कु. I
		66211 ख	0	6	कु. I
		663	0	5	"
		664	0	5	कु. I
		665	0	14	कु. I
		5	2	16	

1	2	3	4	5	6
79.	श्री हजारी पिता देवा 112 लाडू संवर लाल पिता जयचन्द 112 जाट, सा. देह	661 667  668 669 670 671 672 673 674	6 8 1 4  0 4 1 16 2 9 3 12 3 13 0 6 0 4	मू. बीड. कु. I मू. क. आ. चाह कु. I कु. I कु. II कु. II आ. चाह. मू. क.	1-00 0-4
		9	19 16		
80.	श्री मेगा, छोया पिता नंगा 113 हीरा पिता तोला 113 भेरा, रतनचाल पिता कालू 113 जाट, सा. देह	66212	3 2	कु. I	
81.	श्री हजारी महादेव पिता चम्पा हीरा पिता सुख मांगीया पिता हरलाल मु. कंकु बेवा पोखर जाट, सा. देह	66611	0 4	आ. चाह.	
82.	श्री रामलाल पिता गिरधारी जाट	675 676 677 678 681 682 683 684	3 19 0 6 0 6 3 5 2 00 0 12 6 18 0 4	मू. बीड. " आ. चाह कु. I मू. बीड कु. II कु. I आ. चाह.	
		8	17 4		
83.	श्री सोराप पिता खेमा 1110 भूरा पिता घीसा 1110 गिरधारी नाथ पिता कालू 11100 अमरा पिता नन्दा 11100 सोराम पिता अमरा 11100 हजारी पिता भागीरथ 11100 नाना जगन्नाथ पिता सुधा 1120 ऊंकार पिता वरदा 1160 पोखर पिता एकलिंग 1130 तानी बेवा खुरान 1160 माधु पिता सवाईराम 1110 श्री किशन मागा पिता आशा 1140 सं. चम्पा बेवा लाल 1140 जगन्नाथ पिता सूरजमल सोला पिता भूरा 11120 होक्मा पिता श्रीकिशन 11120 हरलाल पिता देवा 11120 हजारी पिता बेणा 1140 केशी बेवा श्री किशन 1118 भगना पिता गोमा 1118 भुवाना पिता सगा 116 सूरजमल पिता मेधा 116 भेरा पिता हुक्मा 1118 सा. देह फूला पिता घीसा 11100	689 761  2	0 3 0 3  0 6	आ. चाह. आ. चाह.	
84.	श्री चम्पा पिता भुवाना ब्राह्मण सा. देह	680 744 745 750 754 759	2 12 0 2 1 3 1 17 0 9 0 1	कु. II मू. रे. कु. III कु. II कु. II मू.	
		6	6 04		
85.	श्री शमकू बेवा कालू 112 जीवा हीरा पिता नन्दा 112 जाट सा. देह	686 70011	8 15 7 12	मू. रे. बी. "	
		2	16 7		
86.	श्री चम्पा पिता महादेव हीरा पिता भुवाना जाट सा. देह	687 68811 68812 68813 689 690	2 12 0 16 0 15 0 16 2 13 0 5	मू. रे. क. मू. रे. क. " " " छड्डा	



1	2	3	4	5	6
		691	1 00	मू. रे. क.	
		702	12 10	मू. रे. बी.	
		73111	0 4	"	
		73212	1 1	"	
		722	2 14	कु. 11	
		11	25 6		
87.	श्री कालू, मयूरा पिता कैशा 112 केला पिता जीवन 112, जाट, सा. देह	70012	9 04	मू. रे. बी.	
88.	श्री मेगा, छोगा, पिता गोंगा 113 होरा पिता तोला 113 मंरा रतनलाल पिता कालू 113 जाट	70111 70112	8 3 0 2	मू. रे. बी. आ. चाह.	
		2	8 5		
89.	श्री लेहू, रंगलाल, प्रभु, भीमा पिता कालू जाट, सा. देह	703	14 7	मू. रे. बी.	
90.	श्री गिरवारी गेहू पिता धुकल 112 हजारी पिता मगरा गोपी पिता जयचन्द 112 जाट, सा. देह	704	15 3	मू. रे. बी.	
91.	श्री गिरवारी, गेहू पिता धुकल जाट, सा. देह	70511 711 717 718 719 720 721 713 73211	2 04 0 12 2 00 1 00 0 19 6 6 0 9 0 13 2 01	रे. क. मू. रे. बी. " मू. रे. मू. रे. बी. कु. 11 मू. रे. बी. " "	
		9	16 04		
92.	श्री अमरा, वरदा, गोपी पिता लछमन जाट, सा. देह	707 712 71412 715 716	2 00 0 14 1 5 2 1 1 17	रे. क. मू. रे. क. मू. रे. बी. मू. रे. मू. रे. बी.	
		5	7 17		
93.	श्री वरदा, गोपी पिता लछमन 112 अमरा पिता नाथू, उंकार पिता दलीचन्द मू. कुली बेवा देवजी 114 गेहू, धारा, नाता पिता अर्जुन 1112 हीरा, गोकुल पिता तोला 116	71411	0 02	आ. चाह.	
94.	श्री गिरवारी पिता जयकिशन जाट, सा. देह	70512	2 3	रे. क.	
95.	श्री हीरा पिता सुवाना 114 जम्मा पिता महादेव 114 गिरवारी गेहू पिता धुकल 112	723	0 6	बाडा	
96.	श्री गिरवारी, गेहू पिता धुकल 112 हीरा पिता सुवाना जम्मा पिता माधो, हजारी पिता नाथू गोपी पिता जयचन्द, अम्बालाल पिता वालिया 114	724	0 3	आ. चाह.	
97.	श्री अम्बालाल पिता गंगालिया जाट सा. देह	72511 726 728 730 73311	0 4 0 12 0 17 0 9 0 19	बाडा कु. 11 कु. 11 कु. 11 मू. रे. बी.	
		5	3 1		

1	2	3	4	5	6
98.	श्री हजारि पिता मगना जाट, सा. देह	72512 727 73312 ख 3	0 2 0 11 0 4 0 17	वाडा कु. II सू. रे. बी.	
99.	श्री चूनिया, छोगा पिता मगना जाट, सा. देह	729 73312 क 77813 3	0 5 0 5 0 19 1 9	कु. III सू. रे. बी. कु. I	
100.	श्री चूनिया, छोगा पिता मगना जाट, अम्बालाल पिता मांगलिया जाट	73112	0 4	सू. रे. बी.	
101.	श्री गिरधारी पिता भग, रामा पिता भूरा जाट	734	3 1	कु. III	
102.	श्री महादेव पिता हीरा जाट सा. देह	736 737 738 775 783 784 785 786 8	11 2 1 9 11 12 5 15 0 5 0 5 0 6 3 3 33 17	कु. II सू. बी. सू. बी. " रास्ता आ. चाह. वाडा सू. रे. बी.	
103.	श्री मोहन पिता छोगा जाट सा. देह	740 742 769 3	0 8 0 17 0 14 1 19	कु. III " कु. I	
104.	श्री गोपी पिता प्रताप, बालू, मोडा पिता कजोड 113 केला, श्यामा पिता होक्मा 113 हजारि पिता बेला 113 ब्राह्मण, सा. देह	74111	0 5	रे. बी.	
105.	श्री गोपी पिता प्रताप बालू, मोडा पिता कजोड 113 केला, श्यामा पिता होक्मा 113 छोगा पिता जगन्नाथ 113 ब्राह्मण,	74112	0 03	आ. चाह.	
106.	श्री उदा पिता मगना 112 माघो पिता मैरू 112 ब्राह्मण,	743 751 755 763 76412 774 6	0 7 0 19 0 1 2 1 1 6 0 3 4 17	सू. रे. बी. कु. III सू. कु. II कु. I आ. ह.	
107.	श्रीमती सु. दाखी बेवा धौसा ब्राह्मण	746	1 14	कु. II	
108.	श्री रामचन्द्र पिता हजारि ब्राह्मण	747	0 17	कु. II	
109.	श्री फूल चन्द पिता गुला ब्राह्मण	748	0 5	कु. II	
110.	श्री गिरधारी, माधू पिता कालू ब्राह्मण	749	0 11	कु. II	
111.	श्री माघो पिता मैरू ब्राह्मण]	752 773 2	0 14 1 10 2 4	कु. II कु. I	



1	2	3	4	5
112.	श्री उदा पिता मगना ब्राह्मण	753 76411 2	0 15 कु. II 1 10 कु. I 2 5	
113.	श्री नाहरू पिता देवा ब्राह्मण	756 757 2	0 10 कु. III 0 5 कु. II 0 15	
114.	श्री देवी लाल पिता नन्दा ब्राह्मण	758	0 7 कु. II	
115.	श्री देवी लाल पिता नन्दा 113, देवा मु. जालम 113, काना मु. मियाचन्द 113 ब्राह्मण	760	0 5 कु. II	
116.	श्री काना मु. मियाचन्द ब्राह्मण	762	0 6 कु. II	
117.	श्री हीरा, मथुरा, गोकल, पिता माधो ब्राह्मण सा. देह	76511	1 10 कु. II	
118.	श्री गोपी पिता प्रताप 113 हीरा, मथुरा, गोकुल पिता माधो 113, केला श्यामा पिता होक्मा 113 ब्राह्मण	76512	0 9 कु. II	
119.	श्री कैलाश, श्यामा पिता होक्मा 113 कु. चान्दी बेवा हरलाल 113 मोहन पिता छोगा 116 उदा पिता भोला 116 ब्राह्मण	766	0 9 कु. II	
120.	श्री गोपी पिता प्रताप, बालू, मोडा पिता कजोड, ब्राह्मण, सा. देह	767	0 9 कु. III	
121.	श्री उदयराम ब्राह्मण पिता मोडा	768	0 15 कु. I	
122.	श्री कैलाश, श्यामा पिता होक्मा ब्राह्मण	770	1 4 कु. I	
123.	श्री मोहन लाल, दत्तक, प्रभु, हरलाल ब्राह्मण सा. देह	771	1 8 कु. I	
124.	श्री मोहन लाल, दत्तक, प्रभु, हरलाल, कैलाश, श्यामा पिता होक्मा, छोगा 772 पिता जगन्नाथ, उदा पिता भोला ब्राह्मण	772	0 3 आ. चाह.	
125.	श्री नन्दा, सुखदेव पिता पोखर जाट, सा. देह	776	0 5 कु. III	
126.	श्री गोपी पिता जयचन्द जाट, सा. देह	777 77811 77812 3	0 7 कु. I 0 13 कु. I 0 16 कु. I 1 16	
127.	श्री लहरू, प्रभु जगन्नाथ पिता कालू, लहरू, पिता उंकार 114 गिरधारी पिता मगा, रामा पिता भूरा 114 सूरजमल, डालू पिता हरलाल 112 जाट, सा. देह	787	0 6 आ. चाह.	
128.	श्री गोकल पिता हजारी मथुरा लाल पिता गोकल 112 सोहन, कैलाश पिता देवा, सा. देह	789	0 3 आ. चाह.	
129.	श्री हजारी पिता मगना, प्रनिया, छोगा पिता मगना, अम्बालाल पिता जगलिया, गोपी पिता जयचन्द जाट, सा. देह	791	0 3 आ. चाह.	
130.	श्री छोगा पिता सोती, प्रताप पिता महादेव जाट, सा. देह	792 794	0 5 मू. क. 1 16 मू.	

1	2	3	4	5	6
		795	6 6	मू.	
		3	8 7		
131.	श्री सूरज मल, डालू पिता हरलाल जाट, सा. देह	793	0 02	बाडा	
		796	5 5	कु. III	
		797	3 8	कु. III	
		3	8 15		
132.	श्री होवमा, उंकार पिता कालू जाट, सा. देह	798।1	6 14	मू. रे. क.	
	कुल अवाप्ति हेतु प्रस्तावित भूमि का योग:-	307	574 00		

हिन्दुस्तान जिक लिमिटेड  
(भारत सरकार का उपक्रम)

हिन्दुस्तान जिक लिमिटेड के नये स्मेल्टर प्रोजेक्ट के लिये ग्राम बिलिया, तहसील गंगरार, जिला चित्तौड़गढ़ की प्रस्तावित भूमि का विवरण जो कि अवाप्त की जानी है।

क्र.सं.	नाम खातेदार	खसरा नम्बर	क्षेत्रफल जो अवाप्त किया जाना है	किस्म जमीन	विशेष
1	2	3	4	5	6
1.	श्री जसा पिता उदा भोल, सा. देह	742।1क	10 9	प. II	
2.	श्री घीसा पिता उदा भोल, सा. देह	742।1ख	10 3	प. II	
3.	श्री नारू पिता धूला भोल, सा. देह	742।1ग	10 0	प. II	
4.	श्री मांगु पिता उदा भोल सा. देह	742।1घ	10 0	प. II	
5.	श्री रता पिता मूरा 1।2, चम्पा, मोहन 1।4, मांगीया, देवा 1।4 गाडरी, सा. देह	742।2	13 16	प. II	
6.	श्री बालू, मोडा, कजोड 1।4 हि. व. गोपी, प्रताप 1।4, उदयराम रामचन्द्र, शान्ति, माना 1।4, माधू, मेरू 1।4 ब्राह्मण, सा. देह, आगोलियों का खेडा	743।1 743।2	7 15 16 5	प. II बीड I	
		2	24 00		
7.	श्री नाथू पिता जोधा ब्राह्मण, आगोलियों का खेडा	744	8 1	प. II	
8.	श्री नारायण पिता जेराम गाडरी, सा. आ. खेडा	745 746 747 748 749 750 751 752 753 754 755 757	1 3 1 19 0 09 1 00 0 13 2 1 1 17 1 6 1 8 3 8 2 11	कु. I प. III बीड II कु. III आ. चा. कु. II " कु. III बीड I बीड I	



1	2	3	4	5	6
		756	2	2	बीड।
		758	5	1	बीड।
		759	1	11	बीड।
		14	26	9	
9. श्री लक्ष्मण, लहर, सोमा बेफी, लकमा पिता हीरा जाट		760	2	3	कु. ॥
		761	0	9	आ. चा.
		762	2	18	बी. ड.।
		763	10	8	बीड।
		764।3मी.	2	19	बीड।
		5	18	17	
10. श्री नारायण पिता भागीरथ जाट, सा. आ. खेडा		764।1	1	3	
		765।1	2	17	
		2	4	00	
11. श्री भूरा लाल पिता गिरवारी जाट सा. आ. खेडा		764।2	1	00	बीड।
		765	7	00	बीड।
		2	8	00	
12. श्री गोपी पिता गोकल गाडरी		767	6	18	प. ॥
		775	0	4	खा. ॥॥
		885	0	9	बीड।
		857	1	17	कु. ॥
		858	1	4	बीड ॥
		883	0	8	कु.।
		6	11	00	
13. श्री छगन, मोहन, बंशी पिता हरी राम खाती, गौरी शंकर रूप शंकर जगन्नाथ ब्राह्मण आ. खेडा		768	0	6	प. ॥
		769	0	12	कु. ॥
		770	0	3	आ. चा.
		771	4	11	कु. ॥
		773	2	13	बीड ॥
		5	8	5	
14. श्री मोती पिता शिवजी ब्राह्मण आ. खेडा		772	1	1	बीड
		774	1	7	कु. ॥॥
		776	0	6	आ. चा.
		777	0	14	बा.।
		778	0	17	बा.।
		779	1	00	"
		781	0	7	खेडा
		7	5	12	

1	2	3	4	5	6
15.	श्री नारु बंशी पिता देवी लाल ब्राह्मण सा. आ. खेडा	780 782 783 <hr/> 3	0 17 2 7 1 15 <hr/> 4 19	कु. III बीड I कु. III	
16.	श्री देवी लाल पिता नन्दा 113 नारु बंशी देवा, उदी बेवा कालू, सोमा, देवा, गिरधारी 113 काना, मियाचन्द ब्राह्मण, आ. खेडा	78411	0 2	आ. चा.	
17.	श्री काना पिता मियाचन्द ब्राह्मण	78412 789 792 793 794 796 799 809 811 813 824 <hr/> 11	0 7 1 3 1 7 1 18 1 4 0 3 1 10 2 11 0 10 0 02 0 3 <hr/> 10 18	बीड I कु. II बीड II कु. II कु. II आ. चा. बीड II कु. III वा. II बीड II बीड III	
18.	श्री देवीलाल पिता नन्दा ब्राह्मण, आ. खेडा	785 790 791 800 806 808 812 823 <hr/> 8	0 7 1 4 0 3 0 13 0 14 2 8 0 2 0 3 <hr/> 5 14	वा. I कु. III वा. I बीड II कु. III " बीड I बीड II	
19.	श्री मियाचन्द पिता जगन्नाथ ब्राह्मण सा. खेडा	845 846 848 851 <hr/> 4	0 6 1 16 0 12 0 12 <hr/> 3 6	वा. I कु. III बीड I बीड I	
20.	श्री नारु, बंशी देवी, उदी बेवा कालू सोमा बेवा गिरधारी ब्राह्मण आ. खेडा	786 787 788 795 798 810 814 822 840 841 842 849 850 <hr/> 13	0 8 1 12 1 1 0 5 1 19 2 17 0 3 0 3 0 8 0 6 0 15 0 18 0 14 <hr/> 11 09	बीड III कु. II कु. III प. II बीड II कु. III बीड II बीड II बीड I बीड I कु. III बीड I बीड I	



1	2	3	4	5	6
21.	श्री रामा पिता दोला जाट सा. देह	797	7	1	बीड I
22.	श्री संखा नन्द रोशनलाल सज्जनलाल शंकरलाल जीवराम ब्राह्मण सा. आ. खेडा	80312	7	00	बीड II
23.	श्रीमती देवी, नन्दा 113 काना, मियाचन्द 113 नारु, बंसी, देवा, उदी बेवा कालू, सोसर बेवा गिरधारी	804 805 807	7 0 0	04 9 2	बीड II आ. चा. रे. छा.
		3	7	15	
24.	श्री गोकल, लक्ष्मण, सरजू पिता हजारी जाट सा. आ. खेडा	815 816	3 3	17 04	बीड II बीड II
		2	7	01	
25.	श्री गिरधारी, कालू जाट सा. आ. खेडा	817	9	06	बीड II
26.	श्री सुखदेव, महादेव, चम्पा, मांगू पिता हरलाल जाट सा. आ. खेडा	818 821	1 2	18 18	बीड II बीड II
		2	4	16	
27.	श्री एकलिंग, गिरधारी 112 गोपी, कालू 114 बरदा उदा 114 जाट सा. आ. खेडा	819 820	1 3	13 3	बीड II बीड II
		2	4	16	
28.	श्री नानूराम, रामचन्द्र, भीम शंकर ब्राह्मण सा. देह	825	3	6	बीड II
29.	श्री रूपशंकर, अम्बालाल 112 रामप्यारी जोजे किशनलाल 112	826	9	5	बीड II
30.	श्री मांगीलाल, केशरमल, लक्ष्मीचन्द 112 दुर्गाशंकर, प्रसुलाल 112 हि.ब.	827	1	01	बीड II
31.	श्री दुर्गाशंकर, नन्द किशोर, किशनलाल 112 कन्हैयालाल, नारायण 112 हि. ब. सा. देह	828 829	1 1	06 11	बीड II बीड II
		2	2	17	
32.	श्री धीसूलाल, हरिशंकर 112 नानूराम, रामचन्द्र, भीमशंकर ब्राह्मण सा. देह	830 831 972 973 974 975 976 977 978 834	0 4 3 0 1 3 1 0 2 3	2 5 17 8 14 2 2 8 0 00	ओडी बीड II प. II प. II बीड. II प. कु. II ओडी प. II बीड II
		10	19	18	
33.	श्री देवीलाल पिता नन्दा ब्राह्मण	832	2	11	बीड II
34.	श्री कन्हैयालाल, नारायण ब्राह्मण सा. देह	833 847	3 0	19 14	बीड II बीड. I
		2	4	13	
35.	श्री हीरा, तोला, छाजू बेवा गिरधारी	835	8	02	बीड II
36.	श्री जीतू पिता रूपा जाट सा. आ. खेडा	836 837	4 2	00 00	बीड II बीड II
		2	6	00	

1	2	3	4	5	6
37.	श्री नारु, बंसी, देवा, उदी देवा कालू, सोसर देवा गिरधारी 113, देवीलाल नन्दलाल 213 आ. खेडा	843 844 <hr/> 2	0 03 0 02 <hr/> 0 05	बीड. I आ. वा. <hr/>	
38.	श्री गणेश, भैरु 112, डालू घीसा 112, गाडरी सा. देह	852 866 871 875 879 880 <hr/> 6	0 13 2 7 0 12 1 01 0 5 0 11 <hr/> 5 09	बीड. I बीड. I बीड. II कु. I बीड. I कु. II <hr/>	
39.	श्री गणेश, भैरु, गाडरी सा. देह	853 867 868 872 877 878 94712 <hr/> 7	0 7 1 5 1 1 3 11 0 9 0 5 3 19 <hr/> 10 17	बीड. I बीड. I कु. I प. II प. II बीड. I <hr/>	
40.	श्री घीसलाल, हरिशंकर ब्राह्म सा. देह	854 856 865 886 <hr/> 4	0 10 1 06 3 3 1 07 <hr/> 6 6	बीड कु. II बीड II बीड II <hr/>	
41.	श्री कालूराम पिता छोटेला महाजन	859 860 <hr/>	1 3 <hr/>	कु. I <hr/>	
42.	श्री जोषा पिता रामा गाडरी सा. देह	861 863 885 887 888 889 873 874 <hr/> 8	2 2 0 14 1 8 1 16 1 11 2 6 0 11 1 00 <hr/> 11 08	ह. I बीड I बीड II प. II बीड प. II बीड II कु. I <hr/>	
43.	श्री नारु पिता जालम गाडरी सा. देह	862 864 <hr/> 2	1 4 0 7 <hr/> 1 11	कु. I बीड. 2 <hr/>	
44.	श्री डालू पिता घीसा गाडरी सा. देह	869 870 876 94711 94811 <hr/> 5	0 13 0 7 1 00 0 15 6 10 <hr/> 9 5	कु. II बीड II कु. I प. II प. II <hr/>	



1	2	3	4	5	6
45.	श्री उदा, किसान 116, बीवा 116, रामा 116, गोपी 116, गणेश, भैरू 119, नारू पिता जानम 116, हजारी पिता भैरू 119, डालू पिता घीसा 119 गाडरी	881 882 2	0 6 0 5 0 11	रास्ता "	
46.	श्री उदयराम पिता मोती बलाई	892	5 00	प. ॥	
47.	श्री घना पिता रता भील	896	10 00	प. ॥	
48.	श्री लेहरू, मोहन नारायण सुयार	896 भी.	5 07	प. ॥	
49.	श्री नारायण उदा भील सा. देह	946	5 14	प. ॥	
50.	श्री कालू पिता घीसा भील	946।2 946।3 2	11 6 3 13 14 19	प. ॥ प. ॥	
51.	श्री घीसुलाल, हरिशंकर 116, नानूराम, रामचन्द्र, सीमशंकर 116, दुर्गाशंकर, नन्द किशोर, किसानलाल, मंगीलाल	948।2 958 959 960 961 962 963 964 8	6 5 0 15 1 5 0 3 2 9 0 10 1 11 0 10 13 8	प. ॥ बीड। कु. ॥ आ. चा. बीड ॥ प. ॥ प. ॥ कु. ॥	
52.	श्री चम्पालाल।चमना जाट आ. खेडा	948।1	2 5	प. ॥	
53.	श्री मोहनलाल पिता चमना जाट सा. आ. खेडा	949 सी. 965 966 3	11 6 1 10 2 13 15 9	प. ॥ बीड ॥ प. ॥	
54.	श्री भैरू पिता उदा गाडरी	950 951 952 953 954 955 956 957 8	12 14 1 14 0 2 10 5 3 2 2 5 1 5 0 14 32 1	बीड। कु. ॥ आ. चा. बीड ॥ कु. ॥ कु. ॥ बीड। बीड	
55.	श्री प्यारा, कैशी, प्यारी पिता नारायण भील	967 968 969 970।1 क 4	0 13 1 8 2 00 0 2 4 3	प. ॥ प. ॥ खा. ॥ आ. चा.	
56.	श्री मोहनलाल, चमना, चम्पा जाट सा. देह	970।2 क	6 2	बीड।	
57.	श्री दुर्गाशंकर, प्रमूलाल ब्राह्मण सा. देह	970।2 ख	6 2	बीड।	
58.	श्री मगना, कजोड, हजारी गाडरी	971	10 10	बीड।	
कुल अवधि हेतु प्रस्तावित भूमि का योग :—		192	438 03		

हिन्दुस्तान जिक लिमिटेड

(भारत सरकार का उपक्रम)

हिन्दुस्तान जिक लि. के नये स्मेल्टर प्रोजेक्ट चित्तौड़गढ़ के कोलोनी क्षेत्र के लिए अवाप्त की जाने वाली भूमि का विवरण  
ग्राम बोदियाना तहसील चित्तौड़गढ़ (राज.)

क्र.सं.	नाम खातेदार	खसरा नम्बर	क्षेत्रफल जो अवाप्त करता है	किस्म	विवरण
			बीघा बिस्वा		
1	2	3	4	5	6
1.	श्री देवी लाल पिता किशोरीलाल ब्राह्मण	135 143 144 145 146 147	1 2 3 18 1 12 0 2 2 11 2 00	प. III बीड II कु. II आ. चा. कु. II कु. II	
		6	11 05		
2.	श्री देवीलाल प्यारा लाल ब्राह्मण	134 136 139 140 141 142 148	1 1 2 4 1 11 0 8 3 16 0 2 5 00	प. III प. II बीड II ह. III खा. II आ. चा. बीड	
		7	16 17		
3.	श्री गोपी पिता उदा भील	155 149 150 151 152 153 154	0 09 1 05 0 4 0 16 0 08 0 11 3 03	कु. III आ. चा. कु. II ह. I ह. II बीड	
		7	6 16		
4.	श्री मं. आयजां जोड़े मोहम्मद युसुफ छोपा सा. चित्तौड़गढ़	156 157 158 159 160 161 162	3 16 3 2 2 7 0 3 1 2 1 1 1 8	बीड कु. II बीड I कु. II आ. चा. कु. II प. II	2-15 1-7
		7	12 19		
5.	श्री नारायण, रामा, सरगड़ा सा. देह	163 168 169 170	0 9 1 13 2 17 1 11	बीड कु. I कु. III बीड II	
		4	6 10		



1	2	3	4	5	6
6.	श्री मथुरा पिता भागीरथ सरगड़ा	164 165 166 171	0 10 1 15 3 1 1 10	बीड कु. II कु. III बीड II	
		4	6 16		
7.	श्री तारायण मथुरा सरगड़ा	167	0 5	कु. III आ. चा.	
8.	श्री धूल पिता सवाईराम जाट सा. देह	172 173 174 175 176 177 178 179 180 209 210 211	1 2 2 19 1 8 0 17 0 12 2 14 0 5 2 00 0 15 0 7 2 8 2 14	बीड कु. III कु. III बीड II बीड II कु. II आ. चा. कु. II बीड II आ. चा. ह. I बीड I	
		12	18 1		
9.	श्री रामा पिता धूला जाट	181 182 183 184 271 272 273 274	0 8 0 3 3 11 0 15 1 1 0 14 1 15 1 7	बीड II आ. चा. कु. II बीड I प. II कु. II " बीड	
		8	9 14		
10.	श्री नन्दा पिता उदा भील सा. देह	185 186 187 188 189 190 191 204 205 206 207 208	1 8 1 9 0 4 2 1 1 1 1 00 0 15 4 18 1 17 1 15 0 8 2 5	बीड I कु. III आ. चा. कु. III कु. II कु. II प. II बीड I ह. II ह. I आ. चा. ह. I	
		12	19 1		
11.	श्री हजारी, दौला, मेगा, पिता बरदा 112, पुनिया पिता बरदा 112, अहीर सा. देह	192 193 194 195 196 197 198 199 200	4 13 3 3 0 16 1 3 1 15 1 16 0 6 0 8 3 12	प. III ह. II कु. II " कु. III कु. III आ. चा. कु. II बीड II	
		9	17 12		

1	2	3	4	5	6
12. श्री मोतीलाल पिता निर्मल राम ब्राह्मण		212 213 214	1 19 1 9 8 19	बीड बीड बीड	
		3	12 7		
13. श्री रामा पिता धूला जाट सा. देह		215	2 3	प. III	
14. श्री देवा, डालू जाट सा. देह		216 218	10 2 17 2	प. III प. III	
		2	27 4		
15. श्री चम्पा लाल पिता नाथू भाण्ड सा. जित्तोडगढ़		219 220 221 222 223	1 6 0 3 2 16 2 12 5 3	कु. III आ. चा. कु. III कु. III प. II	
		5	12 00		
16. श्री दधनाय डालू वनैरह जाट सा. देह		224 230 298 299 300	18 8 2 8 0 4 1 17 1 11	प. II बीड I वाडा कु. I बीड I	
		5	24 08		
17. श्री मोहनलाल पिता किरण लाल ब्राह्मण		225 254 255 304 305 306 307 310	16 4 2 3 4 6 0 9 0 2 7 10 1 1 0 8	बीड I बीड " प. II आ. चाह कु. I बीड प. III	
		8	32 3		
18. श्री सोमल सिंह पिता मनोहर सिंह राजपूत		227/1	0 4	प. III	
19. श्री फूलसिंह ऊकारसिंह राजपूत सा. देह		227/2	1 12	प. II	
20. श्री नाथू पिता आशा जाट सा. देह		231 293 294 296	3 00 1 3 1 14 0 2	बीड बीड I कु. I वाडा	
		4	5 19		
21. श्री रामा पिता धुला II 2 रामी बेवा किराना जाट II 2 सा. देह		232 281 282 283 290 291 292	0 15 1 4 2 00 0 16 0 7 2 00 0 7	बीड प. II कु. II बीड II बीड I कु. I बीड I	
		7	7 09		



1	2	3	4	5	6
22.	श्री रामा पिता लखमा भील सा. देह	234	3 5	बीड	
		235	0 16	कु. ॥	
		236	0 4	कु. ॥	
		237-	1 14	कु. ॥	
		238-			
		239	1 17	"	
		240	0 5	आ. चा.	
		241	2 00	प. ॥	
		7	10 1		
23.	श्री सवाई राम पिता वरदा बलाई, सा. देह	242	1 12	बीड	
		250	1 15	कु. ॥	
		251	0 4	खड्डा	
		252	1 10	कु. ॥	
		260	0 5	प. ॥	
		5	5 6		
24.	श्री गणेश पिता उंकार, डालू, मोहन, बलाई, सा. देह	243	1 00	बीड ॥	
		248	0 19	कु. ॥	
		2	1 19		
25.	श्री काशिया पिता खुराज बलाई, सा. देह	244	0 9	बीड ॥	
		247	0 16	कु. ॥	
		2	1 5		
26.	श्री भूरा पिता रामा बलाई, सा. देह	245	1 9	बीड	
		246	1 3	कु. ॥	
		2	2 12		
27.	श्री काशिया, खराज वगैरह 113, सवाईराम पिता वरदा 113, जैराम माना वगैरह 113 बलाई	249	0 3	आ. चा.	
28.	श्री जैराम पिता माना 112, मोहन, छीतर बलाई 112, सा. देह	253	0 15	बीड	
		261	0 9	प. ॥	
		262	0 14	प. ॥	
		263	1 1	कु. ॥	
		4	2 19		
29.	श्री उदा, भूरा, पिता रामा, काशिया पिता खुराज बलाई, सा. देह	256 ॥	0 17	बीड	
		257	0 17	कु. ॥	
		2	1 14		
30.	श्री डालू, मोहन, गणेश, उंकार बलाई	258	1 1	बीड	
31.	श्री जैराम पिता माना बलाई, सा. देह	259 1	1 12	कु. ॥	
32.	श्री प्रताप, मोहन, वगैरह बलाई	259 2	1 11	कु. ॥	
33.	श्री देवा पिता हजारी जाट, सा. देह	201	4 10	बीड	
		264	0 15	प. ॥	
		265	2 11	कु. ॥	
		266	0 15	बीड ॥	

1	2	3	4	5	6
		267	0 12	बीड I	
		268	3 8	कु. II	
		269	0 6	आ. चा.	
		270	0 12	प. II	
		275	1 1	बीड I	
		276	1 13	कु. II	
		309	4 11	बीड	
		11	20 4		
34.	श्री रामा पिता धूला 112, रामी बेवा किशना 116, देवा पिता हजारी 113 जाट, सा. देह	277	0 6	आ. चा.	
35.	श्री उवा पिता रूपा भील पुजारी नरसिंह माताजी	278	0 13	प. II	
		279	1 4	"	
		2	1 17		
36.	श्री नाथू पिता आशा 112 मोहनी पिता गंगाराम 114 लहू पिता रघनाथ 114 जाट, सा. देह	285	6 5	बीड	
		286	2 00	कु. II	
		287	1 00	कु. I	
		288	0 5	आ. चा.	
		289	1 9	कु. I	
		5	10 19		
37.	श्री नाथू पिता आशा 7116 रघनाथ 3116, रामा पिता धूला 3116 रामी बेवा किशना 3116 जाट सा. देह	295	0 3	आ. चा.	
38.	श्री रघनाथ, डालू 113 रामा धूला 113 नाथू पिता आशा 113 जाट सा. देह	301	3 7	बीड I	
		302	2 5	कु. I	
		303	0 4	प. III	
		3	5 16		
39.	श्री गणेश दास पिता मोहनदास बैरागी, सा. देह	308	1 18	बीड	
40.	श्री मोतीलाल पिता गोकुलचन्द, सपरिया, सा. चित्तौड़	45112	2 14	प. II	
कुल योग :-		167	325 05		

हिन्दुस्तान जिक लिमिटेड

(भारत सरकार का उपक्रम)

हिन्दुस्तान जिक लिमिटेड के नये स्मेल्टर प्रोजेक्ट चित्तौड़गढ़ कालोती के लिए अवाप्त की जाने वाली भूमि का विवरण  
ग्राम नरपट की खेड़ी, तहसील चित्तौड़गढ़, जिला चित्तौड़गढ़।

क्र. सं.	नाम ज्ञातेदार	खसरा नम्बर	क्षेत्रफल जो अवाप्त करना है	किस्म	विशेष
			बीघा	बिस्वा	
1	2	3	4	5	6
1.	श्री रतनलाल पिता छननलाल ब्राह्मण	361	14 10	प. III	



1	2	3	4	5	6
2.	श्री रतनलाल पिता कालू भील	364 365 366 367 368 <hr/> 5	5 4 बीड 5 00 कु. II 1 17 " 4 2 " 1 5 बीड. <hr/> 17 08		
3.	श्री हेमा, उंकार, सुरन्दा, कालू पिता माना भील	369 370 371 <hr/> 3	4 5 ह. III 3 4 ह. III 0 5 आ. चा. <hr/> 7 14		
4.	श्री उंकार पिता गुमाना भील	372	2 01 प. II		
5.	श्री कालूराम, खेमराज, चुन्नीलाल पिता मैलाल ब्राह्मण, जगन्नाथ पिता बरदेव ब्राह्मण	230 232 235 236 238 239 241 243 244 247 245 246 248 <hr/> 12	3 01 बीड 1-10, पट्ट 1-11 0 17 बीड 3 06 बीड 1 05 बीड 1 14 कु. II 2 15 ख I. II 1 03 कु. II 0 11 कु. III 4 06 बीड <hr/> 0 14 कु. II 0 06 आ. चा. 1 04 बीड <hr/> 21 02		
6.	श्री कालूराम, खेमराज, चुन्नीलाल पिता मैलाल ब्राह्मण	23111 242 <hr/> 2	2 17 बीड 1 13 सा. II <hr/> 4 10		
7.	श्री हमेरलाल पिता चतरभुज, जमनालाल, लालशंकर पिता हमेरलाल ब्राह्मण	231 मिन 237 249 <hr/> 3	2 13 बीड 1 13 बीड 1 18 बीड <hr/> 6 04		
8.	श्री हमेरलाल पिता चतरभुज, जमनालाल, लालशंकर पिता हमेरलाल 112 माधू पिता कजोड 112 ब्राह्मण	240	0 05 आ. चा.		
9.	श्री हीरालाल पिता टीकाराम ब्राह्मण	251 258 259 <hr/> 3	0 14 बीड 0 11 बीड 0 14 कु. 14 <hr/> 1 19		
10.	श्री सवान्नीराम पिता जगन्नाथ ब्राह्मण	252 256 257 <hr/> 3	0 08 बीड II 0 08 कु. III 0 05 बीड II <hr/> 1 01		
11.	श्री रतनलाल पिता छपनलाल ब्राह्मण	235	0 09 बीड II		

1	2	3	4	5	6
		260	0 10	कु. III	
		261	0 07	बीड II	
		3	1 08		
12.	श्री जयशंकर पिता नन्दलाल कजोड/मांगीलाल पिता ह्यालीलाल ब्राह्मण	254	1 17	बीड II	
		255	1 16	कु. III	
		338	3 01	बीड	
		3	6 14		
13.	श्री रामकिशन, हरलाल पिता गोकुल ब्राह्मण	262	0 19	कु. III	
		263	1 00	कु. III	
		264	1 10	बीड II	
		339	0 08	बीड I	
		340	1 07	कु. II	
		5	5 04		
14.	श्री रतनलाल, शोमालाल पिता उंकार, मु. गंगा बेवा रामकिशन, जगन्नाथ पिता बलदेव ब्राह्मण	265	1 10	बीड II	
		266	0 19	कु. III	
		267	0 16	"	
		344	1 02	"	
		4	4 07		
15.	श्री जगन्नाथ पिता बलदेव ब्राह्मण	341	0 14	बीड I	
16.	श्री जयशंकर पिता नन्दलाल 118, कजोड/मांगीलाल पिता ह्यालीलाल 118, हीरालाल पिता टीकाराम 118, भवानीराम पिता जगन्नाथ 1116, रतनलाल पिता छगनलाल 1116, रामकिशन, हरलाल पिता गोकुल 114, शोमालाल रतनलाल पिता उंकार मु. गंगा बेवा रामकिशन, जगन्नाथ पिता बलदेव 114 ब्राह्मण	268	0 02	आ. चा.	
17.	श्री सोला पिता भागीरथ सुथार	269	1 12		
18.	श्री जगन्नाथ पिता किशना सुथार	270	0 18	कु. III	
		271	0 17	कु. III	
		274	0 13	बीड II	
		3	2 08		
19.	मु. गंगा बेवा रामकिशन ब्राह्मण	343	0 12	बीड II	
20.	श्री चारभुजाजी स्थान देव पुजारी मांगीदास, गोपीदास, चतरभुजदास, रतनदास पिता भरदास बैरागी	345	0 14	कु. III	
21.	श्री किशनलाल पिता धमा ब्राह्मण	347	0 16	ह. III	
22.	श्री मोहनलाल पिता लखलाल ब्राह्मण	348 मी.	0 05	आ. चा.	
		349 मी.	0 02	कु. II	
		350	2 02	कु. II	
		351	2 03	"	
		352	1 04	बीड II	
		5	5 16		
23.	श्री किशोरीलाल/कृपाशंकर पिता किशनलाल ब्राह्मण	353	2 07		
		354 मी.	0 07	कु. III	
		355	4 07	"	
		3	7 01		
24.	श्री रतनलाल, शोमालाल पिता उंकारलाल ब्राह्मण	342	0 18	बीड I	
25.	श्री जयशंकर पिता नन्दलाल ब्राह्मण	356	10 09	बीड	



1	2	3	4	5	6
26.	श्री सुमा, गोटू वगैरहा बलाई	357 मी. 359 360 <hr/> 3	1 11 1 11 1 16 <hr/> 4 18	कु ॥ " " <hr/>	
27.	श्री उंकारलाल पिता लालूराम बलाई	358	3 00	हस	
28.	श्री पृथ्वीराज पिता चतरमुज सुधार	272	1 00	बीड ॥	
29.	श्री भुवना पिता किशना सुधार	273	0 11	बीड ॥	
30.	श्री भवानी शंकर पिता जगन्नाथ ब्राह्मण	384 मी.	13 3	ह. ॥	
31.	श्री कालूराम, खेमराज ब्राह्मण	385 मी. <hr/>	2 5 <hr/>	प. ॥	
कुल योग :—		76	150 04		

हिन्दुस्तान जिंक लिमिटेड  
(भारत सरकार का उपक्रम)

हिन्दुस्तान जिंक लि. के नये स्मेल्टर प्रोजेक्ट चित्तौड़गढ़ कालोनी के लिए अवाप्त की जाने वाली भूमि का विवरण ग्राम डगली का खेडा, तहसील चित्तौड़गढ़, जिला चित्तौड़गढ़।

क्र. सं.	नाम सातेदार	खसरा नम्बर	क्षेत्रफल जो अवाप्त करना है <hr/> बीघा बिस्वा	किस्म	विशेष
1	2	3	4	5	6
1.	श्री फूलसिंह, उंकार सिंह, गुमानसिंह पिता डूंगरसिंह राजपूत	212	4 00	बीड	
2.	श्री नाथू, कालू पिता मोती बोला, सा. देह	3	3 00	बीड	
3.	श्री मांगू, गणेश पिता धीसा गूजर, सा. देह	5	3 00		
कुल योग :—		3	10 00		

राज्यपाल की आज्ञा से,  
गोकुल चन्द,  
शासन उप सचिव।

राज्य केन्द्रीय भूदालय, जयपुर।

राजस्थान सरकार  
उद्योग (ग्रुप-१) विभाग

क्रमांक प०४(६६)उद्योग।१।८३

जयपुर, दिनांक

४ जून, १९८४

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72-8

जि.सि.वि.  
नं. ६६१  
दि. १३.६.८४  
वि.सं. वि.सं.

जनरल मैनेजर,  
हिन्दुस्तान जिंक लिमिटेड,  
६, न्यू फोर्सेथमुरा,  
उदयपुर-३१३००१

विषय: मेसर्स हिन्दुस्तान जिंक लि० को नये स्मेल्टर प्लान्ट के लिए चिचोड़ा में  
भू आवंटन बाका -  
संदर्भ :- आपका पत्र क्रमांक एचजीपीसी-१६-२५। (२-२)८३। ६५। १०५३८ दिनांक  
१२-६-८३ एवं क्रमांक एचजीपीसी-२५ (२-२)। ६३ दिनांक १२-३-८४

महोदय,

निम्नानुसार उपर्युक्त विषयान्तर्गत जिलाधीश, चिचोड़ा के आदेश संख्या राजस्वा।१।  
(६-६)८३। ५४४-४९ दिनांक १५-११-८३, राजस्वा।१। (६-६)८३। १६१-१६५ दिनांक १६-३-१९८४  
एवं राजस्वा।१। (६-६)८३। ८४९-५१ दिनांक १६-१-१९८४ के अन्तर्गत औद्योगिक प्रयोजनार्थ सुरक्षित  
ग्राम मुठोली, आजोखियाँ का खड़ा, बिलिया तहसील गंगार जिला चिचोड़ा की ५८६ बीघा  
०६ किस्वा भूमि चिचोड़ा में प्रस्तावित नये स्मेल्टर प्लान्ट के स्थापित करने के लिए मेसर्स  
हिन्दुस्तान जिंक लि० को सख्त द्वारा आवंटित की जाती है। यह भूमि निम्नलिखित शर्तों पर  
आवंटित की जा रही है :-

- यह आवंटन राजस्थान इण्डस्ट्रियल एरिया अलायन्स क्लस्स, १९५६ एवं सन् १९८३ के अधिनियमों के अन्तर्गत होगा।
- विकास शुल्क एवं लीज रेंट की राशि से पूर्णतः न्यूनतम के अन्तर्गत वृत्तमान में प्रचलित दर से  
होगा।
- आवंटी द्वारा उक्त भूखण्ड या उसके अधीन किसी भाग को हकलेट नहीं किया जा सकेगा, न  
ही बेगा, न किसी अन्य तरीके से संक्रामित होगा और न ही राज्य सरकार की अनुमति  
के बिना कोई विदेशी या तकनिकी भण्डार बनायेगा।
- आवंटी की विधि के तहत माह की अवधि में इस भूमि का लीज डीड जिलाधीश, चिचोड़ा  
से करवाकर लीज डीड की रजिस्ट्री करवायी होगी।
- जल वायु एवं धूल प्रदूषण नियंत्रण एवं नियंत्रण हेतु आवश्यक उपाय राजस्थान राज्य जल  
प्रदूषण एवं नियंत्रण बोर्ड द्वारा निर्धारित मान जल एवं मानक के अनुसार करने होंगे।
- भूमि जिस प्रयोजन हेतु आवंटित की गई है उसकी स्थापना के लिए तीन माह की अवधि में  
कार्यवाही करके पूर्णतः से राज्य सरकार को अवगत कराना होगा।
- भूमि पर कोई भी निर्माण हेतु भूमि उपयोग का नक्शा (६ आउट प्लान) एक माह की  
अवधि में संयुक्त निदेशक, जिला उद्योग सेंद्र, उदयपुर को प्रस्तुत कर अनुमोदित करवाना  
होगा।
- उपर्युक्त प्लान्ट के लिए आवंटित भूमि पर भारत सरकार की नीति के अनुसार  
वन विभाग के अधिकारियों के परामर्श लेकर वृक्षारोपण किया जाएगा।

कृपया ०००



६. प्लान्ट में रोजगार हेतु स्थानीय लोगों को प्रामुखता दी जायेगी।

उपयुक्त शर्तों में से किसी भी शर्त का उल्लंघन होने पर आवंटन रकम की निरस्त समझा जायेगा और जमा कराई गई सत्यकार राशि नुक़्त हो जायेगी।

भवदीय,

(रसो जलमन)  
शालन उप सचिव

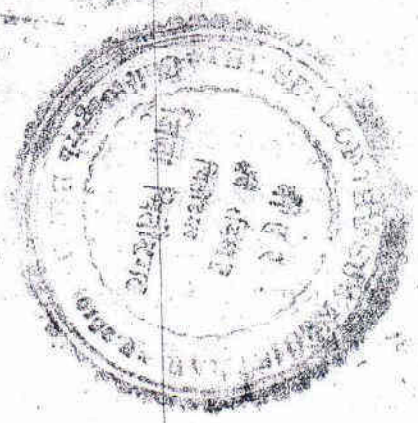


प्रतिलिपि निम्नांकितों को सूचनाएँ एवं आवश्यक कार्यवाही हेतु भिजित है :-

१. राजस्व (गुप-३) विभाग
२. जिलाधीश, चित्तोड़गढ़
३. निदेशक, उद्योग विभाग, राजस्थान, जयपुर को बैंक ड्राफ्ट संख्या जी टी।रा।८०६४६२ दिनांक १२-३-१६८४ तादादी रु० ५००० (पाँच सौ) मात्र का संलग्न करते हुए निवेदन है इस ड्राफ्ट की राशि को राजकीय कोषा के सम्बन्धित मद में जमा कराकर राज्य सरकार को सूचित करने का काम करें।
४. संयुक्त निदेशक, जिला उद्योग केंद्र, चित्तोड़गढ़
५. सदस्य सचिव, राजस्थान राज्य जल प्रवृत्तिका निगराना एवं नियंत्रण बोर्ड, जयपुर
६. रक्षित पत्रावली।

*Sanjay Singh*  
(सी०वी०माधुर)  
अनुभाग अधिकारी

M(LRA)  
13/6



**LIST OF GOVERNMENT AND CHARAGAH LAND  
FOR NEW SMELTER PROJECT, CHITTORGARH**

(Village- PUTHOLI; Tehsil- Gangrar; District - Chittorgarh)

GOVERNMENT LANDCHARAGAH LAND

Khasra No.	Area (in Bigha-Biswa)	Type of land	Khasra No.	Area (in Bigha-Biswa)	Type of land
575	2-00	Nallah	713	0-04	Charagah
576	1-12	Rasta	829	5-08	"
577/2	0-02	"			
598	0-05	"	2	5-12	
626	0-05	Khaddha	=====	=====	
643	1-07	Rasta			
668	1-13	Nallah			
669	1-12	Bhatwed			
692	2-12	Rasta			
693	0-08	Bhatwed			
714	2-00	Road			
744	0-16	Rasta			
747	0-16	Rasta			
748	0-03	Nalee			
790	1-16	Rasta			
791	0-14	"			
794	0-05	Nalee			
801	1/4-04	Nallah			
830	1-08	Bhatwed			
833 M	1-08	Rasta			
834	12-05	Nallah			
844	2-07	Rasta			
861	1-11	"			
906	25-00	Nallah			
918/1	0-09	Bhatwed			
919	0-07	"			
927	2-00	Nalee			
941	1-05	Rasta			

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83-10

Manager (Finance)  
Hindustan Zinc Limited  
a Govt. of India Enterprise  
6, New Patchpura  
Bhilai-462 001 (Ra.)

उपनिदेशक  
जिन्हा उद्योग लिमिटेड  
बिलासपुर (राज.)

बिलासपुर, चित्तोड़गढ़

Contd. 2



**LIST OF GOVERNMENT AND CHARAGAH LAND  
FOR NEW SMELTER PROJECT, CHITTORGARH**

(Village- Ajoliyo Ka Khara; Tehsil- Gangrar; District- Chittorgarh)

<u>GOVERNMENT LAND</u>			<u>CHARAGAH LAND</u>		
<u>Khasra No.</u>	<u>Area (in Bigha-Biswa)</u>	<u>Type of land</u>	<u>Khasra No.</u>	<u>Area (in Bigha-Biswa)</u>	<u>Type of land</u>
557	1-02	Rasta	604	3-11	Charagah
572	0-14	"	692	30-12	"
592	1-03	"	699	136-13	"
608	4-03	"	708	12-14	"
624	0-15	"	710	9-16	"
685	2-44	Nalee			
706	1-04	Rasta	5	192-06	
709	2-19	Nalee			
739	1-09	Rasta			
788	0-05	"			
11	17-06				
=====	=====				

**VILLAGE - BILIYA.**

741	0-11	Rasta	899	80-00	Charagah
742	7-11	Parat	943	139-00	"
766	4-08	Rasta			
801	0-07	"	2	219-00	
802/1	7-03	"	=====	=====	
803	0-14	Nalee			
838	5-13	Nalee & Rasta			
839	1-12	Padat II			
890	3-12	"			
891	1-18	Rasta			
892	12-09	Padat II			
893	0-05	Rasta			
894	5-02	Padat II			
895	0-14	Rasta			
897	0-18	"			
900	0-15	"			
945	3-06	"			
946	0-11	"			
979	13-06	Nallah			
19	70-15				
=====	=====				

Total Govt. land 171-11

Total Charagah land 417-18

**Total Land = (171-11 + 417-18) = 589-09 Bighas. i.e. 414.56 Acres**

Year	Month	Date	Hour	Temperature Dry (°C)	Relative Humidity (%)	Wind Speed (m/s)	Wind Direction (°)
20	10	1	1	21.1	49	2.4	9
20	10	1	2	21.2	50	1.9	218
20	10	1	3	21.5	51	0.5	11
20	10	1	4	21.6	52	0.3	218
20	10	1	5	20.3	49	0.3	218
20	10	1	6	22.1	49	2.7	218
20	10	1	7	22.6	48	1.8	9
20	10	1	8	21.8	50	0.1	2
20	10	1	9	20.9	58	0.6	2
20	10	1	10	22.1	59	2.1	181
20	10	1	11	28.2	60	2.4	351
20	10	1	12	30.4	62	0.3	350
20	10	1	13	31.5	69	3.5	9
20	10	1	14	32.5	70	0.3	352
20	10	1	15	30	66	2	218
20	10	1	16	31.4	64	0.3	10
20	10	1	17	28.9	61	2.3	218
20	10	1	18	23.3	52	1.8	9
20	10	1	19	24.6	55	2.3	183
20	10	1	20	25.6	56	0.3	9
20	10	1	21	28.4	59	2.3	183
20	10	1	22	26.4	61	2.3	218
20	10	1	23	26.2	55	2.7	9
20	10	1	24	28.1	64	0.3	10
20	10	2	1	20	49	0.5	9
20	10	2	2	20.1	50	2.3	124
20	10	2	3	22.3	51	1.9	173
20	10	2	4	24.1	54	1.9	129
20	10	2	5	21.4	49	0.3	9
20	10	2	6	23.6	49	0.9	2
20	10	2	7	25.7	49	3.5	2
20	10	2	8	25.9	56	2.3	218
20	10	2	9	27.4	59	2.3	2
20	10	2	10	28.9	59	1.9	9
20	10	2	11	29.8	60	1.9	351
20	10	2	12	31	68	0.3	193
20	10	2	13	31.5	69	0.9	2
20	10	2	14	31.1	70	0.2	9
20	10	2	15	31.1	69	0.3	9
20	10	2	16	31	64	3.2	2
20	10	2	17	31.4	61	4.8	2
20	10	2	18	30.8	51	3.5	9
20	10	2	19	25.5	56	2.8	9
20	10	2	20	27.7	57	0.4	9
20	10	2	21	24.6	59	0.6	2
20	10	2	22	27	61	1.9	9
20	10	2	23	25.1	56	0.1	9
20	10	2	24	29	54	1.9	10
20	10	3	1	21.1	54	3.5	6
20	10	3	2	21.4	50	0.1	11
20	10	3	3	20.7	51	0.3	218
20	10	3	4	21.1	52	0.3	2
20	10	3	5	24.4	49	3.5	2
20	10	3	6	20.8	49	0.3	220
20	10	3	7	21.6	49	0.3	2
20	10	3	8	23.4	50	0.1	351
20	10	3	9	24.4	58	0.1	351
20	10	3	10	26.9	59	0.5	124
20	10	3	11	27.6	60	0.1	6
20	10	3	12	29.6	67	0.1	6
20	10	3	13	30.5	69	2.4	6
20	10	3	14	29.7	70	0.5	6
20	10	3	15	29.9	66	2.4	220
20	10	3	16	29.5	64	2.4	2
20	10	3	17	29.4	65	2.4	220
20	10	3	18	29.6	61	0.5	220
20	10	3	19	29.7	54	3.5	220
20	10	3	20	29.6	57	2.4	220
20	10	3	21	28.4	59	2.4	7
20	10	3	22	27.1	61	2.4	6
20	10	3	23	25.6	55	2.4	2
20	10	3	24	24.8	54	2.4	351
20	10	4	1	22.1	49	3.5	2
20	10	4	2	21.4	50	0.6	220
20	10	4	3	20.6	51	3.5	6
20	10	4	4	23.3	51	2.4	10
20	10	4	5	25.7	49	2.4	351
20	10	4	6	26	49	2.4	352
20	10	4	7	21.6	49	0.1	6
20	10	4	8	23.4	59	2.4	351
20	10	4	9	25.8	59	3.5	6
20	10	4	10	27.1	59	3.5	6
20	10	4	11	28.6	60	3.5	220

Year	Month	Date	Hour	Temperature Dry (°C)	Relative Humidity (%)	Wind Speed (m/s)	Wind Direction (°)
20	10	4	12	30.1	69	2.4	351
20	10	4	13	31.7	66	4.6	6
20	10	4	14	30.2	64	2.4	6
20	10	4	15	31.1	66	0.6	6
20	10	4	16	29.9	64	0.2	2
20	10	4	17	25.5	61	0.3	6
20	10	4	18	22.3	51	3.5	220
20	10	4	19	20.7	50	0.3	220
20	10	4	20	24.6	57	3.5	6
20	10	4	21	22.5	59	3.5	220
20	10	4	22	19.8	64	3.5	220
20	10	4	23	17.6	61	0.1	220
20	10	4	24	16.8	54	2	6
20	10	5	1	14.6	49	4.6	6
20	10	5	2	21.1	50	0.3	351
20	10	5	3	23.9	51	0.6	351
20	10	5	4	20.3	52	3.5	220
20	10	5	5	20.4	49	0.5	2
20	10	5	6	20.5	49	3.5	6
20	10	5	7	25.9	55	0.3	183
20	10	5	8	25.5	55	3.5	220
20	10	5	9	26.7	58	3.5	220
20	10	5	10	24.3	59	0.1	2
20	10	5	11	24.4	60	0.6	6
20	10	5	12	23.2	67	2	2
20	10	5	13	21.1	64	1.9	4
20	10	5	14	20	70	0.1	2
20	10	5	15	20.9	66	0.9	6
20	10	5	16	20.4	64	0.6	2
20	10	5	17	27.7	63	0.1	2
20	10	5	18	28.8	52	0.1	220
20	10	5	19	24.4	55	1.9	2
20	10	5	20	24.4	55	0.3	220
20	10	5	21	24.4	54	1.9	2
20	10	6	1	27.9	49	0.8	2
20	10	6	2	21.4	50	0.1	2
20	10	6	3	20	54	0.2	220
20	10	6	4	23.2	54	0.1	220
20	10	6	5	24.4	49	0.1	6
20	10	6	6	26.6	49	0.1	220
20	10	6	7	25.3	49	0.1	69
20	10	6	8	25.6	49	0.3	2
20	10	6	9	25.4	58	0.3	351
20	10	6	10	29.4	59	0.3	7
20	10	6	11	24.4	60	0.3	220
20	10	6	12	24.1	61	0.5	351
20	10	6	13	32.2	69	0.1	2
20	10	6	14	32.3	70	0.3	10
20	10	6	15	32.2	66	0.2	2
20	10	6	16	32.1	66	0.6	351
20	10	6	17	29.9	64	0.6	2
20	10	6	18	30	57	0.9	2
20	10	6	19	31.4	59	0.2	2
20	10	6	20	29.7	52	0.1	351
20	10	6	21	27.4	52	0.1	351
20	10	6	22	26.2	61	0.7	351
20	10	6	23	25.7	55	0.5	2
20	10	6	24	23.1	54	0.3	183
20	10	7	1	23.7	54	0.3	220
20	10	7	2	20	50	0.7	220
20	10	7	3	24.4	51	0.1	351
20	10	7	4	24.9	52	0.4	2
20	10	7	5	23.5	49	0.1	10
20	10	7	6	20.2	49	0.3	183
20	10	7	7	22.6	49	0.3	183
20	10	7	8	24.1	50	0.6	6
20	10	7	9	24.8	49	0.1	10
20	10	7	10	24.4	59	0.3	11
20	10	7	11	30.3	66	0.1	351
20	10	7	12	31.4	67	0.5	2
20	10	7	13	32.2	66	0.6	9
20	10	7	14	32.1	70	0.1	2
20	10	7	15	30.9	68	0.1	2
20	10	7	16	32.2	64	0.1	351
20	10	7	17	30	53	0.1	350
20	10	7	18	32.5	63	0.3	2
20	10	7	19	31.1	55	0.6	351
20	10	7	20	30.9	57	0.1	351
20	10	7	21	29.7	59	0.2	2
20	10	7	22	27.4	61	0.6	10

Year	Month	Date	Hour	Temperature Dry (°C)	Relative Humidity (%)	Wind Speed (m/s)	Wind Direction (°)
20	10	7	23	25.8	55	0.1	10
20	10	7	24	24.6	54	0.2	2
20	10	8	1	22.2	49	0.6	2
20	10	8	2	21.4	50	1.4	10
20	10	8	3	20.6	51	1.4	10
20	10	8	4	20	52	1.4	10
20	10	8	5	21.4	49	0.8	2
20	10	8	6	20.8	49	0.7	109
20	10	8	7	21.4	49	0.8	2
20	10	8	8	21.9	59	0.4	2
20	10	8	9	24.7	58	0.6	351
20	10	8	10	26.3	59	0.6	2
20	10	8	11	28.4	60	0.1	10
20	10	8	12	30.3	67	0.9	10
20	10	8	13	31.9	69	1.4	2
20	10	8	14	32.3	70	1.2	10
20	10	8	15	32	66	0.1	348
20	10	8	16	31.2	64	0.1	350
20	10	8	17	31.4	64	0.8	121
20	10	8	18	31.9	51	1.2	10
20	10	8	19	31.6	55	1.4	68
20	10	8	20	29.4	57	0.8	10
20	10	8	21	27.4	59	0.7	10
20	10	8	22	25.9	61	1	10
20	10	8	23	24.6	59	0.4	350
20	10	8	24	22.8	54	0.2	351
20	10	9	1	22.2	49	0.1	2
20	10	9	2	21.6	50	0.1	5
20	10	9	3	20.1	51	0.1	10
20	10	9	4	22.1	52	0.1	10
20	10	9	5	24.4	49	0.6	10
20	10	9	6	23.2	49	0.1	351
20	10	9	7	21.4	49	0.1	5
20	10	9	8	21.6	56	0.1	5
20	10	9	9	21.9	59	0.1	2
20	10	9	10	24.7	58	0.6	351
20	10	9	11	26.3	59	0.6	2
20	10	9	12	28.4	60	0.1	10
20	10	9	13	30.3	67	0.9	10
20	10	9	14	31.9	69	1.4	2
20	10	9	15	32.3	70	1.2	10
20	10	9	16	32	66	0.6	248
20	10	9	17	31.2	64	0.6	5
20	10	9	18	31.4	64	0.8	350
20	10	9	19	31.9	51	0.7	351
20	10	9	20	31.6	55	0.3	109
20	10	9	21	30.3	57	0.6	10
20	10	9	22	28.4	59	0.6	10
20	10	9	23	27.4	61	0.6	10
20	10	9	24	25.9	64	0.8	10
20	10	9	25	24.7	55	0.4	10
20	10	9	26	23.5	54	0.6	10
20	10	10	1	21.4	49	0.6	10
20	10	10	2	21.6	56	0.6	10
20	10	10	3	21.9	59	0.6	10
20	10	10	4	24.7	58	0.6	351
20	10	10	5	26.3	59	0.6	2
20	10	10	6	28.4	60	0.1	10
20	10	10	7	30.3	67	0.9	10
20	10	10	8	31.9	69	1.4	2
20	10	10	9	32.3	70	1.2	10
20	10	10	10	32	66	0.6	38
20	10	10	11	31.2	64	0.6	351
20	10	10	12	31.4	64	0.8	121
20	10	10	13	31.9	51	1.2	10
20	10	10	14	31.6	55	1.4	68
20	10	10	15	29.4	57	0.8	10
20	10	10	16	27.4	59	0.7	10
20	10	10	17	25.9	61	1	10
20	10	10	18	24.6	59	0.4	350
20	10	10	19	22.8	54	0.2	351
20	10	10	20	22.2	49	0.1	2
20	10	10	21	21.6	50	0.1	5
20	10	10	22	20.1	51	0.1	10
20	10	10	23	22.1	52	0.1	10
20	10	10	24	24.4	49	0.6	10
20	10	10	25	23.2	49	0.1	351
20	10	10	26	21.4	49	0.1	5
20	10	10	27	21.6	56	0.1	5
20	10	10	28	21.9	59	0.1	2
20	10	10	29	24.7	58	0.6	351
20	10	10	30	26.3	59	0.6	2
20	10	10	31	28.4	60	0.1	10
20	10	11	1	30.3	67	0.9	10
20	10	11	2	31.9	69	1.4	2
20	10	11	3	32.3	70	1.2	10
20	10	11	4	32	66	0.6	248
20	10	11	5	31.2	64	0.6	5
20	10	11	6	31.4	64	0.8	350
20	10	11	7	31.9	51	0.7	351
20	10	11	8	31.6	55	0.3	109
20	10	11	9	30.3	57	0.6	10
20	10	11	10	28.4	59	0.6	10
20	10	11	11	27.4	61	0.6	10
20	10	11	12	25.9	64	0.8	10
20	10	11	13	24.7	55	0.4	10
20	10	11	14	23.5	54	0.6	10
20	10	11	15	21.4	49	0.6	10
20	10	11	16	21.6	56	0.6	10
20	10	11	17	21.9	59	0.6	10
20	10	11	18	24.7	58	0.6	351
20	10	11	19	26.3	59	0.6	2
20	10	11	20	28.4	60	0.1	10
20	10	11	21	30.3	67	0.9	10
20	10	11	22	31.9	69	1.4	2
20	10	11	23	32.3	70	1.2	10
20	10	11	24	32	66	0.6	38
20	10	11	25	31.2	64	0.6	351
20	10	11	26	31.4	64	0.8	121
20	10	11	27	31.9	51	1.2	10
20	10	11	28	31.6	55	1.4	68
20	10	11	29	29.4	57	0.8	10
20	10	11	30	27.4	59	0.7	10
20	10	11	31	25.9	61	1	10
20	10	11	32	24.6	59	0.4	350
20	10	11	33	22.8	54	0.2	351
20	10	11	34	22.2	49	0.1	2
20	10	11	35	21.6	50	0.1	5
20	10	11	36	20.1	51	0.1	10
20	10	11	37	22.1	52	0.1	10
20	10	11	38	24.4	49	0.6	10
20	10	11	39	23.2	49	0.1	351
20	10	11	40	21.4	49	0.1	5
20	10	11	41	21.6	56	0.1	5
20	10	11	42	21.9	59	0.1	2
20	10	11	43	24.7	58	0.6	351
20	10	11	44	26.3	59	0.6	2
20	10	11	45	28.4	60	0.1	10
20	10	11	46	30.3	67	0.9	10
20	10	11	47	31.9	69	1.4	2
20	10	11	48	32.3	70	1.2	10
20	10	11	49	32	66	0.6	38
20	10	11	50	31.2	64	0.6	351
20	10	11	51	31.4	64	0.8	121
20	10	11	52	31.9	51	1.2	10
20	10	11	53	31.6	55	1.4	68
20	10	11	54	29.4	57	0.8	10
20	10	11	55	27.4	59	0.7	10
20	10	11	56	25.9	61	1	10
20	10	11	57	24.6	59	0.4	350
20	10	11	58	22.8	54	0.2	351
20	10	11	59	22.2	49	0.1	2
20	10	11	60	21.6	50	0.1	5
20	10	11	61	20.1	51	0.1	10
20	10	11	62	22.1	52	0.1	10
20	10	11	63	24.4	49	0.6	10
20	10	11	64	23.2	49	0.1	351
20	10	11	65	21.4	49	0.1	5
20	10	11	66	21.6	56	0.1	5
20	10	11	67	21.9	59	0.1	2
20	10	11	68	24.7	58	0.6	351
20	10	11	69	26.3	59	0.6	2
20	10	11	70	28.4	60	0.1	10
20	10	11	71	30.3	67	0.9	10
20	10	11	72	31.9	69	1.4	2
20	10	11	73	32.3	70	1.2	10
20	10	11	74	32	66	0.6	38
20	10	11	75	31.2	64	0.6	351
20	10	11	76	31.4	64	0.8	121
20	10	11	77	31.9	51	1.2	10
20	10	11	78	31.6	55	1.4	68
20	10	11	79	29.4	57	0.8	10
20	10	11	80	27.4	59	0.7	10
20	10	11	81	25.9	61	1	10
20	10	11	82	24.6	59	0.4	350
20	10	11	83	22.8	54	0.2	351
20	10	11	84	22.2	49	0.1	2
20	10	11	85	21.6	50	0.1	5
20	10	11	86	20.1	51	0.1	10
20	10	11	87	22.1	52	0.1	10
20	10	11	88	24.4	49	0.6	10
20	10	11	89	23.2	49	0.1	351
20	10	11	90	21.4	49	0.1	5
20	10	11	91	21.6	56	0.1	5
20	10	11	92	21.9	59	0.1	2
20	10	11	93	24.7	58	0.6	351
20	10	11	94	26.3	59	0.6	2
20	10	11	95	28.4	60	0.1	10
20	10	11	96	30.3	67	0.9	10
20	10	11	97	31.9	69	1.4	2
20	10	11	98	32.3	70	1.2	10
20	10	11	99	32	66	0.6	38
20	10	11	100	31.2	64	0.6	351
20	10	11	101	31.4	64	0.8	121
20	10	11	102	31.9	51	1.2	10
20	10	11	103	31.6	55	1.4	68
20	10	11	104	29.4	57	0.8	10
20	10	11	105	27.4	59	0.7	10
20	10	11	106	25.9	61	1	10
20	10	11	107	24.6	59	0.4	350
20	10	11	108	22.8	54	0.2	351
20	10	11	109	22.2	49	0.1	2
20	10	11	110	21.6	50	0.1	5
20	10	11	111	20.1	51	0.1	10
20	10	11	112	22.1	52	0.1	10
20	10	11	113	24.4	49	0.6	10
20	10	11	114	23.2	49	0.1	351
20							



Year	Month	Date	Hour	Temperature Dry (°C)	Relative Humidity (%)	Wind Speed (m/s)	Wind Direction (°)
20	10	14	21	28.2	59	0.4	351
20	10	14	22	26.6	61	0.4	35
20	10	14	23	24.4	55	0.1	330
20	10	14	24	22.7	52	0.2	5
20	10	15	1	20.9	49	1.3	339
20	10	15	2	20.5	50	1.1	38
20	10	15	3	21.3	51	1.3	355
20	10	15	4	21.7	52	1.6	38
20	10	15	5	21.1	49	-1.8	38
20	10	15	6	21.1	49	2	351
20	10	15	7	20.2	49	2	351
20	10	15	8	21.4	49	1.8	351
20	10	15	9	20.8	50	1.8	338
20	10	15	10	20.4	50	1.2	183
20	10	15	11	20.9	60	1	38
20	10	15	12	20.9	67	1.3	337
20	10	15	13	20	69	0.9	351
20	10	15	14	20	70	0.9	4
20	10	15	15	20.4	66	1.1	38
20	10	15	16	20.6	64	1.3	38
20	10	15	17	20.8	63	1.7	38
20	10	15	18	21.2	54	1.1	38
20	10	15	19	21	55	0.8	105
20	10	15	20	20.6	56	0.8	105
20	10	15	21	20.2	59	1.1	358
20	10	15	22	20.6	61	0.8	4
20	10	15	23	20.4	55	0.9	351
20	10	15	24	21.2	54	0.9	351
20	10	16	1	21.1	53	0.1	351
20	10	16	2	20.6	50	1.8	352
20	10	16	3	21.1	51	1.6	352
20	10	16	4	21.3	52	1.6	38
20	10	16	5	21.6	50	1.8	38
20	10	16	6	21.8	49	1.3	38
20	10	16	7	21.2	49	1.8	38
20	10	16	8	20.8	56	1.3	338
20	10	16	9	20.4	63	1.6	38
20	10	16	10	20	59	1.3	338
20	10	16	11	20.9	60	1.3	23
20	10	16	12	21.2	67	1.6	38
20	10	16	13	21.6	69	1.3	351
20	10	16	14	20.9	70	1	40
20	10	16	15	20.4	66	1.1	6
20	10	16	16	20.1	64	0.1	351
20	10	16	17	20.6	60	0.3	38
20	10	16	18	20	53	0.9	183
20	10	16	19	20	55	1.3	352
20	10	16	20	20.8	57	0.6	38
20	10	16	21	20.1	59	1.6	23
20	10	16	22	21.2	61	1.6	183
20	10	16	23	21.9	55	0.3	38
20	10	16	24	20.2	54	0.1	5
20	10	17	1	20	48	1.7	28
20	10	17	2	20.7	50	0.5	105
20	10	17	3	20.8	51	1.6	38
20	10	17	4	20.6	52	0.6	105
20	10	17	5	20.2	49	2.5	38
20	10	17	6	20.4	49	1.5	105
20	10	17	7	20.1	49	0.5	350
20	10	17	8	21.1	50	0.5	38
20	10	17	9	21.5	58	0.9	43
20	10	17	10	21.6	60	1.3	43
20	10	17	11	21.2	60	0.9	43
20	10	17	12	20.8	67	0.5	43
20	10	17	13	21.2	69	0.9	43
20	10	17	14	21.6	72	1.9	43
20	10	17	15	20.9	66	0.9	43
20	10	17	16	21.2	64	0.9	43
20	10	17	17	20.6	61	1.3	336
20	10	17	18	20.4	54	1.1	38
20	10	17	19	21.3	55	1.6	43
20	10	17	20	20.1	52	1.3	353
20	10	17	21	20.9	50	0.9	355
20	10	17	22	21.4	50	0.5	43
20	10	17	23	21.5	53	0.4	43
20	10	17	24	21.9	54	1.4	105
20	10	18	1	21.1	49	2	43
20	10	18	2	20	50	1.9	43
20	10	18	3	21.1	51	2	43
20	10	18	4	21.5	52	1.8	183
20	10	18	5	21.2	49	1.8	353
20	10	18	6	20.9	49	1.9	43
20	10	18	7	21.6	49	2	43

Year	Month	Date	Hour	Temperature Dry (°C)	Relative Humidity (%)	Wind Speed (m/s)	Wind Direction (°)
20	10	18	8	21.9	56	2	43
20	10	18	9	21.8	58	1.7	43
20	10	18	10	22.2	58	0.9	238
20	10	18	11	20.9	60	0.9	43
20	10	18	12	21.2	62	1.3	351
20	10	18	13	21.2	69	1.3	5
20	10	18	14	20	70	1.3	43
20	10	18	15	20.6	65	0.6	43
20	10	18	16	20.1	64	0.4	43
20	10	18	17	20	63	0.6	5
20	10	18	18	20.9	53	0.1	5
20	10	18	19	20.7	50	0.1	352
20	10	18	20	21.4	57	0.7	43
20	10	18	21	20.9	59	0.1	43
20	10	18	22	20.2	64	1.7	43
20	10	18	23	21.4	59	1.9	43
20	10	18	24	21.4	54	1.3	43
20	10	19	1	20.8	49	0.3	183
20	10	19	2	20.6	50	0.3	5
20	10	19	3	20.6	50	0.7	43
20	10	19	4	20.4	52	0.5	5
20	10	19	5	21.1	49	1.6	43
20	10	19	6	20.5	49	0.1	10
20	10	19	7	20.6	48	1.6	43
20	10	19	8	21.3	50	0.3	352
20	10	19	9	20.4	45	0.3	359
20	10	19	10	20.6	50	1.9	43
20	10	19	11	22.2	60	0.1	43
20	10	19	12	20.9	62	0.9	43
20	10	19	13	21.1	69	1.9	43
20	10	19	14	21.5	70	0.3	5
20	10	19	15	21.2	66	0.1	105
20	10	19	16	20.2	64	1.7	352
20	10	19	17	21.6	63	1.9	43
20	10	19	18	21.6	51	0.2	43
20	10	19	19	20.4	55	0.4	4
20	10	19	20	20.7	63	0.1	5
20	10	19	21	21.4	59	0.8	5
20	10	19	22	20.9	61	0.2	43
20	10	19	23	21.2	55	0.3	5
20	10	19	24	21.6	62	0.1	43
20	10	20	1	21.5	49	0.1	43
20	10	20	2	21.4	50	0.3	42
20	10	20	3	21.3	51	0.1	53
20	10	20	4	21.3	50	0.1	359
20	10	20	5	20.6	49	0.3	5
20	10	20	6	20	49	0.1	5
20	10	20	7	21.2	49	0.3	42
20	10	20	8	21.6	49	0.6	4
20	10	20	9	21.4	50	0.3	353
20	10	20	10	20.6	59	0.6	5
20	10	20	11	20.8	60	0.3	43
20	10	20	12	20.9	60	0.1	43
20	10	20	13	21.2	60	0.3	105
20	10	20	14	21.2	70	0.1	4
20	10	20	15	21.4	66	0.1	105
20	10	20	16	21.4	64	0.1	4
20	10	20	17	21.6	62	0.1	4
20	10	20	18	21.2	51	0.3	183
20	10	20	19	20.4	55	0.6	0
20	10	20	20	20.4	52	0.1	55
20	10	20	21	20.5	60	0.1	4
20	10	20	22	20.4	60	0.7	68
20	10	20	23	21.2	59	0.1	43
20	10	20	24	21	54	0.1	352
20	10	21	1	21.3	50	1.6	38
20	10	21	2	21.6	50	0.5	43
20	10	21	3	21.1	51	0.2	349
20	10	21	4	21.2	52	0.1	248
20	10	21	5	21.4	50	0.1	183
20	10	21	6	20.2	49	0.1	5
20	10	21	7	21.8	49	0.5	43
20	10	21	8	20.6	56	1.6	43
20	10	21	9	21.9	60	0.3	38
20	10	21	10	21.8	59	0.2	183
20	10	21	11	21.4	60	0.1	10
20	10	21	12	21.2	62	1.4	43
20	10	21	13	20.1	59	1.4	43
20	10	21	14	21.2	70	1.6	354
20	10	21	15	20.5	66	0.4	353
20	10	21	16	20	64	0.9	5
20	10	21	17	20.8	63	1.3	352
20	10	21	18	20.9	51	1.4	5

Year	Month	Date	Hour	Temperature Dry (°C)	Relative Humidity (%)	Wind Speed (m/s)	Wind Direction (°)
20	10	21	19	21.5	55	1.6	351
20	10	21	20	20.8	52	1	5
20	10	21	21	21.6	50	0.3	5
20	10	21	22	20.6	61	0.4	5
20	10	21	23	21.4	55	0.9	43
20	10	21	24	21.6	54	1.6	105
20	10	22	1	20.2	49	1.8	43
20	10	22	2	21.4	50	0.3	3
20	10	22	3	21.5	51	0.3	5
20	10	22	4	21.4	51	2	5
20	10	22	5	21.1	49	2	10
20	10	22	6	20.2	49	1.9	43
20	10	22	7	21.6	49	1.4	43
20	10	22	8	21.3	50	2	43
20	10	22	9	21.2	58	0.4	43
20	10	22	10	20.1	59	0.8	5
20	10	22	11	20.2	62	1.7	11
20	10	22	12	20.2	67	1.9	5
20	10	22	13	21.4	69	1.2	5
20	10	22	14	21.1	70	0.9	338
20	10	22	15	21.6	66	0.7	105
20	10	22	16	21.6	64	0.4	43
20	10	22	17	21.1	64	1.5	43
20	10	22	18	20.9	51	2	55
20	10	22	19	20.8	55	1.3	43
20	10	22	20	21.4	52	0.4	5
20	10	22	21	20.9	50	0.8	43
20	10	22	22	20.1	6	0.3	43
20	10	22	23	21.2	55	2	43
20	10	22	24	21.6	54	0.6	5
20	10	23	1	20.9	49	2.3	5
20	10	23	2	21.4	50	2.5	43
20	10	23	3	21.4	50	1	5
20	10	23	4	20.7	51	0.9	5
20	10	23	5	21.2	52	2.6	43
20	10	23	6	21.5	49	1.8	5
20	10	23	7	21.4	49	1.4	43
20	10	23	8	21.6	46	0.5	5
20	10	23	9	21.8	58	1.8	351
20	10	23	10	21.8	58	1.8	3
20	10	23	11	20.9	59	2.3	5
20	10	23	12	20.7	60	1.6	5
20	10	23	13	20.2	67	1.8	68
20	10	23	14	21.5	69	2.5	5
20	10	23	15	21.4	70	1.4	43
20	10	23	16	21.8	66	1.6	43
20	10	23	17	21.6	64	3.5	105
20	10	23	18	21.5	61	1.6	3
20	10	23	19	20.2	61	2.5	5
20	10	23	20	20.4	55	3.5	5
20	10	23	21	20.7	57	1.8	358
20	10	23	22	21.5	59	2.6	43
20	10	23	23	21.2	63	3.3	7
20	10	23	24	21.6	55	2.5	351
20	10	24	1	21.7	54	1.8	43
20	10	24	2	24.7	49	0.3	7
20	10	24	3	24.8	50	0.3	7
20	10	24	4	25.5	51	2.3	7
20	10	24	5	23.1	52	0.1	7
20	10	24	6	20.7	49	1.8	43
20	10	24	7	20.9	49	1.8	43
20	10	24	8	22.4	56	0.7	7
20	10	24	9	23.6	58	0.3	7
20	10	24	10	21.2	59	1.6	43
20	10	24	11	21.7	60	0.7	4
20	10	24	12	20.3	67	0.4	43
20	10	24	13	21.2	69	0.9	5
20	10	24	14	22.9	70	0.7	7
20	10	24	15	24.7	66	0.7	351
20	10	24	16	23.4	64	1.3	43
20	10	24	17	21.8	61	0.3	105
20	10	24	18	20.5	61	0.3	383
20	10	24	19	20.2	55	1.8	105
20	10	24	20	22.4	57	0.3	43
20	10	24	21	21.6	59	1.8	43
20	10	24	22	23.4	61	0.3	7
20	10	24	23	21.1	55	0.3	7
20	10	24	24	21.8	54	0.3	43
20	10	25	1	20.1	49	0.4	55
20	10	25	2	20.1	50	1.6	105
20	10	25	3	21.4	61	0.3	43
20	10	25	4	21.3	52	0.3	351
20	10	25	5	24.4	49	2.9	43

Year	Month	Date	Hour	Temperature Dry (°C)	Relative Humidity (%)	Wind Speed (m/s)	Wind Direction (°)
20	10	28	17	13.4	63	0.9	47
20	10	28	18	12.6	51	0.9	47
20	10	28	19	12.7	55	0.1	183
20	10	28	20	12.7	57	0.4	11
20	10	28	21	15.9	59	0.4	9
20	10	28	22	14.6	61	0.7	47
20	10	28	23	14.6	55	1.5	47
20	10	28	24	16.1	54	1.6	47
20	10	29	1	22.2	49	0.3	47
20	10	29	2	21.1	50	1.8	47
20	10	29	3	16.4	51	2	47
20	10	29	4	24.3	52	0.3	55
20	10	29	5	22.2	49	0.4	352
20	10	29	6	21.1	49	0.2	7
20	10	29	7	20.4	49	0.2	55
20	10	29	8	21.6	56	0.3	7
20	10	29	9	22.2	58	2	47
20	10	29	10	24.6	59	1.8	47
20	10	29	11	26.9	60	0.3	7
20	10	29	12	27.5	67	0.5	7
20	10	29	13	29.5	69	1.8	47
20	10	29	14	30.1	70	0.4	7
20	10	29	15	32.1	66	2	7
20	10	29	16	34.6	64	2	6
20	10	29	17	37.6	63	0.4	112
20	10	29	18	37.8	51	0.1	112
20	10	29	19	29.6	55	2.5	112
20	10	29	20	28.8	52	1.8	7
20	10	29	21	26.7	50	2	352
20	10	29	22	24.6	61	2	47
20	10	29	23	22.1	55	1.8	7
20	10	29	24	20	54	1.8	55
20	10	30	1	21.1	49	1.8	47
20	10	30	2	16.1	50	0.5	47
20	10	30	3	23.2	51	2	47
20	10	30	4	24.6	52	1.6	47
20	10	30	5	25.5	49	0.5	47
20	10	30	6	25.5	49	1.9	47
20	10	30	7	21.1	49	2	47
20	10	30	8	21.2	56	3.5	7
20	10	30	9	21.6	59	0.4	7
20	10	30	10	23.5	59	0.4	7
20	10	30	11	27.6	60	2	352
20	10	30	12	29.6	67	0.1	7
20	10	30	13	30	69	1.8	7
20	10	30	14	31.2	70	0.3	352
20	10	30	15	32.5	66	0.1	7
20	10	30	16	32.3	64	0.1	47
20	10	30	17	32.3	55	0.7	7
20	10	30	18	31.8	51	0.1	7
20	10	30	19	30.7	55	0.4	10
20	10	30	20	28.9	57	0.4	7
20	10	30	21	26.4	59	0.3	7
20	10	30	22	24.6	59	0.3	7
20	10	30	23	22.2	55	2	7
20	10	30	24	20.1	54	0.9	112
20	10	31	1	21.3	49	0.9	352
20	10	31	2	21.3	49	0.5	47
20	10	31	3	20.5	51	0.2	47
20	10	31	4	20.4	52	0.3	352
20	10	31	5	22.3	49	0.3	7
20	10	31	6	21.4	49	0.6	7
20	10	31	7	20.1	49	0.8	7
20	10	31	8	21.6	56	0.1	112
20	10	31	9	23.4	58	0.1	47
20	10	31	10	25.9	60	0.9	7
20	10	31	11	28.7	66	0.8	7
20	10	31	12	28.9	67	0.1	7
20	10	31	13	30.1	69	0.7	7
20	10	31	14	31.8	70	0.9	7
20	10	31	15	33.9	66	0.3	7
20	10	31	16	33.2	64	0.8	7
20	10	31	17	26.6	61	0.3	10
20	10	31	18	26.9	54	0.3	7
20	10	31	19	26.7	56	0.3	352
20	10	31	20	27.4	57	0.2	7
20	10	31	21	26.6	59	0.3	7
20	10	31	22	24.4	61	0.2	7
20	10	31	23	21.5	59	0.9	352
20	10	31	24	23.6	49	0.3	7
20	11	1	1	14.2	44	2	7
20	11	1	2	16.4	45	0.3	7
20	11	1	3	14.5	46	1.9	352

0.1  
7.2

10  
32.9

43  
66

Year	Month	Date	Hour	Temperature Dry (°C)	Relative Humidity (%)	Wind Speed (m/s)	Wind Direction (°)
20	11	1	4	16.6	47	0.3	7
20	11	1	5	14.7	48	1.6	7
20	11	1	6	14.3	48	1.8	7
20	11	1	7	14.5	49	2	47
20	11	1	8	14.2	47	1.8	352
20	11	1	9	14.4	46	2	7
20	11	1	10	15.7	44	3.5	47
20	11	1	11	16.7	43	1.8	7
20	11	1	12	18.9	45	1.8	112
20	11	1	13	19	52	0.9	112
20	11	1	14	20.4	44	1.8	7
20	11	1	15	20.9	44	0.3	7
20	11	1	16	23.8	46	0.3	47
20	11	1	17	28	44	1.8	68
20	11	1	18	28.1	45	1.8	23
20	11	1	19	26	43	3.5	7
20	11	1	20	25.1	50	3.5	47
20	11	1	21	24.2	51	0.9	68
20	11	1	22	24.7	47	2	47
20	11	1	23	24.5	49	3.5	47
20	11	1	24	25	50	1.8	7
20	11	2	1	14.2	66	2	47
20	11	2	2	14.4	64	1.6	7
20	11	2	3	14.5	64	0.3	47
20	11	2	4	14.5	65	1.6	68
20	11	2	5	14.5	61	0.3	352
20	11	2	6	14.2	64	1.6	352
20	11	2	7	14.5	64	1.8	47
20	11	2	8	14.2	62	2	47
20	11	2	9	14.4	64	1.6	47
20	11	2	10	15.7	49	2	47
20	11	2	11	16.7	43	0.3	7
20	11	2	12	18.9	45	1.8	47
20	11	2	13	19	52	0.9	112
20	11	2	14	20.4	44	1.8	7
20	11	2	15	20.9	44	2	352
20	11	2	16	23.8	46	0.3	9
20	11	2	17	28	44	1.8	112
20	11	2	18	28.1	49	1.6	55
20	11	2	19	25	45	1.8	23
20	11	2	20	24.5	50	3.5	47
20	11	2	21	24.2	51	0.3	352
20	11	2	22	24.7	47	1.8	112
20	11	2	23	24.5	49	0.2	352
20	11	3	1	14.2	48	0.5	47
20	11	3	2	14.4	46	2.3	112
20	11	3	3	14.5	47	0.2	112
20	11	3	4	14.5	48	0.3	10
20	11	3	5	14.5	49	1.8	23
20	11	3	6	14.7	45	3.5	9
20	11	3	7	14.5	44	3.5	47
20	11	3	8	14.3	45	3.5	47
20	11	3	9	14.4	50	2	47
20	11	3	10	15.7	59	1.8	112
20	11	3	11	16.7	51	1.8	9
20	11	3	12	18.9	62	3.5	9
20	11	3	13	19	69	2.9	47
20	11	3	14	20.4	46	1.9	9
20	11	3	15	20.9	44	2	183
20	11	3	16	23.8	46	1.9	352
20	11	3	17	28	45	1.6	10
20	11	3	18	28.1	49	0.1	183
20	11	3	19	25	46	0.1	183
20	11	3	20	25.1	48	0.4	47
20	11	3	21	24.2	49	0.2	47
20	11	3	22	24.7	45	3.2	47
20	11	3	23	24.5	46	1.4	9
20	11	3	24	20	64	0.3	352
20	11	4	1	14.4	49	0.2	47
20	11	4	2	14.4	49	3.5	47
20	11	4	3	14.5	47	3.5	9
20	11	4	4	14.5	49	0.2	9
20	11	4	5	14.7	44	3.5	112
20	11	4	6	14.5	44	0.2	9
20	11	4	7	14.5	44	0.2	9
20	11	4	8	14.2	50	2	47
20	11	4	9	14.4	52	3.5	47
20	11	4	10	15.7	50	3.5	47
20	11	4	11	16.7	51	1.8	183
20	11	4	12	18.9	46	1.8	55
20	11	4	13	19	66	3.5	47
20	11	4	14	20.4	44	3.5	47

Year	Month	Date	Hour	Temperature Dry (°C)	Relative Humidity (%)	Wind Speed (m/s)	Wind Direction (°)
20	11	4	15	29	45	3.3	47
20	11	4	16	28.8	65	3.5	47
20	11	4	17	28	47	1.8	53
20	11	4	18	28.1	46	0.1	183
20	11	4	19	25	45	0.2	352
20	11	4	20	25.1	59	0.2	47
20	11	4	21	24.2	52	3.5	47
20	11	4	22	24.7	50	0.3	352
20	11	4	23	24.5	49	2	352
20	11	4	24	20	49	0.9	55
20	11	5	1	14.2	44	3.5	47
20	11	5	2	14.4	46	2	352
20	11	5	3	14.5	47	1.6	47
20	11	5	4	10	49	1.6	9
20	11	5	5	14.5	44	2	352
20	11	5	6	14.7	45	2	248
20	11	5	7	14.5	44	2	47
20	11	5	8	14.2	50	1.6	47
20	11	5	9	14.4	57	2	47
20	11	5	10	15.7	59	1.8	55
20	11	5	11	16.7	51	1.8	9
20	11	5	12	18.9	44	2	9
20	11	5	13	19	66	1.8	352
20	11	5	14	20.4	46	2	9
20	11	5	15	20.9	47	3.5	9
20	11	5	16	23.8	65	3.5	68
20	11	5	17	28	46	3.9	112
20	11	5	18	28.1	45	3.5	47
20	11	5	19	26	46	0.2	351
20	11	5	20	25.1	59	0.2	9
20	11	5	21	24.2	60	2	112
20	11	5	22	24.5	61	3.4	354
20	11	5	23	24.5	56	2	55
20	11	5	24	20	61	1.8	47
20	11	6	1	14.2	44	1.6	50
20	11	6	2	14.4	46	2	47
20	11	6	3	14.5	47	1.6	354
20	11	6	4	10	49	3.5	9
20	11	6	5	14.5	44	0.3	50
20	11	6	6	14.7	45	2	50
20	11	6	7	14.5	43	4.2	50
20	11	6	8	14.2	57	2	55
20	11	6	9	14.4	54	1.6	9
20	11	6	10	15.7	59	0.6	50
20	11	6	11	16.7	51	1.8	112
20	11	6	12	19.2	45	3.5	50
20	11	6	13	21.5	66	2	112
20	11	6	14	20.4	47	1.8	112
20	11	6	15	20.9	45	1.8	112
20	11	6	16	22.9	65	2	354
20	11	6	17	28.3	46	2	50
20	11	6	18	27.4	47	1.8	50
20	11	6	19	24.5	45	2	50
20	11	6	20	24.9	59	2	50
20	11	6	21	23.6	60	3.9	50
20	11	6	22	24.2	61	1.8	50
20	11	6	23	24.5	56	1.8	112
20	11	6	24	20	61	0.3	112
20	11	7	1	14.2	44	0.3	68
20	11	7	2	14.4	45	0.3	50
20	11	7	3	14.5	47	1.8	50
20	11	7	4	10	49	0.2	50
20	11	7	5	14.5	44	1.6	50
20	11	7	6	14.7	45	0.3	354
20	11	7	7	14.5	44	2	354
20	11	7	8	14.2	56	1.8	50
20	11	7	9	14.4	57	1.8	351
20	11	7	10	15.7	59	2	50
20	11	7	11	16.7	51	0.3	68
20	11	7	12	18.9	45	3	9
20	11	7	13	19	66	3.1	351
20	11	7	14	20.4	63	1.8	354
20	11	7	15	20.9	64	0.3	9
20	11	7	16	22.9	66	1.8	183
20	11	7	17	28.3	63	0.2	112
20	11	7	18	28.1	64	1.8	9
20	11	7	19	25	62	0.2	50
20	11	7	20	25.1	59	0.3	51
20	11	7	21	24.2	60	2	50
20	11	7	22	24.2	61	3.9	50
20	11	7	23	24.5	1.8	112	112
20	11	7	24	20	64	1.8	354
20	11	8	1	14.2	44	1.5	68

Year	Month	Date	Hour	Temperature Dry (°C)	Relative Humidity (%)	Wind Speed (m/s)	Wind Direction (°)
20	11	11	13	19	66	0.7	120
20	11	11	14	29.6	62	2	9
20	11	11	15	29	64	3.2	9
20	11	11	16	28.8	65	1.5	350
20	11	11	17	28	62	1.5	248
20	11	11	18	28.1	64	0.1	120
20	11	11	19	29	65	0.3	183
20	11	11	20	25.1	59	0.1	120
20	11	11	21	24.2	60	3.5	120
20	11	11	22	24.2	61	2	158
20	11	11	23	24.5	56	2	350
20	11	11	24	24	61	3.5	9
20	11	12	1	14.2	44	2	9
20	11	12	2	14.4	49	0.3	9
20	11	12	3	14.5	47	0.3	9
20	11	12	4	14.1	49	0.3	183
20	11	12	5	14.5	44	0.3	23
20	11	12	6	14.2	45	2	9
20	11	12	7	14.5	44	3.5	50
20	11	12	8	14.2	45	0.3	338
20	11	12	9	14.4	52	2	248
20	11	12	10	15.7	59	0.2	338
20	11	12	11	16.7	51	0.3	120
20	11	12	12	16.9	60	0.5	120
20	11	12	13	16	66	0.3	120
20	11	12	14	19.6	62	2	350
20	11	12	15	29	64	1.6	158
20	11	12	16	28.8	65	0.3	9
20	11	12	17	28	62	2	120
20	11	12	18	28.1	64	0.3	183
20	11	12	19	29	62	0.3	120
20	11	12	20	25.1	59	0.1	9
20	11	12	21	24.2	60	3.5	120
20	11	12	22	24.2	61	0.3	15
20	11	12	23	24.5	56	1.8	68
20	11	12	24	24	61	0.3	13
20	11	12	1	14.2	44	2	50
20	11	13	2	14.4	49	2	50
20	11	13	3	14.5	47	0.5	354
20	11	13	4	14.1	49	3.5	50
20	11	13	5	14.5	44	0.3	50
20	11	13	6	14.2	45	2.2	50
20	11	13	7	14.5	44	0.5	9
20	11	13	8	14.2	56	1.8	353
20	11	13	9	14.4	57	0.3	354
20	11	13	10	15.7	59	2	350
20	11	13	11	16.7	51	0.5	351
20	11	13	12	16.9	50	0.3	10
20	11	13	13	16	60	0.5	50
20	11	13	14	19.6	62	0.3	9
20	11	13	15	29.1	64	0.3	50
20	11	13	16	28.8	65	1.6	9
20	11	13	17	28	62	1.8	9
20	11	13	18	28.1	64	0.3	68
20	11	13	19	29	62	2	68
20	11	13	20	25.1	61	2	64
20	11	13	21	24.2	59	0.3	23
20	11	13	22	24.2	60	0.1	50
20	11	13	23	24.5	56	0.1	50
20	11	13	24	24	61	0.1	50
20	11	14	1	14.2	44	2	50
20	11	14	2	14.4	49	2	50
20	11	14	3	14.5	47	1.8	351
20	11	14	4	14.1	49	3.3	13
20	11	14	5	14.5	44	0.5	18
20	11	14	6	14.2	45	0.3	183
20	11	14	7	14.5	44	0.5	50
20	11	14	8	14.2	56	0.6	50
20	11	14	9	14.4	57	0.3	9
20	11	14	10	15.7	59	0.3	68
20	11	14	11	16.7	51	1.8	13
20	11	14	12	16.9	50	3.5	13
20	11	14	13	16	60	1.8	9
20	11	14	14	19.6	62	3.5	13
20	11	14	15	29.1	64	0.3	183
20	11	14	16	28.8	65	1.6	9
20	11	14	17	28	62	3.5	13
20	11	14	18	28.1	64	0.3	183
20	11	14	19	29	62	1.6	9
20	11	14	20	25.1	59	1.8	68
20	11	14	21	24.2	60	0.3	13
20	11	14	22	24.2	61	0.7	50
20	11	14	23	24.5	56	1.8	13

Year	Month	Date	Hour	Temperature Dry (°C)	Relative Humidity (%)	Wind Speed (m/s)	Wind Direction (°)	
20	11	14	24	26	61	3	50	
20	11	15	1	14.2	44	2.2	9	
20	11	15	2	14.4	46	1.8	50	
20	11	15	3	14.5	47	2.3	9	
20	11	15	4	14.1	49	0.5	9	
20	11	15	5	14.5	44	1.8	354	
20	11	15	6	14.2	45	0.9	350	
20	11	15	7	14.5	47	3.5	13	
20	11	15	8	14.2	56	2.9	351	
20	11	15	9	14.4	57	0.3	13	
20	11	15	10	15.7	59	1.8	9	
20	11	15	11	16.7	51	1.6	9	
20	11	15	12	16.9	50	3.5	50	
20	11	15	13	16	60	0.9	351	
20	11	15	14	19.6	62	3.5	50	
20	11	15	15	29.1	64	0.3	183	
20	11	15	16	28.8	65	0.6	9	
20	11	15	17	28	62	3.5	13	
20	11	15	18	28.1	64	1.8	9	
20	11	15	19	29	62	1.8	350	
20	11	15	20	25.1	59	0.9	13	
20	11	15	21	24.2	60	3.5	148	
20	11	15	22	24.2	61	1.8	55	
20	11	15	23	24.5	56	0.5	50	
20	11	15	24	24	61	1.8	351	
20	11	16	1	14.2	44	3.5	50	
20	11	16	2	14.4	46	0.6	9	
20	11	16	3	14.5	47	1.8	50	
20	11	16	4	14.1	49	3.5	50	
20	11	16	5	14.5	44	0.1	358	
20	11	16	6	14.2	45	0.9	13	
20	11	16	7	14.5	44	0.3	50	
20	11	16	8	14.2	45	1.8	13	
20	11	16	9	14.4	50	0.3	183	
20	11	16	10	15.7	59	1.6	352	
20	11	16	11	16.7	51	1.8	354	
20	11	16	12	16.9	50	1.8	354	
20	11	16	13	16	60	0.3	50	
20	11	16	14	19.6	62	0.3	50	
20	11	16	15	29.1	64	1.8	7	
20	11	16	16	28.8	65	0.3	68	
20	11	16	17	28	62	3.5	50	
20	11	16	18	28.1	64	1.8	50	
20	11	16	19	29	62	0.6	9	
20	11	16	20	25.1	59	2.2	50	
20	11	16	21	24.2	60	3.5	50	
20	11	16	22	24.2	61	5.1	50	
20	11	16	23	24.5	56	0.3	183	
20	11	16	24	24	61	0.3	50	
20	11	17	1	14.2	44	3.5	248	
20	11	17	2	14.4	46	3.5	248	
20	11	17	3	14.5	47	3.5	9	
20	11	17	4	14.1	49	3.5	50	
20	11	17	5	14.5	44	0.3	350	
20	11	17	6	14.2	45	1.8	50	
20	11	17	7	14.5	44	1.8	50	
20	11	17	8	14.2	56	0.6	50	
20	11	17	9	14.4	57	0.3	183	
20	11	17	10	15.7	59	0.3	183	
20	11	17	11	16.7	51	4.3	293	
20	11	17	12	16.9	50	2.5	13	
20	11	17	13	16	60	0.3	338	
20	11	17	14	19.6	62	0.3	183	
20	11	17	15	29.1	64	0.3	23	
20	11	17	16	28.8	65	1.8	13	
20	11	17	17	28	62	0.3	183	
20	11	17	18	28.1	64	1.9	50	
20	11	17	19	29	62	3.5	50	
20	11	17	20	25.1	59	3.5	50	
20	11	17	21	24.2	60	0.3	338	
20	11	17	22	24.2	61	6.2	50	
20	11	17	23	24.5	56	1.8	9	
20	11	17	24	24	61	4.2	13	
20	11	18	1	14.2	44	1.6	350	
20	11	18	2	14.4	46	3.5	50	
20	11	18	3	14.5	47	1.6	354	
20	11	18	4	14.1	49	2	9	
20	11	18	5	14.5	44	1.6	50	
20	11	18	6	14.2	45	1.6	350	
20	11	18	7	14.5	44	0.3	183	
20	11	18	8	14.2	56	0.3	183	
20	11	18	9	14.4	57	0.3	183	
20	11	18	10	15.7	59	1.8	68	
20	11	18	11	16.7	51	1.8	9	
20	11	18	12	16.9	50	3.5	50	
20	11	18	13	16	60	0.3	338	
20	11	18	14	19.6	62	0.3	50	
20	11	18	15	29.1	64	1.6	9	
20	11	18	16	28.8	65	0.3	338	
20	11	18	17	28	62	1.6	230	
20	11	18	18	28.1	64	0.3	183	
20	11	18	19	29	62	3.5	50	
20	11	18	20	25.1	59	2.2	50	
20	11	18	21	24.2	60	2.3	50	
20	11	18	22	24.2	61	0.3	230	
20	11	18	23	24.5	56	0.3	230	
20	11	18	24	24	61	0.3	11	
20	11	18	25	1	14.2	64	0.3	183
20	11	19	1	14.4	46	0.3	183	
20	11	19	2	14.5	47	0.3	183	
20	11	19	3	14.1	49	3.5	18	
20	11	19	4	14.5	44	0.2	350	
20	11	19	5	14.2	45	0.3	183	
20	11	19	6	14.5	44	0.3	183	
20	11	19	7	14.2	45	0.6	230	
20	11	19	8	14.4	49	0.5	50	
20	11	19	9	14.5	47	0.3	338	
20	11	19	10	14.2	49	0.5	50	
20	11	19	11	14.5	44	0.3	338	
20	11	19	12	14.2	49	0.5	50	
20	11	19	13	14.5	44	0.3	338	
20	11	19	14	14.2	49	0.5	50	
20	11	19	15	14.5	44	0.3	338	
20	11	19	16	14.2	49	0.5	50	
20	11	19	17	14.5	44	0.3	338	
20	11	19	18	14.2	49	0.5	50	
20	11	19	19	14.5	44	0.3	338	
20	11	19	20	14.2	49	0.5	50	
20	11	19	21	14.5	44	0.3	338	
20	11	19	22	14.2	49	0.5	50	
20	11	19	23	14.5	44	0.3	338	
20	11	19	24	14.2	49	0.5	50	
20	11	19	25	1	14.2	64	0.3	183

Year	Month	Date	Hour	Temperature Dry (°C)	Relative Humidity (%)	Wind Speed (m/s)	Wind Direction (°)
20	11	25	9	16.4	48	1.8	25
20	11	25	10	16.2	49	1.8	25
20	11	25	11	16.2	48	2.3	183
20	11	25	12	15.9	47	18.9	68
20	11	25	13	16	47	0.5	232
20	11	25	14	16.4	66	1.8	25
20	11	25	15	16	65	3.5	448
20	11	25	16	16.8	64	1.6	50
20	11	25	17	18	63	3.5	232
20	11	25	18	18.1	62	3.5	232
20	11	25	19	19	61	0.9	50
20	11	25	20	19.6	60	0.5	232
20	11	25	21	19.2	60	3.5	248
20	11	25	22	19.7	58	3.5	25
20	11	25	23	19.5	59	3.5	50
20	11	25	14	19	44	0.5	50
20	11	26	1	19.2	44	1.8	50
20	11	26	2	19.4	46	0.2	55
20	11	26	3	19.5	45	1.8	183
20	11	26	4	19.2	45	1.8	25
20	11	26	5	19.5	45	1.8	25
20	11	26	6	19.7	46	0.3	232
20	11	26	7	19.5	44	0.2	219
20	11	26	8	19.2	46	1.8	219
20	11	26	9	19.4	46	1.6	226
20	11	26	10	19.2	45	0.5	226
20	11	26	11	19.2	46	0.9	126
20	11	26	12	18.9	45	0.2	183
20	11	26	13	19	45	0.2	23
20	11	26	14	19.4	66	3.5	232
20	11	26	15	19	64	3.5	50
20	11	26	16	19.8	63	1.6	50
20	11	26	17	19.6	62	0.3	50
20	11	26	18	18.1	61	0.2	232
20	11	26	19	19	62	0.2	338
20	11	26	20	19.1	63	0.2	232
20	11	26	21	19.2	62	3.5	50
20	11	26	22	19.2	58	0.2	338
20	11	26	23	19.5	54	3.5	50
20	11	26	24	19	47	3.5	232
20	11	27	1	19.3	44	1.6	25
20	11	27	2	19.4	46	1.8	232
20	11	27	3	19.5	46	3.1	25
20	11	27	4	19.1	44	0.2	28
20	11	27	5	19.5	46	1.6	25
20	11	27	6	19.2	48	3.5	232
20	11	27	7	19.5	46	0.3	50
20	11	27	8	19.2	44	1.6	219
20	11	27	9	19.4	46	0.2	26
20	11	27	10	19.2	52	3.5	100.5
20	11	27	11	19.2	51	0.2	183
20	11	27	12	18.9	53	3.5	232
20	11	27	13	19	46	0.2	24
20	11	27	14	19.4	66	3.5	232
20	11	27	15	19.4	62	1.6	219
20	11	27	16	18.8	66	1.6	50
20	11	27	17	18	64	3.5	50
20	11	27	18	18	62	0.3	232
20	11	27	19	19	62	0.5	50
20	11	27	20	19.1	61	2.2	50
20	11	27	21	19.2	62	0.2	50
20	11	27	22	19.2	61	3.5	232
20	11	27	23	19.5	64	1.8	183
20	11	27	24	19	52	3.2	50
20	11	28	1	19.2	45	0.3	232
20	11	28	2	19	44	1.6	232
20	11	28	3	19.5	46	0.3	232
20	11	28	4	19.1	44	3.5	100.5
20	11	28	5	19.5	45	0.1	232
20	11	28	6	19.7	47	0.8	219
20	11	28	7	19.5	44	0.1	93
20	11	28	8	19.3	44	3.5	232
20	11	28	9	19.4	45	0.2	232
20	11	28	10	19.2	47	0.1	232
20	11	28	11	19.2	49	1.6	219
20	11	28	12	18.9	47	1.8	232
20	11	28	13	19	52	1.6	68
20	11	28	14	19.4	66	1.6	50
20	11	28	15	19.6	64	1.6	50
20	11	28	16	18.8	61	1.6	219
20	11	28	17	18	62	3.5	248
20	11	28	18	18.1	61	0.3	232
20	11	28	19	19	60	0.1	248

Year	Month	Date	Hour	Temperature Dry (°C)	Relative Humidity (%)	Wind Speed (m/s)	Wind Direction (°)
20	11	28	20	19.1	62	1.6	55
20	11	28	21	19.2	61	0.3	219
20	11	28	22	19.2	63	0.2	219
20	11	28	23	19.5	63	3.5	232
20	11	28	24	20	62	3.5	50
20	11	29	1	19.2	44	1.6	50
20	11	29	2	19.4	46	0.3	232
20	11	29	3	19.5	45	1.6	50
20	11	29	4	19.1	44	0.5	90
20	11	29	5	19.5	44	0.2	23
20	11	29	6	19.2	46	0.5	232
20	11	29	7	19.5	46	0.3	232
20	11	29	8	19.2	45	0.3	232
20	11	29	9	19.2	45	1.6	483
20	11	29	10	19.4	44	0.3	232
20	11	29	11	19.7	47	0.5	232
20	11	29	12	19.5	49	0.3	232
20	11	29	13	18.9	50	0.3	338
20	11	29	14	19	52	0.5	90
20	11	29	15	19.4	66	0.1	232
20	11	29	16	19.6	64	1.6	232
20	11	29	17	19.8	63	1.6	227
20	11	29	18	19.1	62	1.6	232
20	11	29	19	19.2	64	1.6	55
20	11	29	20	19.2	65	1.6	93
20	11	29	21	19.2	54	0.3	232
20	11	29	22	19.2	56	1.6	232
20	11	29	23	19.5	54	1.6	232
20	11	29	24	19.7	52	0.2	232
20	11	30	1	19.2	44	0.1	232
20	11	30	2	19.4	46	0.1	227
20	11	30	3	19.5	46	2.9	272
20	11	30	4	19.1	44	0.2	23
20	11	30	5	19.5	45	3.5	55
20	11	30	6	19.2	44	3.5	232
20	11	30	7	19.5	46	3.5	248
20	11	30	8	19.4	46	1.6	55
20	11	30	9	19.4	45	0.2	55
20	11	30	10	19.2	52	0.2	23
20	11	30	11	19.2	53	3.5	55
20	11	30	12	19.5	52	0.3	23
20	11	30	13	19.6	62	3.5	68
20	11	30	14	19.4	66	1.6	90
20	11	30	15	19	66	0.3	232
20	11	30	16	19.6	64	1.6	232
20	11	30	17	19.1	68	1.6	90
20	11	30	18	18.1	62	0.2	23
20	11	30	19	19	60	0.1	232
20	11	30	20	19.1	58	1.6	232
20	11	30	21	19.2	63	1.6	95
20	11	30	22	19.2	62	0.2	23
20	11	30	23	19.5	60	0.3	232
20	11	30	24	19.7	58	0.2	232
20	12	1	1	19.5	70	3.5	100.5
20	12	1	2	19.2	71	1.8	227
20	12	1	3	19.1	70	1.9	226
20	12	1	4	19.8	73	2.5	95
20	12	1	5	19.1	70	0.6	227
20	12	1	6	19.3	72	0.5	90
20	12	1	7	19.6	71	3.5	55
20	12	1	8	19.8	70	0.5	90
20	12	1	9	19.6	69	0.5	232
20	12	1	10	19	69	0.5	232
20	12	1	11	17	58	2.1	55
20	12	1	12	18	58	3.5	232
20	12	1	13	19.8	57	0.3	23
20	12	1	14	20	55	0.5	55
20	12	1	15	22	52	0.5	90
20	12	1	16	25.9	49	0.5	90
20	12	1	17	25.9	49	0.5	90
20	12	1	18	25	51	1.8	232
20	12	1	19	24	52	1.9	100
20	12	1	20	23	50	0.5	100.5
20	12	1	21	23	51	3.5	55
20	12	1	22	21	51	2.2	55
20	12	1	23	20	50	0.5	55
20	12	1	24	18	52	0.6	90
20	12	2	1	19.5	70	1.6	55
20	12	2	2	19.2	71	3.5	95
20	12	2	3	19.1	70	0.5	90
20	12	2	4	19.8	73	2.1	100
20	12	2	5	19.1	71	0.3	232
20	12	2	6	19.8	72	3.5	55

3.5  
28.2

49  
73

0.1  
6.7

Year	Month	Date	Hour	Temperature Dry (°C)	Relative Humidity (%)	Wind Speed (m/s)	Wind Direction (°)
20	12	2	7	19.6	71	0.5	55
20	12	2	8	19.8	70	0.5	55
20	12	2	9	19.5	69	3.5	100.5
20	12	2	10	19	69	0.3	232
20	12	2	11	17	58	0.3	232
20	12	2	12	18	50	1.8	99
20	12	2	13	19.8	52	1.9	55
20	12	2	14	20	55	0.5	232
20	12	2	15	22	53	0.3	53
20	12	2	16	25.9	49	3.5	232
20	12	2	17	25.6	50	0.5	55
20	12	2	18	25	51	0.3	232
20	12	2	19	24	50	3.5	55
20	12	2	20	23	50	3.5	55
20	12	2	21	21	51	0.3	55
20	12	2	22	21	51	2.4	100.5
20	12	2	23	20	50	3.5	55
20	12	2	24	18	52	0.5	232
20	12	3	1	19.5	70	3.5	100.5
20	12	3	2	19	71	0.5	232
20	12	3	3	19.5	70	0.5	93
20	12	3	4	19.6	73	3.5	93
20	12	3	5	19.1	71	0.5	93
20	12	3	6	19.3	72	0.3	231
20	12	3	7	19.8	71	3.5	232
20	12	3	8	19.2	70	3.5	55
20	12	3	9	19.5	69	3.5	55
20	12	3	10	19.6	68	1.8	55
20	12	3	11	21.1	58	0.5	55
20	12	3	12	22.2	56	0.5	232
20	12	3	13	23.6	52	1.8	221
20	12	3	14	25.8	55	1.8	232
20	12	3	15	27.9	57	0.5	55
20	12	3	16	28.2	49	0.5	232
20	12	3	17	25.4	50	0.5	55
20	12	3	18	25	51	1.8	55
20	12	3	19	24	52	0.5	232
20	12	3	20	23	50	3.5	55
20	12	3	21	21	51	3.5	232
20	12	3	22	21	51	3.5	232
20	12	3	23	20	50	3.5	232
20	12	3	24	18	52	0.8	55
20	12	4	1	19.5	70	0.3	318
20	12	4	2	19.7	71	3.5	55
20	12	4	3	19.1	73	0.3	93
20	12	4	4	19.8	73	0.3	318
20	12	4	5	19.1	71	1.9	93
20	12	4	6	19.5	72	3.5	55
20	12	4	7	19.8	71	0.3	55
20	12	4	8	19.8	70	3.5	95
20	12	4	9	19.9	69	0.5	248
20	12	4	10	19	69	0.3	23
20	12	4	11	17	56	1.8	68
20	12	4	12	18	50	0.8	68
20	12	4	13	19.8	52	1.9	183
20	12	4	14	20	55	1.8	232
20	12	4	15	22	57	3.5	100.5
20	12	4	16	25.9	49	3.5	68
20	12	4	17	25.6	50	3.5	100.5
20	12	4	18	25	51	0.3	221
20	12	4	19	24	52	1.8	55
20	12	4	20	23	50	0.3	221
20	12	4	21	21	51	0.3	221
20	12	4	22	21	51	0.3	221
20	12	4	23	20	50	3.5	55
20	12	4	24	18	52	1.8	232
20	12	5	1	19.5	70	0.5	232
20	12	5	2	19.7	71	0.6	231
20	12	5	3	19.1	70	1.8	232
20	12	5	4	19.8	73	0.3	232
20	12	5	5	19.1	71	3.5	55
20	12	5	6	19.3	72	1.8	334
20	12	5	7	19.8	71	0.5	236
20	12	5	8	19	70	1.8	55
20	12	5	9	19.9	69	1.8	55
20	12	5	10	19	69	3.5	93
20	12	5	11	17	56	2.3	93
20	12	5	12	18	50	1.8	23
20	12	5	13	19.8	52	0.5	23
20	12	5	14	20	55	0.3	90
20	12	5	15	22	57	3.5	100.5
20	12	5	16	25.9	49	0.3	221
20	12	5	17	25.6	50	1.8	93



Year	Month	Date	Hour	Temperature Dry (°C)	Relative Humidity (%)	Wind Speed (m/s)	Wind Direction (°)
20	12	9	5	15.9	71	3.3	55
20	12	9	6	16.5	72	3.3	55
20	12	9	7	16.2	71	3.3	230
20	12	9	8	16.8	70	3.3	93
20	12	9	9	16.2	69	1.8	308
20	12	9	10	16.8	69	3.3	93
20	12	9	11	17	56	3.3	93
20	12	9	12	18	50	1.8	108
20	12	9	13	19.8	52	3.3	93
20	12	9	14	20	56	3	55
20	12	9	15	21	52	3.3	55
20	12	9	16	21.6	50	0.5	229
20	12	9	17	20.6	50	3.3	55
20	12	9	18	14.6	51	3.2	384
20	12	9	19	22.5	52	1.8	55
20	12	9	20	20.8	60	3.3	148
20	12	9	21	18.2	51	0.5	384
20	12	9	22	16.6	51	1.8	55
20	12	9	23	15.9	50	3.5	384
20	12	10	1	1	70	0.5	90
20	12	10	2	0.3	70	1.9	55
20	12	10	3	0.7	71	3.5	55
20	12	10	4	0.1	70	3.5	55
20	12	10	5	0.8	74	3.5	48
20	12	10	6	10.1	71	3.5	55
20	12	10	7	10.6	71	1.8	55
20	12	10	8	10.8	70	1.8	326
20	12	10	9	10.5	69	1.8	229
20	12	10	10	15	69	1.8	319
20	12	10	11	12	56	0.1	183
20	12	10	12	18	50	2	319
20	12	10	13	15.8	52	1.1	93
20	12	10	14	16.2	55	3.5	55
20	12	10	15	21	57	1.8	319
20	12	10	16	22.9	49	3.5	55
20	12	10	17	20.6	49	3.5	384
20	12	10	18	25	51	3.5	55
20	12	10	19	24	52	0.5	55
20	12	10	20	23	50	3.5	93
20	12	10	21	21	51	0.5	388
20	12	10	22	21	51	1.8	315
20	12	10	23	20	59	3.5	148
20	12	10	24	18	52	3.5	55
20	12	11	1	0.9	70	3.5	93
20	12	11	2	0.2	70	0.5	229
20	12	11	3	0.1	70	0.1	55
20	12	11	4	0.8	73	3.2	100.5
20	12	11	5	10.1	71	4	55
20	12	11	6	10.3	71	0.5	93
20	12	11	7	10.6	71	3.5	285
20	12	11	8	10.8	70	1.9	229
20	12	11	9	10.9	69	1.8	384
20	12	11	10	10.5	69	3.5	100.5
20	12	11	11	17	59	1.8	55
20	12	11	12	18	50	1.9	55
20	12	11	13	15.8	52	1.9	319
20	12	11	14	16.2	55	1.8	100.5
20	12	11	15	22	57	0.5	55
20	12	11	16	25.9	49	3.5	384
20	12	11	17	20.6	50	1.8	55
20	12	11	18	21	51	0.5	55
20	12	11	19	24	52	3.5	55
20	12	11	20	23	50	0.5	229
20	12	11	21	21	51	0.1	183
20	12	11	22	21	51	3.5	319
20	12	11	23	20	50	0.1	183
20	12	11	24	18	52	3.5	55
20	12	12	1	0.5	70	3.5	55
20	12	12	2	0.7	71	3.5	55
20	12	12	3	0.1	70	3.5	55
20	12	12	4	0.8	73	3.5	100.5
20	12	12	5	10.1	71	3.5	55
20	12	12	6	10.3	71	1.8	229
20	12	12	7	10.6	71	3.5	100.5
20	12	12	8	10.8	70	1.9	55
20	12	12	9	10.9	69	0.5	229
20	12	12	10	10.5	69	3.5	55
20	12	12	11	17	59	1.8	388
20	12	12	12	18	50	0.1	229
20	12	12	13	15.8	52	3.5	93
20	12	12	14	20	55	1.8	55
20	12	12	15	21	52	3.5	93

Year	Month	Date	Hour	Temperature Dry (°C)	Relative Humidity (%)	Wind Speed (m/s)	Wind Direction (°)
20	12	12	16	25.9	49	1.9	235
20	12	12	17	25.6	48	3.5	100.5
20	12	12	18	26	51	3.5	388
20	12	12	19	24	50	3.5	55
20	12	12	20	23	50	3.5	55
20	12	12	21	21	51	3.9	93
20	12	12	22	21	51	3.5	55
20	12	12	23	20	50	0.5	55
20	12	12	24	18	52	3.5	319
20	12	13	1	0.5	70	3.5	55
20	12	13	2	0.2	71	3.5	55
20	12	13	3	0.1	70	3.5	55
20	12	13	4	0.8	73	1.8	68
20	12	13	5	10.1	71	1.9	55
20	12	13	6	10.3	72	1.8	93
20	12	13	7	10.6	71	1.9	90
20	12	13	8	10.8	70	0.5	55
20	12	13	9	10.9	69	0.1	48
20	12	13	10	10.5	69	1.9	90
20	12	13	11	17	59	1.9	55
20	12	13	12	18	50	2	55
20	12	13	13	19.8	52	3.5	93
20	12	13	14	20	55	1.9	55
20	12	13	15	22	56	1.8	68
20	12	13	16	25.9	49	1.9	90
20	12	13	17	25.6	48	1.8	90
20	12	13	18	26	51	3.5	68
20	12	13	19	24	52	0.9	238
20	12	13	20	23	50	0.9	55
20	12	13	21	21	51	0.3	90
20	12	13	22	21	51	3.5	55
20	12	13	23	20	50	1.8	238
20	12	13	24	18	52	1.8	238
20	12	14	1	0.5	70	0.2	55
20	12	14	2	0.2	71	0.3	90
20	12	14	3	0.1	70	0.1	183
20	12	14	4	0.8	71	3.5	93
20	12	14	5	10.1	71	3.5	55
20	12	14	6	10.3	72	3.5	100.5
20	12	14	7	10.6	71	3.5	55
20	12	14	8	10.8	70	0.4	55
20	12	14	9	10.9	69	3.5	375
20	12	14	10	10.5	69	1.8	55
20	12	14	11	17	59	3.5	55
20	12	14	12	18	50	3.5	68
20	12	14	13	19.8	52	1.9	90
20	12	14	14	20	55	1.9	93
20	12	14	15	22	52	3.5	55
20	12	14	16	25.9	49	3.5	55
20	12	14	17	25.6	48	3.5	388
20	12	14	18	26	51	3.5	248
20	12	14	19	24	52	3.5	375
20	12	14	20	23	50	0.5	55
20	12	14	21	21	51	0.6	90
20	12	14	22	21	51	0.5	55
20	12	14	23	20	50	0.5	90
20	12	14	24	18	52	3.5	55
20	12	15	1	0.5	70	3.5	55
20	12	15	2	0.2	71	0.5	388
20	12	15	3	0.1	70	1.9	55
20	12	15	4	0.8	73	3.5	55
20	12	15	5	10.1	71	3.5	248
20	12	15	6	10.3	72	0.5	55
20	12	15	7	10.6	71	0.3	8
20	12	15	8	10.8	70	1.9	338
20	12	15	9	10.9	69	0.4	55
20	12	15	10	10.5	69	0.5	183
20	12	15	11	17	59	0.2	183
20	12	15	12	18	50	0.3	94
20	12	15	13	19.8	52	1.8	90
20	12	15	14	20	55	3.5	384
20	12	15	15	22	52	1.8	93
20	12	15	16	25.9	49	3.5	90.9
20	12	15	17	25.6	48	3.5	315
20	12	15	18	26	51	0.5	315
20	12	15	19	24	52	0.5	90
20	12	15	20	23	50	2.3	235
20	12	15	21	21	51	1.9	235
20	12	15	22	21	51	0.1	235
20	12	15	23	20	50	2.2	235
20	12	15	24	18	52	1.9	90
20	12	16	1	0.5	70	3.5	23
20	12	16	2	0.2	71	3.5	177

Year	Month	Date	Hour	Temperature Dry (°C)	Relative Humidity (%)	Wind Speed (m/s)	Wind Direction (°)
20	12	16	3	0.1	70	3.5	93
20	12	16	4	0.8	71	3.5	177
20	12	16	5	10.1	71	1.9	90
20	12	16	6	10.3	71	3.5	100.5
20	12	16	7	10.6	71	2.8	55
20	12	16	8	10.8	70	3.5	177
20	12	16	9	10.9	69	3.5	177
20	12	16	10	10.5	69	3.5	55
20	12	16	11	17	56	3.5	90
20	12	16	12	18	50	3.5	93
20	12	16	13	19.8	52	1.9	235
20	12	16	14	20	55	3.5	55
20	12	16	15	22	52	3.5	93
20	12	16	16	25.9	49	0.5	55
20	12	16	17	25.6	48	3.5	90.9
20	12	16	18	26	51	1.8	338
20	12	16	19	24	52	1.9	90
20	12	16	20	23	50	1.9	90
20	12	16	21	21	51	3.5	55
20	12	16	22	21	51	0.3	55
20	12	16	23	20	50	3.5	55
20	12	16	24	18	52	3.5	55
20	12	17	1	0.5	70	0.5	55
20	12	17	2	0.2	71	1.9	338
20	12	17	3	0.1	70	0.5	90
20	12	17	4	0.8	73	1.9	90
20	12	17	5	10.1	71	0.5	93
20	12	17	6	10.3	72	1.9	338
20	12	17	7	10.6	71	0.5	93
20	12	17	8	10.8	70	3.5	55
20	12	17	9	10.9	69	3.5	55
20	12	17	10	10.5	69	3.5	248
20	12	17	11	17	56	1.8	183
20	12	17	12	18	50	3.5	55
20	12	17	13	19.8	52	0.5	183
20	12	17	14	20	55	3.5	170
20	12	17	15	22	52	0.5	235
20	12	17	16	25.9	49	1.9	55
20	12	17	17	25.6	48	0.5	235
20	12	17	18	26	51	1.9	338
20	12	17	19	24	52	1.9	55
20	12	17	20	23	50	1.9	55
20	12	17	21	21	51	3.5	337
20	12	17	22	21	51	0.3	24
20	12	17	23	20	50	3.5	375
20	12	17	24	18	52	1.8	55
20	12	18	1	0.5	70	1.9	338
20	12	18	2	0.2	71	3.5	248
20	12	18	3	0.1	70	1.8	338
20	12	18	4	0.8	73	1.9	170
20	12	18	5	10.1	71	1.9	337
20	12	18	6	10.3	72	1.9	235
20	12	18	7	10.6	71	1.9	235
20	12	18	8	10.8	70	3.5	170
20	12	18	9	10.9	69	0.5	235
20	12	18	10	10.5	69	0.3	23
20	12	18	11	17	56	3.5	183
20	12	18	12	18	50	3.5	170
20	12	18	13	19.8	52	1.9	338
20	12	18	14	20	55	3.5	128
20	12	18	15	22	52	3.5	170
20	12	18	16	25.9	49	3.5	68
20	12	18	17	25.6	48	0.6	187
20	12	18	18	26	51	0.3	235
20	12	18	19	24	52	0.5	235
20	12	18	20	23	50	3.5	187
20	12	18	21	21	51	1.8	235
20	12	18	22	21	51	1.9	338
20	12	18	23	20	50	3.5	55
20	12	18	24	18	52	1.8	183
20	12	19	1	0.5	70	1.8	175
20	12	19	2	0.2	71	1.8	183
20	12	19	3	0.1	70	1.9	55
20	12	19	4	0.8	73	3.5	175
20	12	19	5	10.1	71	3.5	337
20	12	19	6	10.3	72	3.5	178
20	12	19	7	10.6	71	1.8	337
20	12	19	8	10.8	70	1.8	337
20	12	19	9	10.9	69	1.9	55
20	12	19	10	10.5	69	3.5	228
20	12	19	11	17	56	1.8	55
20	12	19	12	18	50	0.3	23
20	12	19	13	19.8	52	0.5	183

Year	Month	Date	Hour	Temperature Dry (°C)	Relative Humidity (%)	Wind Speed (m/s)	Wind Direction (°)
20	12	23	1	8.5	70	3.5	35
20	12	23	2	9.2	71	3.9	55
20	12	23	3	8.1	70	8.2	354
20	12	23	4	8.8	71	8.5	315
20	12	23	5	10.1	71	1.9	10
20	12	23	6	10.3	72	3.2	313
20	12	23	7	10.6	71	0.5	15
20	12	23	8	10.8	71	3.5	50
20	12	23	9	10.15	69	1.9	40
20	12	23	10	15	69	3.2	351
20	12	23	11	17	56	4.6	305
20	12	23	12	18	52	6.2	313
20	12	23	13	19.8	52	6.5	30
20	12	23	14	20	55	0.3	351
20	12	23	15	21	57	0.5	322
20	12	23	16	25.6	49	0.3	313
20	12	23	17	25.6	50	0.3	350
20	12	23	18	25	51	0.3	350
20	12	23	19	24	52	4.9	228
20	12	23	20	23	50	3.6	229
20	12	23	21	21	51	3.2	68
20	12	23	22	21	51	0.3	90
20	12	23	23	20	50	0.3	90
20	12	24	1	18	52	1.8	222
20	12	24	2	9.5	70	3.1	354
20	12	24	3	8.2	71	2.8	301
20	12	24	4	8.1	70	0.5	313
20	12	24	5	8.9	71	8.5	351
20	12	24	6	10.1	71	8.2	301
20	12	24	7	10.3	72	3.5	350.9
20	12	24	8	10.6	71	3.5	317
20	12	24	9	10.8	70	3.3	317
20	12	24	10	10.15	69	3.5	302
20	12	24	11	15	69	3.5	317
20	12	24	12	17	56	0.5	10
20	12	24	13	18	50	0.5	158
20	12	24	14	19.8	52	6.5	350.9
20	12	24	15	20	55	3.5	304
20	12	24	16	22	57	3.5	317
20	12	24	17	25.9	49	0.3	30
20	12	24	18	25.6	50	0.3	31
20	12	24	19	25	51	3.5	317
20	12	24	20	24	52	0.3	315
20	12	24	21	23	50	1.8	318
20	12	24	22	21	51	3.5	323
20	12	24	23	20	50	3.1	81
20	12	24	24	18	52	0.9	6
20	12	24	25	9.5	70	3.1	354
20	12	25	1	8.2	71	0.3	313
20	12	25	2	8.1	70	0.3	94
20	12	25	3	8.8	71	0.3	351
20	12	25	4	10.1	71	8.5	351
20	12	25	5	10.3	71	8.2	313
20	12	25	6	10.6	70	6.6	0
20	12	25	7	10.8	70	0.3	313
20	12	25	8	10.15	69	3.1	351
20	12	25	9	10.3	69	3.5	302
20	12	25	10	15	69	3.5	302
20	12	25	11	17	56	3	55
20	12	25	12	18	50	0.3	313
20	12	25	13	19.8	52	0.3	315
20	12	25	14	20	52	6.2	325
20	12	25	15	22	57	0.3	315
20	12	25	16	25.9	49	0.3	315
20	12	25	17	25.6	50	3.3	55
20	12	25	18	25	51	6.5	158
20	12	25	19	24	52	1.5	55
20	12	25	20	23	50	1.5	158
20	12	25	21	21	51	1.5	158
20	12	25	22	20	50	4.4	31
20	12	25	23	20	50	3	55
20	12	25	24	18	52	5.9	221
20	12	26	1	9.5	70	0.3	55
20	12	26	2	8.2	71	3.5	351
20	12	26	3	8.1	70	3.9	351
20	12	26	4	8.8	71	3.9	55
20	12	26	5	10.1	71	1.8	314
20	12	26	6	10.3	72	1.8	315
20	12	26	7	10.6	71	0.3	315
20	12	26	8	10.8	70	4.6	350.9
20	12	26	9	10.15	69	2.9	183
20	12	26	10	15	69	4.4	314
20	12	26	11	17	56	2.9	125

Year	Month	Date	Hour	Temperature Dry (°C)	Relative Humidity (%)	Wind Speed (m/s)	Wind Direction (°)
20	12	26	12	18	50	3.5	355
20	12	26	13	19.8	52	3.2	93
20	12	26	14	20	55	3.5	317
20	12	26	15	21	52	6.1	351
20	12	26	16	25.9	49	4.5	313
20	12	26	17	25.6	50	1.5	351
20	12	26	18	25	51	1.5	351
20	12	26	19	24	50	0.3	350
20	12	26	20	23	50	3.5	68
20	12	26	21	21	51	0.5	351
20	12	26	22	21	51	3.5	350
20	12	26	23	20	50	0.1	21
20	12	26	24	18	52	3.5	354
20	12	27	1	9.5	70	3.5	108
20	12	27	2	8.2	71	6.5	350
20	12	27	3	8.1	70	0.3	350
20	12	27	4	8.8	71	3	313
20	12	27	5	10.1	71	1.8	334
20	12	27	6	10.3	72	4.3	313
20	12	27	7	10.6	71	3.5	351
20	12	27	8	10.8	70	1.8	55
20	12	27	9	10.15	69	3.5	52
20	12	27	10	15	69	2.9	93
20	12	27	11	17	56	4.3	350
20	12	27	12	18	50	3.5	55
20	12	27	13	19.8	52	3.5	93
20	12	27	14	20	55	3.5	55
20	12	27	15	22	52	3.5	351
20	12	27	16	25.9	49	3.5	350.9
20	12	27	17	25.6	50	6.1	81
20	12	27	18	25	51	3.5	354
20	12	27	19	24	52	7	55
20	12	27	20	23	50	3.5	351
20	12	27	21	21	51	2.8	55
20	12	27	22	21	50	1.8	55
20	12	27	23	20	52	3.5	350
20	12	27	24	18	52	3.5	351
20	12	28	1	9.5	70	3.5	351
20	12	28	2	8.2	71	3.5	218
20	12	28	3	8.1	70	6.3	350
20	12	28	4	8.8	71	3	314
20	12	28	5	10.1	71	0.5	351
20	12	28	6	10.3	72	3.5	55
20	12	28	7	10.6	71	2.9	55
20	12	28	8	10.8	70	3.5	350
20	12	28	9	10.15	69	3.4	93
20	12	28	10	15	69	3.3	218
20	12	28	11	17	56	3.5	93
20	12	28	12	18	50	1.5	351
20	12	28	13	19.8	52	3.5	351
20	12	28	14	20	55	1.9	55
20	12	28	15	22	52	0.5	158
20	12	28	16	25.9	49	3.5	350.9
20	12	28	17	25.6	50	3.5	55
20	12	28	18	25	51	3.5	55
20	12	28	19	24	52	3.5	317
20	12	28	20	23	50	3.5	93
20	12	28	21	21	51	3.5	55
20	12	28	22	21	51	3.5	55
20	12	28	23	20	50	1.8	83
20	12	28	24	18	52	3.5	350
20	12	29	1	9.5	70	1.8	213
20	12	29	2	8.2	71	0.3	70
20	12	29	3	8.1	70	0.3	350
20	12	29	4	8.8	71	6.3	350
20	12	29	5	10.1	71	3.1	315
20	12	29	6	10.3	72	3.3	355
20	12	29	7	10.6	71	0.1	13
20	12	29	8	10.8	70	0.1	23
20	12	29	9	10.15	69	2.5	312
20	12	29	10	15	69	6.3	313
20	12	29	11	17	56	4.4	218
20	12	29	12	18	50	1.8	339
20	12	29	13	19.8	52	3.5	34
20	12	29	14	20	55	3.5	68
20	12	29	15	22	52	1.9	350
20	12	29	16	25.9	49	1.8	221
20	12	29	17	25.6	50	1.5	158
20	12	29	18	25	51	4.3	183
20	12	29	19	24	52	3.4	55
20	12	29	20	23	50	4.2	55
20	12	29	21	21	51	2.4	350.9
20	12	29	22	21	51	5.3	272

Year	Month	Date	Hour	Temperature Dry (°C)	Relative Humidity (%)	Wind Speed (m/s)	Wind Direction (°)
20	12	29	23	20	50	4.3	183
20	12	29	24	18	52	1.9	317
20	12	30	1	9.5	70	2.9	272
20	12	30	2	8.2	71	3.5	350
20	12	30	3	8.1	70	1.9	358
20	12	30	4	8.8	71	3.5	315
20	12	30	5	10.1	71	1.9	355
20	12	30	6	10.3	72	1.9	351
20	12	30	7	10.6	71	3.5	351
20	12	30	8	10.8	70	1.9	308
20	12	30	9	10.15	69	3.5	350.9
20	12	30	10	15	69	3.5	351
20	12	30	11	17	56	3.9	183
20	12	30	12	18	50	3.5	315
20	12	30	13	19.8	52	3.5	315
20	12	30	14	20	55	3.9	271
20	12	30	15	21	52	3.5	351
20	12	30	16	25.9	49	1.8	351
20	12	30	17	25.6	50	3.2	271
20	12	30	18	25	51	1.8	325
20	12	30	19	24	50	1.8	324
20	12	30	20	23	50	3.5	315
20	12	30	21	21	51	3.5	317
20	12	30	22	21	51	3	271
20	12	30	23	20	50	3.9	183
20	12	30	24	18	52	3.5	270
20	12	31	1	9.5	70	1.8	316
20	12	31	2	8.2	71	3.5	350.9
20	12	31	3	8.1	70	1.9	358
20	12	31	4	8.8	71	3.5	277
20	12	31	5	10.1	71	1.8	314
20	12	31	6	10.3	72	1.8	308
20	12	31	7	10.6	71	3.5	351
20	12	31	8	10.8	70	3.5	270
20	12	31	9	10.15	69	3.5	317
20	12	31	10	15	69	3.2	271
20	12	31	11	17	56	3.5	315
20	12	31	12	18	50	3.9	319
20	12	31	13	19.8	52	4.1	354
20	12	31	14	20	55	3.4	309.9
20	12	31	15	21	52	3.5	351
20	12	31	16	25.9	49	0.7	316
20	12	31	17	25.6	50	3.4	304
20	12	31	18	25	51	1.8	276
20	12	31	19	24	50	3.2	309.9
20	12	31	20	23	50	3.5	271
20	12	31	21	21	51	0.7	314
20	12	31	22	21	51	3.5	317
20	12	31	23	20	50	3.5	315
20	12	31	24	18	52	1.9	352

## Ambient Air Quality

## Location –Plant Site

DATE	CLOCK HOURS							
	00 – 08		08 – 16		16 – 24		24 HOURS	24 HOURS
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
03.10.2020	11.8	26.8	18.2	34.8	15.9	33.5	77.2	45.6
04.10.2020	12.6	27.6	17.9	36.9	14.2	32.8	79.5	49.8
11.10.2020	13.7	28.1	18.7	37.2	16.8	35.1	90.5	48.2
12.10.2020	11.2	25.1	19.5	35.6	18.9	30.5	88.5	51.7
19.10.2020	12.9	24.1	17.2	38.6	15.1	32.4	83.4	40.7
20.10.2020	13.2	26.1	18.6	37.2	17.8	36.5	79.6	53.6
27.10.2020	12.8	27.9	17.2	31.2	15.2	29.8	77.2	54.8
28.10.2020	11.8	26.7	19.6	36.4	16.4	34.9	81.6	50.4
04.11.2020	12.3	28.2	18.6	35.6	17.8	30.7	84.6	53.8
05. 11.2020	13.9	26.7	17.5	35.9	16.8	34.8	91.8	55.4
12. 11.2020	11.5	24.5	19.2	37.6	15.3	34.2	92.4	51.2
13. 11.2020	11.6	28.9	17.1	34.2	16.2	35.1	83.7	53.8
20. 11.2020	12.8	24.5	18.5	35.7	18.1	32.8	85.7	40.7
21. 11.2020	13.8	27.8	19.7	34.6	17.7	30.5	89.7	43.6
27. 11.2020	13.1	25.6	16.2	38.2	15.6	31.8	79.4	42.1
28. 11.2020	11.6	27.2	17.4	35.9	16.3	30.5	78.5	40.8
04.12.2020	12.8	27.4	18.5	34.6	16.2	34.9	80.9	42.6
05. 12.2020	13.4	28.9	19.7	35.1	17.6	34.2	83.4	52.4
11. 12.2020	12.8	25.8	17.6	32.4	16.7	31.2	86.7	42.8
12.12.2020	13.5	26.4	18.3	33.8	15.9	30.8	89.8	48.3
18. 12.2020	12.9	28.6	18.9	32.6	17.1	31.9	92.4	50.7
19. 12.2020	11.8	26.3	17.3	38.4	16.7	32.5	83.4	55.3
25. 12.2020	12.5	26.5	18.7	35.9	15.2	29.5	76.2	46.1
26. 12.2020	12.8	28.7	19.6	37.4	17.4	31.4	76.5	48.3

	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
<b>Max.</b>	19.7	38.6	92.4	55.4
<b>Min.</b>	11.2	24.1	76.2	40.7
<b>98%tile</b>	<b>19.65</b>	<b>38.29</b>	<b>92.40</b>	<b>55.35</b>
<b>95%tile</b>	<b>19.52</b>	<b>37.43</b>	<b>92.3</b>	<b>55.23</b>

## Ambient Air Quality

Location –Ghosundi

DATE	CLOCK HOURS							
	00 – 08		08 – 16		16 – 24		24 HOURS	24 HOURS
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
03.10.2020	7.8	16.8	12.5	25.6	9.5	19.5	59.6	35.8
04.10.2020	6.9	15.9	13.5	23.6	9.2	20.6	71.2	37.6
11.10.2020	7.5	18.9	13.8	24.2	10.6	21.3	75.6	33.5
12.10.2020	7.5	16.4	13.5	25.3	8.9	22.5	65	28.9
19.10.2020	6.3	17.2	12.8	24.5	11.7	23.4	64.3	27.6
20.10.2020	7.5	18.6	13.9	23.1	12.6	20.3	78.3	36.5
27.10.2020	8.9	17.2	14	24.8	13.5	20.4	78.3	38.6
28.10.2020	7.4	18.6	12.8	25.6	10.1	21.5	65.3	28.1
04.11.2020	6.8	16.2	12.3	23.4	11.8	20.6	59.7	29.8
05. 11.2020	8.5	18.9	13.8	21.5	12.3	21.4	58.2	28.9
12. 11.2020	7.6	16.5	12.7	23.6	10.8	20.4	62.8	32.5
13. 11.2020	8.1	18.3	13.2	24.1	12.8	21.5	63.5	33.7
20. 11.2020	7.2	16.8	13.8	25.3	12.9	22.6	66.8	34.6
21. 11.2020	8.3	16.9	12.8	24.8	10.2	21.4	69.4	38.1
27. 11.2020	7.4	18.2	13.9	25.1	10.5	23.5	59.8	35.7
28. 11.2020	8.4	15.7	13.2	24.8	13.5	20.6	67.5	29.1
04.12.2020	6.6	16.3	13.9	23.5	12.6	21.4	63.7	31.5
05. 12.2020	7.8	18.4	12.4	24.7	11.5	23.5	69.1	35.7
11. 12.2020	8.9	17.6	13.1	23.9	12.8	21.7	68.4	35.6
12.12.2020	7.5	18.5	12.4	24.7	13.9	21.5	65.7	29.4
18. 12.2020	6.8	16.9	13.5	24.5	12.4	21.1	64.8	35.2
19. 12.2020	7.5	18.2	13.2	23.5	10.3	23.1	69.1	27.9
25. 12.2020	8.3	15.9	12.4	24.6	11.8	24.2	59.8	28.9
26. 12.2020	6.5	16.4	13.8	24.9	10.5	23.5	64.2	33.5

	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Max.	14.0	25.6	78.3	38.6
Min.	6.3	15.7	58.2	27.6
98%tile	13.90	25.44	78.30	38.37
95%tile	13.90	25.13	77.9	38.03



## Ambient Air Quality

Location –Putholi

DATE	CLOCK HOURS							
	00 – 08		08 – 16		16 – 24		24 HOURS	24 HOURS
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
03.10.2020	9.3	19.9	14.8	29.8	12.5	24.8	73.5	35.8
04.10.2020	9.8	20.6	13.8	30.4	13.5	25.6	75.9	37.6
11.10.2020	10.5	21.3	14.6	29.6	13.8	27.8	77.2	42.1
12.10.2020	11.2	22.5	15.8	28.7	13.5	23.6	73.9	36.8
19.10.2020	12.4	23.4	14.2	30.4	12.8	23.4	78.2	39.9
20.10.2020	11.6	20.3	16.7	31.1	13.9	27.5	76.8	36.5
27.10.2020	12.4	20.4	14.9	28.6	14	26.8	78.3	38.6
28.10.2020	11.3	21.5	15.7	29.7	12.8	22.8	83.5	45.2
04.11.2020	10.9	20.6	16.7	30.1	12.3	23.7	75.9	43.5
05. 11.2020	11.5	21.4	16.4	28.6	13.8	27.2	86.5	41.6
12. 11.2020	9.2	19.6	15.1	29.1	12.7	23.9	89.2	40.6
13. 11.2020	12.3	21.5	14.6	28.6	13.2	22.4	76.36	44.3
20. 11.2020	10.4	22.6	16.1	31.5	13.8	25.8	72.4	41.6
21. 11.2020	11.2	21.4	14.6	27.4	12.8	26.9	83.5	38.1
27. 11.2020	11.5	23.5	15.7	30.5	13.9	25.4	76.8	47.2
28. 11.2020	11.9	20.6	15.8	28.9	13.2	27.6	75.2	35
04.12.2020	12.4	21.4	14.2	28.9	13.9	24.8	74.6	46.8
05. 12.2020	12	23.5	13.8	29.7	12.4	26.9	73.6	35.7
11. 12.2020	12.3	21.7	15.7	30.4	13.1	23.8	78.2	47.2
12.12.2020	11.6	21.5	15.2	28.3	12.4	24.1	78.9	37.9
18. 12.2020	11.9	21.1	16.4	29.7	13.5	25.8	84.6	35.2
19. 12.2020	10.5	23.1	13.8	31.2	13.2	24.6	76.4	45.4
25. 12.2020	11.6	24.2	15.6	28.4	12.4	26.1	79.2	45.1
26. 12.2020	11.4	23.5	16.3	29.5	13.8	28.9	83.5	39.7

	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Max.	16.7	31.5	89.2	47.2
Min.	9.2	19.6	72.4	35.0
98%tile	16.54	31.15	87.96	47.20
95%tile	16.32	30.42	86.2	47.14

## Ambient Air Quality

Location –Chanderiya

DATE	CLOCK HOURS							
	00 – 08		08 – 16		16 – 24		24 HOURS	24 HOURS
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
03.10.2020	11.5	22.4	14.8	29.8	12.5	24.8	73.5	42.5
04.10.2020	12.7	20.6	13.8	30.4	13.5	25.6	75.9	37.6
11.10.2020	11.9	21.3	14.6	29.6	13.8	27.8	77.2	42.1
12.10.2020	11.2	22.5	15.8	28.7	13.5	23.6	73.9	36.8
19.10.2020	12.4	23.4	14.2	30.4	12.8	23.4	78.2	39.9
20.10.2020	11.6	20.3	16.7	31.1	13.9	27.5	76.8	37.6
27.10.2020	12.4	20.4	14.9	28.6	14	26.8	78.3	38.6
28.10.2020	11.3	21.5	15.7	29.7	12.8	22.8	83.5	45.2
04.11.2020	10.9	20.6	16.7	30.1	12.3	23.7	71.8	43.5
05. 11.2020	11.5	21.4	16.4	32	13.8	27.2	86.5	48.2
12. 11.2020	11.7	23.5	15.1	29.1	12.7	23.9	86.7	36.8
13. 11.2020	12.3	21.5	14.6	28.6	13.2	22.4	76.36	44.3
20. 11.2020	10.4	22.6	16.1	31.5	13.8	25.8	72.4	41.6
21. 11.2020	11.2	21.4	14.6	27.4	12.8	26.9	83.5	38.1
27. 11.2020	11.5	23.5	15.7	30.5	13.9	25.4	76.8	47.2
28. 11.2020	10.4	20.6	15.8	28.9	13.2	27.6	75.2	38.4
04.12.2020	12.4	21.4	14.2	28.9	13.9	24.8	87.3	46.8
05. 12.2020	9.9	23.5	17.6	29.7	12.4	26.9	73.6	38.5
11. 12.2020	12.3	21.7	15.7	30.4	13.1	23.8	78.2	47.2
12.12.2020	11.6	21.5	15.2	28.3	12.4	24.1	78.9	37.9
18. 12.2020	11.9	21.1	16.4	29.7	13.5	25.8	84.6	45.9
19. 12.2020	10.5	23.1	13.8	31.2	13.2	24.6	76.4	45.4
25. 12.2020	11.6	24.2	15.6	28.4	12.4	26.1	79.2	45.1
26. 12.2020	11.4	23.5	16.3	29.5	13.8	28.9	83.5	39.7

	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Max.	17.6	32.0	87.3	48.2
Min.	9.9	20.3	71.8	36.8
98%tile	16.70	31.34	87.02	47.74
95%tile	16.40	30.59	86.7	47.20

## Ambient Air Quality

Location –Ajoliyan ka khera

DATE	CLOCK HOURS							
	00 – 08		08 – 16		16 – 24		24 HOURS	24 HOURS
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
05.10.2020	8.6	15.4	11.4	24.8	12.5	24.8	73.5	33.8
06.10.2020	6.8	20.6	13.8	25.6	13.5	25.6	75.9	37.6
13.10.2020	8.2	21.3	14.2	27.8	13.8	27.8	77.2	40.7
14.10.2020	6.9	22.5	12.6	23.6	13.5	23.6	73.9	36.8
21.10.2020	7	23.4	14.2	23.4	12.8	23.4	78.2	39.9
22.10.2020	6.9	20.3	12.8	24.1	13.9	24.1	76.8	37.6
29.10.2020	6.9	20.4	11.7	26.8	14	26.8	78.3	38.6
30.10.2020	7.9	21.5	13.5	22.8	12.8	22.8	82.5	37.5
06.11.2020	6.9	20.6	12.6	23.7	12.3	23.7	71.8	32.8
07.11.2020	8.2	21.4	13.5	27.2	13.8	27.2	80.8	31.6
15.11.2020	6.8	14.3	14.1	23.9	12.7	23.9	82.4	36.8
16.11.2020	8.5	21.5	11.8	27.8	13.2	22.4	76.36	33.5
23.11.2020	6.8	22.6	12.6	25.8	13.8	25.8	72.4	41.2
24.11.2020	7.1	21.4	13.5	26.9	12.8	26.9	73.9	31.2
30.11.2020	6.8	23.5	11.8	25.4	13.9	25.4	76.8	35.4
01.12.2020	7.3	20.6	12.7	25.8	13.2	25.8	75.2	38.9
06.12.2020	7.2	21.4	13.4	24.8	13.9	24.8	77.5	41.3
07.12.2020	8.3	23.5	10.9	26.9	12.4	26.9	63.9	38.5
13.12.2020	7	21.7	10.3	23.8	13.1	23.8	78.2	36.2
14.12.2020	6.9	21.5	11.4	24.1	12.4	24.1	78.9	37.9
20.12.2020	6.8	21.1	12.2	25.8	13.5	25.8	65.4	40.1
21.12.2020	9.4	23.1	13.9	24.6	13.2	24.6	76.4	38.4
27.12.2020	7	24.2	12.8	26.1	12.4	26.1	79.2	41.1
28.12.2020	6.8	23.5	11.5	21.6	13.8	21.6	68.3	39.7

	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Max.	14.2	27.8	82.5	41.3
Min.	6.8	14.3	63.9	31.2
98%tile	14.15	27.80	82.45	41.25
95%tile	13.92	27.20	82.2	41.19

# Ambient Air Quality

Location –Biliya

DATE	CLOCK HOURS							
	00 – 08		08 – 16		16 – 24		24 HOURS	24 HOURS
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
05.10.2020	8.5	22.5	11.4	24.8	12.5	24.8	73.5	36.8
06.10.2020	9.1	20.6	13.8	25.6	10.2	25.6	75.9	37.6
13.10.2020	7.8	21.3	14.2	27.8	11.8	27.8	77.2	40.7
14.10.2020	8.3	22.5	12.6	23.6	10.6	23.6	73.9	36.8
21.10.2020	8.5	23.4	14.2	23.4	9.8	23.4	78.2	39.9
22.10.2020	8.1	20.3	12.8	24.1	10.7	24.1	76.8	37.6
29.10.2020	8.6	20.4	11.7	26.8	11.2	26.8	78.3	38.6
30.10.2020	7.7	21.5	13.5	22.8	12.8	22.8	82.5	37.5
06.11.2020	8	20.6	12.6	23.7	11.5	23.7	71.8	35.1
07.11.2020	7.9	21.4	13.5	27.2	10.7	27.2	80.8	38.7
15.11.2020	8.4	21.5	14.1	23.9	11.3	23.9	82.4	45.1
16.11.2020	7.8	22.7	14.8	28.9	12.6	22.4	76.36	34.1
23.11.2020	8.5	23.6	12.6	25.8	11.8	25.8	72.4	41.2
24.11.2020	8.9	21.4	14.1	26.9	10.5	26.9	73.9	38.9
30.11.2020	7.7	18.2	13.6	25.4	12.6	25.4	66.5	35.4
01.12.2020	7.9	20.6	14.2	25.8	11.2	25.8	75.2	38.9
06.12.2020	8.4	21.4	13.4	24.8	11.8	24.8	77.5	41.3
07.12.2020	7.7	23.5	13.1	26.9	12.4	26.9	83.7	38.5
13.12.2020	7.9	21.7	10.3	23.8	9.8	23.8	78.2	36.2
14.12.2020	8.6	21.5	11.4	24.1	10.7	24.1	78.9	37.9
20.12.2020	8.7	21.1	12.2	25.8	11.5	25.8	70.8	40.1
21.12.2020	8.9	23.1	13.9	24.6	10.9	24.6	76.4	38.4
27.12.2020	7.9	24.2	12.8	26.1	12.4	26.1	79.2	41.1
28.12.2020	7.8	23.5	11.5	21.6	10.8	21.6	68.3	39.7

	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Max.	14.8	28.9	83.7	45.1
Min.	7.7	18.2	66.5	34.1
98%tile	14.20	27.80	83.15	43.35
95%tile	14.12	27.20	82.5	41.29



## Ambient Air Quality

Location –Mungava Ka Khera

DATE	CLOCK HOURS							
	00 – 08		08 – 16		16 – 24		24 HOURS	24 HOURS
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
05.10.2020	8.5	14.8	11.4	22.3	12.5	19.6	73.5	36.8
06.10.2020	9.1	16.1	13.8	23.1	10.2	20.6	75.9	37.6
13.10.2020	7.8	14.6	12.3	22.6	11.8	21.6	63.7	28.1
14.10.2020	8.3	15.8	12.6	21.8	10.6	18.1	73.9	36.8
21.10.2020	8.5	17.2	14.1	23.6	9.8	20.4	65.8	28.4
22.10.2020	8.1	16.7	12.8	21.2	10.7	19.8	69.4	30.1
29.10.2020	8.6	14.9	11.7	23.5	11.2	21.6	70.5	32.9
30.10.2020	7.7	15.7	13.5	23.7	12.8	19.5	63.1	37.5
06.11.2020	8	16.7	12.6	23.7	11.5	20.7	71.8	35.1
07.11.2020	7.9	16.4	13.5	22.8	10.7	21.7	69.5	27.6
15.11.2020	8.4	15.1	14.1	23.9	11.3	18.9	76.9	31.2
16.11.2020	7.8	14.6	12.9	22.4	12.6	20.2	73.2	34.3
23.11.2020	8.5	16.1	12.6	21.8	11.8	21.6	72.4	35.1
24.11.2020	8.9	14.6	14.1	20.6	10.5	19.8	73.9	27.8
30.11.2020	7.7	15.7	13.6	23.4	11.1	18.5	61.2	28.9
01.12.2020	7.9	15.8	12.6	24.1	12.9	20.5	75.2	27.7
06.12.2020	7.1	14.5	13.4	23.8	11.8	21.3	67.4	35.4
07.12.2020	7.7	17.6	13.1	23.7	12.4	20.4	72.8	34.5
13.12.2020	7.9	15.7	10.3	21.4	9.8	21.8	65.7	36.2
14.12.2020	8.6	15.2	11.4	24.1	10.7	19.5	68.4	37.9
20.12.2020	8.7	16.4	12.2	22.5	11.5	21.7	70.8	32.5
21.12.2020	8.9	16.4	13.9	21.6	10.9	22.5	71.3	36.1
27.12.2020	7.9	15.6	12.8	23.9	12.4	20.8	65.8	34.8
28.12.2020	7.8	16.3	11.5	21.6	10.8	21.6	68.3	32.4

	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Max.	14.1	24.1	76.9	37.9
Min.	7.1	14.5	61.2	27.6
98%tile	14.10	24.00	76.44	37.76
95%tile	13.82	23.82	75.8	37.59

## Ambient Air Quality

Location- Chogawadi

DATE	CLOCK HOURS							
	00 – 08		08 – 16		16 – 24		24 HOURS	24 HOURS
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
05.10.2020	5.9	14.8	11.4	19.9	8.5	19.6	73.5	36.8
06.10.2020	6.5	16.1	10.5	20.6	10.2	20.6	63.5	32.7
13.10.2020	6.8	14.6	11.7	21.4	8.9	19.2	61.6	28.1
14.10.2020	7.4	15.8	10.5	21.8	9.4	18.1	70.5	36.8
21.10.2020	6.8	17.2	11.8	22.1	9.8	20.4	65.8	28.4
22.10.2020	6.2	16.7	12.2	21.2	10.7	19.8	69.4	30.1
29.10.2020	6.1	14.9	11.7	19.8	8.1	18.4	70.5	32.9
30.10.2020	5.9	15.7	10.8	20.6	8.9	19.5	63.1	28.7
06.11.2020	6.3	16.7	11.2	21.7	9.5	20.7	71.8	35.1
07.11.2020	6.8	13.8	11.8	20.1	10.4	19.4	60.8	27.6
15.11.2020	7.8	15.1	11.3	19.8	9.7	18.9	70.2	31.2
16.11.2020	6.7	14.6	10.8	20.6	9.4	20.2	68.5	36.9
23.11.2020	7.6	16.1	12.3	21.8	8.9	19.6	72.4	26.1
24.11.2020	6.4	14.6	11.8	20.6	9.4	19.8	72.4	27.8
30.11.2020	6.3	15.7	10.9	21.9	10.5	18.5	61.2	28.9
01.12.2020	6.5	15.8	11.3	21.4	10.7	20.5	73.5	27.7
06.12.2020	6.8	14.5	11.5	22.2	9.2	21.3	73.7	35.4
07.12.2020	5.9	17.6	11.8	20.8	9.7	20.4	72.8	34.5
13.12.2020	6.1	15.7	10.3	21.4	8.6	21.8	65.7	36.2
14.12.2020	6.8	15.2	11.4	22.2	10.7	19.5	68.4	31.2
20.12.2020	5.8	16.4	12.2	21.8	9.4	21.7	70.8	32.5
21.12.2020	7.4	16.4	11.6	21.6	10.9	20.4	71.3	36.1
27.12.2020	7.2	15.6	12.1	20.4	9.4	20.8	65.8	34.8
28.12.2020	5.8	16.3	11.5	21.6	10.8	21.6	68.3	32.4

	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Max.	12.3	22.2	73.7	36.9
Min.	5.8	13.8	60.8	26.1
98%tile	12.20	22.15	73.61	36.85
95%tile	11.85	21.82	73.5	36.80

## Ambient Air Quality

Location- Chittorgarh (Zinc Nagar)

DATE	CLOCK HOURS							
	00 – 08		08 – 16		16 – 24		24 HOURS	24 HOURS
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
05.10.2020	5.9	17.5	11.4	19.9	8.5	19.6	65.9	36.8
06.10.2020	6.5	18.6	10.5	20.6	10.2	20.6	63.5	32.7
13.10.2020	6.8	18.1	11.7	21.4	8.9	19.2	61.6	28.1
14.10.2020	7.4	17.2	10.5	21.8	9.4	18.1	70.5	36.8
21.10.2020	6.8	18.2	11.8	22.1	9.8	20.4	65.8	28.4
22.10.2020	6.2	17.2	12.2	21.2	10.7	19.8	69.4	30.1
29.10.2020	6.1	16.5	13.6	19.8	8.1	18.4	70.5	32.9
30.10.2020	5.9	16.7	12.6	20.6	8.9	19.5	63.1	28.7
06.11.2020	6.3	16.3	11.2	21.7	9.5	20.7	59.8	35.1
07.11.2020	6.8	17.2	11.4	20.1	10.4	19.4	60.8	27.6
15.11.2020	7.8	17.8	12.6	22.4	9.7	18.9	70.2	31.2
16.11.2020	6.7	18.4	10.8	20.6	9.4	20.2	71.2	37.2
23.11.2020	7.6	16.3	12.3	24.4	8.9	19.6	60.8	34.1
24.11.2020	6.4	17.8	13.6	22.6	9.4	19.8	59.6	27.8
30.11.2020	6.3	16.9	10.9	21.9	10.5	18.5	61.2	28.9
01.12.2020	6.5	17.2	11.3	21.4	10.7	20.5	70.6	27.7
06.12.2020	6.8	17.8	11.5	22.2	9.2	21.3	59.9	35.4
07.12.2020	5.9	17.2	11.8	20.8	9.7	20.4	62.8	34.5
13.12.2020	6.1	18.5	10.3	21.4	8.6	19.8	65.7	36.2
14.12.2020	6.8	18.9	11.4	22.2	10.7	19.5	68.4	26.8
20.12.2020	6.4	17.5	12.2	21.8	9.4	21.7	70.8	32.5
21.12.2020	7.4	18.4	11.6	21.6	10.9	20.4	70.5	36.1
27.12.2020	7.2	16.8	12.1	22.7	9.4	21.3	65.8	34.8
28.12.2020	7.4	17.1	11.5	21.6	10.8	19.8	68.3	32.4

	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
<b>Max.</b>	13.6	24.4	71.2	37.2
<b>Min.</b>	5.9	16.3	59.6	26.8
<b>98%tile</b>	<b>13.06</b>	<b>22.65</b>	<b>71.02</b>	<b>37.02</b>
<b>95%tile</b>	<b>12.35</b>	<b>22.24</b>	<b>70.8</b>	<b>36.80</b>

## DETAILED AMBIENT AIR QUALITY TABLES

Site 1: Plant Site

(Unit: Microgram/m<sup>3</sup>)

Date	CLOCK HOURS							
	00-08		08-16		16-24		24 HOURS PM <sub>10</sub>	24 HOURS PM <sub>2.5</sub>
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>		
01.10.2021	14.2	23.0	16.5	35.0	16.1	25.0	77.3	41.3
02.10.2021	15.1	24.2	15.0	36.0	14.5	26.8	79.0	42.2
8.10.2021	14.6	25.9	15.8	36.9	15.3	28.0	81.2	43.5
9.10.2021	13.5	26.7	16.6	35.5	16.1	29.4	83.4	44.9
15.10.2021	12.2	27.5	17.5	34.8	17.2	30.6	85.1	46.5
16.10.2021	11.6	28.2	18.4	33.9	18.0	31.3	87.0	48.2
22.10.2021	10.9	27.6	19.5	32.8	19.1	30.9	88.7	50.9
23.10.2021	11.8	27.0	20.1	31.0	19.9	28.4	90.9	53.2

	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Max.	20.10	36.90	90.90	53.20
Min.	10.90	23.00	77.30	41.30
95%tile	18.51	34.83	90.13	52.40
98%tile	19.68	35.73	90.59	52.88

Site 2: Village- Chanderiya

(Unit: Microgram/m<sup>3</sup>)

Date	CLOCK HOURS							
	00-08		08-16		16-24		24 HOURS PM <sub>10</sub>	24 HOURS PM <sub>2.5</sub>
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>		
01.10.2021	9.2	20.7	14.0	26.0	13.6	25.7	72.0	36.3
02.10.2021	10.0	19.8	13.2	25.1	12.9	24.8	73.5	35.6
8.10.2021	10.8	20.5	14.4	25.6	14.0	25.2	75.2	36.9
9.10.2021	11.6	21.2	15.5	26.5	15.1	26.1	77.0	38.8
15.10.2021	12.5	22.0	16.3	27.4	16.0	27.0	79.4	41.2
16.10.2021	13.1	23.1	18.0	28.5	17.7	28.0	82.3	44.0
22.10.2021	12.4	24.0	16.8	30.2	16.5	29.9	84.5	46.0
23.10.2021	11.5	24.9	15.5	28.8	15.0	28.4	86.8	47.9

	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Max.	18.00	30.20	86.80	47.90
Min.	9.20	19.80	72.00	35.60
95%tile	16.33	28.42	86.00	47.24
98%tile	17.21	29.31	86.48	47.63

Site 3: Ajaliyan ka Khera

(Unit: Microgram/m<sup>3</sup>)

Date	CLOCK HOURS							
	00-08		08-16		16-24		24 HOURS PM <sub>10</sub>	24 HOURS PM <sub>2.5</sub>
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>		
01.10.2021	7.2	15.0	9.4	19.8	9.0	19.4	60.8	32.2
02.10.2021	6.6	16.1	10.6	21.0	10.2	20.7	62.4	33.5
8.10.2021	7.4	17.0	11.5	22.5	11.0	22.0	64.6	34.6
9.10.2021	8.1	18.2	13.0	24.3	12.8	23.9	67.0	36.0
15.10.2021	9.0	18.9	12.5	25.0	12.0	24.8	70.4	37.9
16.10.2021	10.3	19.6	13.7	26.1	13.3	25.9	74.0	39.0
22.10.2021	9.8	20.3	15.0	28.0	14.7	27.7	79.2	40.4
23.10.2021	8.9	19.7	12.8	26.4	12.4	26.0	83.6	42.3



# DETAILED AMBIENT AIR QUALITY TABLES

	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
<b>Max.</b>	15.00	28.00	83.60	42.30
<b>Min.</b>	6.60	15.00	60.80	32.20
<b>95%tile</b>	13.05	26.02	82.06	41.64
<b>98%tile</b>	14.16	27.00	82.98	42.03

Site 4: Village- Biliya

(Unit: Microgram/m<sup>3</sup>)

Date	CLOCK HOURS							
	00-08		08-16		16-24		24 HOURS PM <sub>10</sub>	24 HOURS PM <sub>2.5</sub>
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>		
<b>01.10.2021</b>	8.0	19.2	9.4	21.5	9.0	21.1	64.7	35.9
<b>02.10.2021</b>	7.5	18.0	10.0	22.5	9.7	22.2	65.8	35.0
<b>8.10.2021</b>	8.6	19.1	10.6	23.8	10.2	23.5	67.4	36.7
<b>9.10.2021</b>	9.1	20.3	10.9	24.7	10.6	24.4	70.0	38.0
<b>15.10.2021</b>	9.5	21.7	11.5	24.3	11.2	24.0	74.0	40.5
<b>16.10.2021</b>	8.9	20.9	12.5	25.5	12.0	25.0	78.1	42.8
<b>22.10.2021</b>	8.2	19.8	13.9	27.0	13.5	26.8	80.9	44.0
<b>23.10.2021</b>	7.9	18.9	14.6	27.8	14.3	27.5	84.1	43.0

	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
<b>Max.</b>	14.60	27.80	84.10	44.00
<b>Min.</b>	7.50	18.00	64.70	35.00
<b>95%tile</b>	12.65	25.70	82.98	43.65
<b>98%tile</b>	14.08	27.23	83.65	43.86

Site 5: Mungava ka khara

(Unit: Microgram/m<sup>3</sup>)

Date	CLOCK HOURS							
	00-08		08-16		16-24		24 HOURS PM <sub>10</sub>	24 HOURS PM <sub>2.5</sub>
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>		
<b>04.10.2021</b>	7.7	19.1	9.4	19.4	9.0	19.0	60.6	29.9
<b>05.10.2021</b>	6.8	18.5	10.2	20.2	9.9	19.9	61.9	28.9
<b>11.10.2021</b>	7.5	17.9	11.0	20.9	10.7	20.5	64.0	30.0
<b>12.10.2021</b>	8.3	16.8	11.4	22.3	11.2	21.9	66.1	32.1
<b>18.10.2021</b>	8.9	16.0	11.9	22.8	11.6	22.6	69.0	34.0
<b>19.10.2021</b>	9.4	14.9	12.8	22.3	12.4	22.0	72.3	36.2
<b>25.10.2021</b>	9.9	14.0	13.5	24.0	13.2	23.7	75.9	38.6
<b>26.10.2021</b>	8.9	15.2	14.8	25.3	14.5	25.0	78.0	37.0

	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
<b>Max.</b>	14.80	25.30	78.00	38.60
<b>Min.</b>	6.80	14.00	60.60	28.90
<b>95%tile</b>	12.86	22.94	77.27	38.04
<b>98%tile</b>	13.96	24.46	77.71	38.38

Site 6: Putholi

(Unit: Microgram/m<sup>3</sup>)

Date	CLOCK HOURS							
	00-08		08-16		16-24		24 HOURS PM <sub>10</sub>	24 HOURS PM <sub>2.5</sub>
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>		
<b>04.10.2021</b>	9.4	22.0	12.3	23.3	12.0	23.0	70.5	34.4
<b>05.10.2021</b>	10.2	22.9	13.0	24.5	12.6	24.1	72.0	35.2

### DETAILED AMBIENT AIR QUALITY TABLES

11.10.2021	11.0	23.7	13.8	26.0	13.4	25.5	73.6	36.9
12.10.2021	11.9	23.0	14.4	27.5	14.0	27.2	75.5	38.4
18.10.2021	12.7	22.4	13.7	29.4	13.5	29.0	77.9	41.0
19.10.2021	12.0	21.5	14.6	29.9	14.3	29.6	83.0	43.2
25.10.2021	11.2	20.1	16.2	32.0	15.9	31.7	86.1	46.6
26.10.2021	10.5	19.0	17.1	29.5	16.8	29.0	88.7	48.7

	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Max.	17.10	32.00	88.70	48.70
Min.	9.40	19.00	70.50	34.40
95%tile	14.80	29.52	87.79	47.97
98%tile	16.48	30.73	88.34	48.41

Site 7: Village- Chogawadi

(Unit: Microgram/m<sup>3</sup>)

Date	CLOCK HOURS							
	00-08		08-16		16-24		24 HOURS PM <sub>10</sub>	24 HOURS PM <sub>2.5</sub>
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>		
04.10.2021	7.6	16.8	8.5	17.4	8.0	17.0	61.3	28.7
05.10.2021	8.1	16.0	9.0	18.2	8.5	17.9	62.4	29.9
11.10.2021	7.8	15.1	9.5	18.9	9.1	18.6	63.7	31.0
12.10.2021	7.2	14.2	10.2	19.7	9.8	19.4	65.0	32.8
18.10.2021	6.7	15.0	10.5	20.5	10.2	20.2	66.9	34.0
19.10.2021	6.0	15.9	10.9	21.4	10.6	21.0	69.0	35.6
25.10.2021	6.6	16.6	11.9	23.1	11.6	22.8	73.0	36.6
26.10.2021	7.1	17.1	12.3	24.3	12.0	24.0	75.2	37.6

	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Max.	12.30	24.30	75.20	37.60
Min.	6.00	14.20	61.30	28.70
95%tile	11.01	21.61	74.43	37.25
98%tile	11.95	23.51	74.89	37.46

Site 8: Village- Ghosundi

(Unit: Microgram/m<sup>3</sup>)

Date	CLOCK HOURS							
	00-08		08-16		16-24		24 HOURS PM <sub>10</sub>	24 HOURS PM <sub>2.5</sub>
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>		
04.10.2021	7.2	18.5	10.3	18.2	9.8	17.9	60.2	31.5
05.10.2021	6.6	19.0	10.5	18.9	10.2	18.4	61.5	30.2
11.10.2021	7.0	18.6	11.2	19.2	10.9	18.8	63.6	32.1
12.10.2021	7.4	18.2	12.0	19.5	11.6	19.2	66.0	34.3
18.10.2021	8.0	17.7	14.2	20.5	12.1	20.1	68.4	36.0
19.10.2021	8.6	17.1	12.0	22.4	11.5	22.0	71.5	38.1
25.10.2021	9.2	16.1	12.9	23.0	10.9	22.5	75.9	40.0
26.10.2021	9.9	16.8	13.5	23.6	10.0	23.1	80.3	39.1

	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Max.	14.20	23.60	80.30	40.00
Min.	6.60	16.10	60.20	30.20
95%tile	12.02	22.42	78.76	39.69
98%tile	13.18	23.05	79.68	39.87

# DETAILED AMBIENT AIR QUALITY TABLES

Site 9: Chittorgarh (Zinc Nagar)

(Unit: Microgram/m<sup>3</sup>)

Date	CLOCK HOURS							
	00-08		08-16		16-24		24 HOURS PM <sub>10</sub>	24 HOURS PM <sub>2.5</sub>
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>		
06.10.2021	6.2	16.4	9.2	18.5	9.0	18.0	57.1	26.3
07.10.2021	5.6	15.8	8.5	19.0	8.2	18.7	58.5	27.2
13.10.2021	6.1	16.5	9.1	19.8	8.9	19.5	60.0	28.5
14.10.2021	6.9	17.7	10.1	20.8	9.5	20.4	61.2	30.0
21.10.2021	7.2	18.2	10.9	21.3	10.6	20.9	63.4	31.1
22.10.2021	7.7	17.8	11.8	21.9	11.4	21.6	65.0	32.9
28.10.2021	8.1	17.0	12.8	23.1	12.5	22.8	67.5	34.7
29.10.2021	8.5	16.6	13.6	23.9	13.3	23.5	70.8	36.8

	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Max.	13.60	23.90	70.80	36.80
Min.	5.60	15.80	57.10	26.30
95%tile	11.91	22.04	69.65	36.07
98%tile	13.03	23.28	70.34	36.51

Site 10: Vill. Hokampur

(Unit: Microgram/m<sup>3</sup>)

Date	CLOCK HOURS							
	00-08		08-16		16-24		24 HOURS PM <sub>10</sub>	24 HOURS PM <sub>2.5</sub>
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>		
06.10.2021	8.5	15.3	15.4	18.7	10.1	18.3	64.5	32.4
07.10.2021	8.0	14.0	16.0	19.9	10.7	19.5	65.5	31.2
13.10.2021	8.8	15.1	15.0	20.7	11.5	20.4	66.9	32.9
14.10.2021	9.4	16.0	14.2	21.4	12.1	21.0	69.0	34.0
21.10.2021	10.0	17.2	13.1	22.1	12.9	21.8	71.2	35.9
22.10.2021	10.4	18.0	13.9	22.8	13.6	22.4	74.0	37.9
28.10.2021	11.0	18.7	14.8	23.4	14.5	23.0	77.4	38.8
29.10.2021	11.3	17.9	16.8	26.7	16.5	26.5	82.1	40.0

	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Max.	16.80	26.70	82.10	40.00
Min.	8.00	14.00	64.50	31.20
95%tile	15.06	22.83	80.46	39.58
98%tile	16.23	24.83	81.44	39.83

Site 11: Village- Manpura

(Unit: Microgram/m<sup>3</sup>)

Date	CLOCK HOURS							
	00-08		08-16		16-24		24 HOURS PM <sub>10</sub>	24 HOURS PM <sub>2.5</sub>
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>		
06.10.2021	5.8	12.7	8.7	15.7	8.2	15.2	65.5	34.7
07.10.2021	6.1	12.5	8.9	16.9	8.4	16.3	62.8	32.7
13.10.2021	5.7	13.6	10.7	17.1	8.7	16.6	63	33
14.10.2021	6.3	14.9	9.4	17.4	9.1	15.6	61.7	31.2
21.10.2021	6.7	14.7	11.2	19.8	9.4	16.2	68.9	35.6
22.10.2021	6.6	15.1	10.2	18.2	9.7	15.9	66.7	30
28.10.2021	5.5	12.3	10.8	17.7	8.8	14.9	55.4	25.4
29.10.2021	5.9	12.7	11	18.6	10	15.5	58.2	28.2

# DETAILED AMBIENT AIR QUALITY TABLES

	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
<b>Max.</b>	11.2	19.8	68.9	35.6
<b>Min.</b>	5.5	12.3	55.4	25.4
<b>95%tile</b>	10.28	17.45	68.13	35.29
<b>98%tile</b>	10.89	18.38	68.59	35.47

Site 12: Village- Gusai Khera

(Unit: Microgram/m<sup>3</sup>)

Date	CLOCK HOURS							
	00-08		08-16		16-24		24 HOURS PM <sub>10</sub>	24 HOURS PM <sub>2.5</sub>
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>		
<b>06.10.2021</b>	7.8	16.7	15.7	25.7	10.7	21.8	81.8	40
<b>07.10.2021</b>	8.2	17	15.9	26.9	11	20.2	84	41.2
<b>13.10.2021</b>	8.5	17.8	14.8	26	10.7	22.7	72.1	37.8
<b>14.10.2021</b>	7.9	18.2	14.2	24.4	12.3	20	75.8	39.1
<b>21.10.2021</b>	7.4	16	13.6	22.7	13.1	23.7	63.1	33.8
<b>22.10.2021</b>	9.1	18.8	12.7	23.8	12.8	22.1	66.9	35.7
<b>28.10.2021</b>	8	19	14.3	24	10.1	21.5	74.6	36
<b>29.10.2021</b>	8.4	17.6	15	25.1	12	23	77	38.2

	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
<b>Max.</b>	15.9	26.9	84	41.2
<b>Min.</b>	7.4	16.0	63.1	33.8
<b>95%tile</b>	14.38	24.51	83.23	40.78
<b>98%tile</b>	15.32	25.84	83.69	41.03

Site 13: Chittorgarh

(Unit: Microgram/m<sup>3</sup>)

Date	CLOCK HOURS							
	00-08		08-16		16-24		24 HOURS PM <sub>10</sub>	24 HOURS PM <sub>2.5</sub>
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>		
<b>06.10.2021</b>	9.8	24.0	12.6	30.7	12.4	28.0	79.2	38.7
<b>07.10.2021</b>	8.9	23.4	13.7	31.4	13.6	28.7	81.0	39.9
<b>13.10.2021</b>	10.1	25.0	15.5	32.0	15.0	29.4	83.2	41.4
<b>14.10.2021</b>	11.5	26.1	16.6	32.9	16.2	30.0	85.0	43.0
<b>21.10.2021</b>	13.0	27.0	18.0	33.7	17.7	30.5	87.4	45.1
<b>22.10.2021</b>	12.1	27.5	18.8	34.5	18.4	31.0	88.2	47.0
<b>28.10.2021</b>	11.6	28.0	19.9	35.2	19.3	31.6	90.6	50.0
<b>29.10.2021</b>	10.9	27.1	22.1	36.0	21.8	32.0	91.5	53.9

	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
<b>Max.</b>	22.10	36.00	91.50	53.90
<b>Min.</b>	8.90	23.40	79.20	38.70
<b>95%tile</b>	18.88	33.02	91.19	52.54
<b>98%tile</b>	20.77	34.82	91.37	53.35



राजस्थान सरकार

**कार्यालय उप वन संरक्षक, चित्तौड़गढ़ (राज0)**

(वन विभाग परिसर, प्रताप सर्किल, चित्तौड़गढ़-312001; Ph&amp;Fax : 01472-241049 ;email : dcf.chitor.forest@rajasthan.gov.in)

क्रमांक : एफ ( ) सर्वे/उवसं/2022-23/ 7233

दिनांक : 19/10/2022

निमित्त,

Chief Operating Officer Smelters &amp; Location Head

Chanderiya Lead Zinc Smelter,

P.O. Putholi, Chittorgarh -312001

**Sub :-** Regarding Authenticated list of Flora & Fauna of 10 km. radius of the Chanderiya Lend Zinc Smelter Complex at villages Putholi, Ajoliya Ka Khera & Biliya, Tehsil Gangrar & Chittorgarh, District Chittorgarh (Raj)

**प्रसंग :-** आपका पत्र क्रमांक 20.12.2021 एवं संशोधित आवेदन 29.3.2022 एवं इस कार्यालय का पत्र क्रमांक 5600 दिनांक 18.8.2022 के क्रम में।

**संदर्भ :-** आपका आवेदन दिनांक 22.9.2022 के क्रम में।

महोदय,

उपरोक्त विषयान्तर्गत लेख कि आपके संदर्भित आवेदन के क्रम में कार्यालय के पूर्व पत्र क्रमांक 5600 दिनांक 18.8.2022 से वन क्षेत्र में पाये जाने वाले वन्यजीववार की सूची प्रेषित की गई थी। पुनः आप द्वारा आवेदन प्रस्तुत कर उक्त सूची को क्षेत्र विशेष हेतु पुनरावलोकन हेतु निवेदन किया गया। इस क्रम में इस कार्यालय द्वारा प्रत्येक वर्ष करवाई जाने वाली वन्यजीव गणना को आधार मानते हुए विगत तीन वर्षों की वन्यजीव गणना का तुलनात्मक अध्ययन किया गया तथा तुलनात्मक अध्ययन के आधार पर क्षेत्र में पाए जाने वाले वन्यजीवों की सूची तैयार की जाकर संलग्न प्रेषित है।

संलग्न : उक्तानुसार

  
उप वन संरक्षक,  
चित्तौड़गढ़

परिणाम प्रपत्र

विगत तीन वन्यजीव गणना वर्षों के आधार पर Chief Operating Officer Smelters & Location Head,  
Chanderiya Lead Zinc Smelter, P.O. Putholi, Chittorgarh -312001 के आवेदित क्षेत्र Chanderiya Lead  
Zinc Smelter, P.O. Putholi, Tehsil: Gangrar, District: Chittorgarh के 10 कि.मी. की परिधि में पाये जाने  
वाले वन्यजीवों का विवरण

कोड संख्या	वन्यजीव का नाम
	<b>1. मांसाहारी वन्यजीव :-</b>
02	बघेरा
03	सियार/गीदड़ (जेकाल)
04	जरख (हाईना)
05	जंगली बिल्ली(जंगल कैट)
08	जंगली बिल्ली(रस्ती स्पॉटेड बिल्ली)
09	लोमड़ी
13	बिज्जू छोटा (स्माल इंडियन सिबेट/कबर)
20	रोजड़ा/नीलगाय
23	जंगली सुअर
24	सेही (पोरक्यूपाईन)
	लंगूर (काले मुंह वाला)
	<b>3. बर्ड्स :-</b>
27	सारस
29	गिद्ध
	उल्लू
	शिकारी पक्षी
	मोर
	<b>4. रेप्टाईल्स :-</b>
	मानीटर लिजार्ड (पाटा गोह/गोटी)



राजस्थान सरकार

## कार्यालय उप वन संरक्षक, चित्तौड़गढ़ (राज0)

(वन विभाग परिसर, प्रताप सर्किल, चित्तौड़गढ़-312001; Ph&amp;Fax : 01472-241049 ; email : dcf.chitor.forest@rajasthan.gov.in)

क्रमांक : एफ ( ) सर्वे/उपसं/2022-23/ 5600

दिनांक : 18.8.2022

निमित्त,

Chief Operating Officer Smelters & Location Head  
Chanderiya Lead Zinc Smelter,  
P.O. Putholi, Chittorgarh -312001

**Sub :-** Expansion within the existing Chanderiya Lead Zinc Smelter Complex (Expansion in Hydro Plant by adding 1 Induction Furnance, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG-set) at villages Putholi, Ajoliya Ka Khera & Biliya, Tehsil Gangrar & Chittorgarh, District Chittorgarh (Raj.) Authentication regarding the following:

1. Authentication of Location Map showing features of core zone and buffer zone (10 km from project boundary)
2. No Forest Land is involved in the plant area.
3. Authenticated List of Flora & Fauna of 10 Km radius of the plant site

प्रसंग :- आपका पत्र क्रमांक 20.12.2021 एवं संशोधित आवेदन 29.3.2022 के क्रम में।

महोदय,

उपरोक्त विषयान्तर्गत लेख है कि प्रासंगिक पत्र द्वारा चाही जा रही सूचना निम्नानुसार प्रेषित है :-

1. Authentication of Location Map showing features of core zone and buffer zone (10 km from project boundary) :- उक्त सूचना उप वन संरक्षक, वन्यजीव, चित्तौड़गढ़ से प्राप्त करें।
2. No Forest Land is involved in the plant area. :- के संबंध में उक्त आवेदित क्षेत्र की प्रासंगिक पत्र से अवगत कराये प्रस्तावित प्रकरण के लिये वन भूमि सम्बन्धी तथ्यात्मक रिपोर्ट जो इस कार्यालय के क्षेत्रीय वन अधिकारी, कपासन द्वारा मौका मुआयना कर बनाई गई है, जो इस प्रकार है :- आवेदित क्षेत्र वनखण्ड शिकारगाह सालेरा की सीमा से 1331 मीटर की निकटतम दूरी (संलग्न सैटेलाइट इमेज में प्रदर्शित) पर अवस्थित है। अतः आवेदित क्षेत्र हेतु अनापत्ती इस कार्यालय द्वारा इस शर्त पर प्रदान की जाती है कि कालान्तर में भी संबंधित वन सीमा एवं प्रस्तावित क्षेत्र के मध्य निकटतम दूरी 1331 मीटर में किसी प्रकार का ह्रास न हो।
3. Authenticated List of Flora & Fauna of 10 Km radius of the plant site. :- सूचना संलग्न है।

संलग्न : उक्तानुसार

उप वन संरक्षक,  
चित्तौड़गढ़

कार्य आयोजना क्षेत्र में सामान्यतः पाई जाने वाली वनस्पतियों की सूची

क-वृक्ष

स्थानीय / हिन्दी नाम	लेटिन नाम	देवनागरी नाम	कुल
1	3	2	4
आकाश नीम	<i>Milingtonia hortensis</i> Linn.	मिलिंगटोनिया होर्टेन्सिस	Bignoniaceae
अचार, चिरौजी	<i>Buchanania lanzan</i> Spreng.	बुकनानिया लांजन	Anacardiaceae
आल	<i>Morinda tinctoria</i> Roxb.	मोरिन्डा टिंक्टोरिया	Rubiaceae
आम	<i>Mangifera indica</i> Linn.	मैजिफेरा इंडिका	Anacardiaceae
अकोल	<i>Alangium salvifolium</i> Linn.	एलेन्जियम साल्वीफोलियम	Alangiaceae
अमलतास, बरडावन	<i>Cassia fistula</i> Linn.	कैसिया फिस्टूला	Caesalpinaceae
आंवला	<i>Emblica officianalis</i> Gaerth.	एंबलिका आफिसिनेलिस	Euphorbiaceae
अरडू	<i>Ailanthus excelsa</i> Roxb.	आईलेन्थस ऐक्सेल्सा	Simarubaceae
अरीठा	<i>Sapindus emarginatus</i> Walh.	सेपिन्डस इमरजिनेटस	Sapindaceae
अरन्ड	<i>Ricinus communis</i>	रीसिनस कोमुनिस	Euphorbiaceae
रोपित आशापाला, अशोक	<i>Polyalthia longifolia</i> Hook.F.	पोलीएलथिया लॉन्गीफोलिया	Anonaceae
ईमली	<i>Tamarindus indica</i> Linn.	टेमेरिन्डस इंडिका	Caesalpinaceae
इन्द्रोक, अदुक	<i>Anogisus sericea</i> Brandis var. <i>nummularia</i>	एनोगाइसिस सेरेसिया वे. नुमुलेरिया	Combretaceae
कचनार	<i>Bauhinia variegata</i> Linn.	बोहिनिया वेरीगेटा	Caesalpinaceae
कलम, केमड़ा	<i>Mitragyna parvifolia</i> Roxb.	मित्रागयना पार्वीफोलिया	Rubiaceae
कोहड़ा, अर्जुन	<i>Terminalia arjuna</i> Wall.	टर्मिनेलिया अर्जुना	Combretaceae
करंज	<i>Pongamia pinnata</i> Linn.	पोंगेमिया पिन्नाटा	Papilionaceae
कल्मी, धौक	<i>Anogeissus pendula</i> Edgew.	एनोगाइसिस पेन्डूला	Combretaceae
काकोन	<i>Flacourtia indica</i> (Burm.f.) Merr.	फलेकोरसिया इन्डिका	Flacourtiaceae
कैथ	<i>Feronia limonia</i> Swingle (Linn.)	फेरोनिया लिमोनिया	Rutaceae
कलसाडरीया	<i>Lagerstromia parviflora</i> Roxb.	लेजरस्ट्रोमिया पार्वीफ्लोरा	Lythraceae
कलझाड़िया	<i>Bridelia retusa</i> Spreng.	ब्राइडेलिया रेटूसा	Euphorbiaceae



कपासिया, पुला	<i>Kydia calicyna</i> Roxb.	कीडिया केलिसिना	Malvaceae
कड़ाया	<i>Sterculia urens</i> Roxb.	स्टरकुलिया यूरेन्स	Sterculiaceae
करी, उम्बिया	<i>Miliusa tomentosa</i> Roxb.	मिलिउसा टोमेन्टोसा	Anonaceae
कटूम्बर	<i>Ficus hispida</i> Linn.	फाइक्स हिस्पिडा	Moraceae
कैर	<i>Capparis decidua</i> Forsk.	कैपरिस डेसिडुआ	Capparidaceae
कर्कड़ा	<i>Maytenus emarginata</i> Willd.	मईटेनस इमार्जिनेटा	Celastraceae
कामिनी, कुन्ती	<i>Murraya paniculata</i> Linn.	मुराया पैनिकुलेटा	Rutaceae
कसोद	<i>Cassia siamea</i> Linn.	कैसिया स्यामिया	Caesalpiniaceae
कुमठा	<i>Acacia senegal</i> (L.) Willd.	अकैसिया सेनेगल	Mimosaceae
कुसुम	<i>Schleichera oleosa</i> (Lour) Oken.	श्लाइचेरा ओलिओसा	Sapindaceae
खैर	<i>Acacia catechu</i> Wild.	अकैसिया कटेचू	Mimosaceae
खजूर	<i>Phoenix sylvestris</i> Roxb.	फोइनिक्स सिलवेस्टिस	Palmae
खेजड़ा, रोज	<i>Acacia leucophloea</i> Wild.	अकैसिया ल्यूकोफ्लोईया	Mimosaceae
खेजड़ी	<i>Prosopis cineraria</i> (L.) Druce	प्रोसोपिस सीनेररिया	Mimosaceae
खिरनी, खिरना, दूधी	<i>Wrightia tomentosa</i> Roem. & Schult.	राइटिया टोमेन्टोसा	Apocynaceae
खिरना, दूधी	<i>Wrightia tinctoria</i> R.Br.	राइटिया टिंक्टोरिया	Apocynaceae
गूलर	<i>Ficus glomerata</i> Roxb.	फाइक्स ग्लोमेरेटा	Moraceae
गुलमोहर	<i>Delonix regia</i> W. & A.	डेलोनिक्स रिजिया	Caesalpiniaceae
गोयाखैर	<i>Dichrostachys cineria</i> W. & A.	डाइक्रोस्टेकिस सिनेरिया	Mimosaceae
गून्दा, लसोड़ा	<i>Cordia mixa</i> Forst.	कोर्डिया मिक्सा	Boraginaceae
ढैटिया खाखरा	<i>Erythrina suberosa</i> Roxb.	एरीथ्रिना सुबेरोसा	Papilionaceae
गुगल	<i>Commiphora wightii</i> (Arn.) Bhandari	कोमीफोरा विट्टी	Burseraceae
गुर्जन	<i>Lannea grandis</i> Merr.	लेनिया ग्रान्डिस	Anacardiaceae
गून्दी	<i>Cordia ruthali</i> Willd.	कोर्डिया रूथाई	Boraginaceae.
गिरनार, जैजना	<i>Cochlospermum gossypium</i> DC.	कोक्लोस्पर्मम गोसीपियम	Cochlospermaceae
घटबोर	<i>Zizyphus xylopyra</i> Willd.	जिजिफस जाइलोपायरा	Rhamnaceae
छोला, ढाक, पलास, खाखरा,	<i>Butea monosperma</i> Lamk Taub.	ब्यूटिया मॉनोस्पर्म	Papilionaceae

सफेदा	<i>Eucalyptus spp.</i>	यूकेलिप्टस	Myrtaceae
हल्दी	<i>Adina cordifolia Hook.f.</i>	अडाईना कार्डिफोलिया	Rubiaceae
हिगोट	<i>Balanites aegyptica Delile.</i>	बेलनाइटिस इजेप्टिका	Simarubiaceae

### ख-छोटे वृक्ष एवं क्षुप

स्थानीय/हिन्दी नाम	लैटिन वानस्पतिक नाम	देवनागरी	कुल
1	3	2	4
आधाशीशी	<i>Xanthium strumarium Linn.</i>	जैन्थियम स्ट्रूमरियम	Asteraceae
आंकड़ा	<i>Calotropis procera R.Br.</i>	कैलोट्रोपिस प्रोसेरा	Asclepiadiaceae
आंकड़ा(सफेद)	<i>Calotropis gigantea (L.) R.Br.</i>	कैलोट्रोपिस जाइजेनटिया	Asclepiadiaceae
आंधीझाड़ा	<i>Achyranthes aspera Linn.</i>	एकीरन्थस अस्पेरा	Amarantaceae
आंवल छाल	<i>Cassia auriculata L.</i>	कैसिया ओरीकुलेटा	Caesalpiniaceae
अर्निया, आरनी	<i>Clerodendron phlomidis L.f.</i>	क्लेरोडेन्ड्रोन फ्लोमिडिस	Verbenaceae
बकरी खलूड़ा	<i>Hemidesmus indica (L.) B.Br.</i>	हेमीडेसमस इण्डिका	Periplocaceae
अडुसा	<i>Adhatoda zeylanica Medic.</i>	अधाटोडा जाइलेनिका	Acanthaceae
काली स्याली	<i>Grewia flavescens Juss.</i>	ग्रिविया फ्लेवेसेन्स	Tiliaceae
कैलस्पारिया	<i>Securinega leucopyrus (Willd.) Mhell.</i>	सेक्यूरिनेगा ल्यूकोपाइरस	Euphorbiaceae
कलवारिया (जाल)	<i>Capparis spinosa Linn.</i>	कैपेरिस स्पाइनोसा	Capparidaceae
कटेर	<i>Capparis seiparia L.</i>	कैपेरिस सेपेरिया	Capparidaceae
करील	<i>Capparis decidua (Forsk.) Edgew.</i>	कैपेरिस डेसिडूआ	Capparidaceae
करींदा	<i>Carissa spinarum L.</i>	केरिसा स्पाइनेरम	Apocynaceae
काली राई	<i>Brassica nigra (L.) Koch.</i>	ब्रेसीका निग्रा	Brassicaceae
काली मेंहदी	<i>Tridax procumbens L.</i>	ट्राइडेक्स प्रोकम्बेन्स	Asteraceae
काली जीरी	<i>Vernonia anthelmintica (L.) Willd.</i>	वरनोनिया एंटीथेलमैन्टीका	Asteraceae
खीनी	<i>Periploca aphylla Decne.</i>	पेरीप्लोका अफाइला	Asclepiadiaceae
खीम्परा	<i>Leptadenia pyrotechnica (Forsk.) Decne.</i>	लेप्टाडेनिया पायरोटेकनिका	Asclepiadiaceae
गंगोर, गंगेरन	<i>Grewia tenax Fiori. (Forsk.) Fiori.</i>	ग्रिविया टेनेक्स	Tiliaceae
खारपाठा	<i>Aloe vera (L.) Burm.f.</i>	ऐलो वेरा	Liliaceae
गोखरू	<i>Tribulus terrestris Linn.</i>	ट्रिब्युलस टेर्रेस्ट्रिस	Zygophyllaceae



स्थानीय / हिन्दी नाम	लैटिन	देवनागरी	कुल
1	3	2	4
गुडशारिया	<i>Grewia hirsuta Vahl.</i>	श्रिविया हिरसुटा	Tiliaceae
चिड़ियों का धनिया	<i>Molluge cerviana (L.) Seringe</i>	मोलूगे सर्वियाना	Aizoaceae
चित्रक	<i>Plumbago zeylanica L.</i>	प्लम्बेगो जेलानिका	Plumbaginaceae
चीतावल	<i>Vogelia indica Gibs. ex Wight</i>	वोगेलिया इण्डिका	Plumbaginaceae
जंगली भिण्डी	<i>Abelmoschus manihot (L.) Medicns.</i>	एबीलमोसकस मनीहोट	Malvaceae
जंगली तुलसी	<i>Ocimum camum Sims.</i>	ओसीमम केनम	Labiataceae
जंगली प्याज	<i>Urginea indica (Roxb.) Kunth.</i>	अजीनिया इण्डिका	Liliaceae
कधी	<i>Abutilom indicum (L.) Sweet</i>	एब्यूटीलोन इण्डिकम	Malvaceae
झाडीबैर	<i>Zizyphus nummularia (Burm.f.) Wight &amp; Arn.</i>	जिजिफस न्यूमूलेरिया	Rhamnaceae
झील	<i>Indigofera oblongifolia Forek.</i>	इन्डीगोफेरा ओबलॉगीफोलिया	Papilionaceae
झीझनी	<i>Mimosa rubicaulis Linn.</i>	माइमोसा रुबीकॉलिस	Mimoseae
थौर	<i>Euphorbia nivulia Ham.</i>	यूफोरबिया निवुलिया	Euphorbiaceae
थौर	<i>Euphorbia royleana Beiss.</i>	यूफोरबिया रॉयलिना	Euphorbiaceae
थौर	<i>Euphorbia nerifolia L.</i>	यूफोरबिया नेरिफोलिया	Euphorbiaceae
तिजारा	<i>Papaver somniferum L.</i>	पेपेवर सोमनीफेरम	Papavaraceae
तिलबम	<i>Wendlandia exerta</i>	वेन्डलेन्डिया एक्जर्टा	Rubiaceae
तुलसी	<i>Ocimum sanctum L.</i>	ओसीमम सॅक्टम	Labiatae
रतनजोत	<i>Jatropha curcas L.</i>	जट्रोफा कर्कस	Euphorbiaceae
रतनजोत छोटी	<i>Jatropha gossypifolia L.</i>	जट्रोफा गॉसिपीफोलिया	Euphorbiaceae
वन तुलसी	<i>Pogostemon benghalensis (Burm.f) O.ktze</i>	पोगोस्टीमोन बैंगलेनसिस	Labiatae
दमासा	<i>Fagonia cretica</i>	फॅगोनिया क्रेटिका	Zygophyllaceae
दूधी, कंडवाला, करोटिया	<i>Holorrhina antidysenterica Willd.</i>	होलारिना एंटीडाइसेन्टिका	Combretadeleticeae
दुधी	<i>Euphorbia hirta L.</i>	यूफोरबिया हिर्टा	Euphorbiaceae
डोल्कन	<i>Grewia villosa Willd.</i>	श्रिविया विलोसा	Tiliaceae
धतूरा	<i>Datura metal Linn.</i>	धतुरा मेटल	Solanaceae

स्थानीय / हिन्दी नाम 1	लैटिन 3	देवनागरी 2	कुल 4
धावड़ी	<i>Woodfordia fruticosa</i> (L.) Kuntz.	वुडफोर्डिया फ्रुटीकोसा	Lythraceae
पाठा	<i>Alycarpus hamosus</i> Edgew.	एलीकार्पस हेमोसस	Papilionaceae
पाठा	<i>Alycarpus longifolius</i> (Rottl. ex Spreng.) Wight f Arn.	एलीकार्पस लॉगीफोलियस	Papilionaceae
पाठा	<i>Alycarpus rotundifolia</i>	एलीकार्पस रोटंडीफोलिया	Papilionaceae
पाठा	<i>Alycarpus tetragonoloba</i>	एलीकार्पस टेट्रागोनोलोबा	Papilionaceae
पाठा	<i>Alycarpus vaginalis</i> (L.) DC	एलीकार्पस वेंजीनेलीस	Papilionaceae
ब्राह्मी	<i>Baccopa monnieri</i> (L.) Wettst.	बकोपा मोनेरी	Scrophulariaceae
ब्राह्मी(जल)	<i>Centella asiatica</i> (L.) Urban	सेन्टेला एशियाटिका	Apiaceae
भांग	<i>Cannabis sativa</i> L.	कनेबीस सटाईवा	Cannabianaceae
बेर	<i>Zizyphus oenoplia</i> (L.) Miller	जिजिफस ओइनोप्लीया	Rhamnaceae
मकोय	<i>Solanum nigrum</i> Linn.	सॉलेनम नाइग्रम	Solanaceae
मरोड़फली	<i>Helicteres isora</i> Linn.	हेलीक्टिस आईसोरा	Sterculiaceae
मेंहदी	<i>Lawsonia inermis</i> Linn.	लावसोनिया इर्नेमिस	Lythraceae
मोरली	<i>Lycium europacum</i> L.	लाईसियम युरोपियम	Solanaceae.
नील	<i>Indigofera tinctoria</i> Linn.	इन्डिगोफेरा टिंक्टोरिया	Leguminosae
नेगड़	<i>Vitex negundo</i> Linn.	वाइटेक्स निगन्डो	Verbenaceae
पन्डन बोर	<i>Capparis grandis</i> L.f.	कैपेरिस ग्रान्डिस	Capparaceae
पंचारिया, फवाड़	<i>Cassia tora</i> Linn.	कैसिया टोरा	Caesalpinaceae
पीली कटेली	<i>Barleria prionitis</i> L.	बारलेरिया प्रायोनिटीज	Acanthaceae
पीथारिया	<i>Abutilon ramosum</i> (Cav.) Ginii & Perr.	एबुटीलोन रेमोसम	Malvaceae
बैकल	<i>Gymnosporia spinosa</i> (Forsk) Fiori	जिम्नोस्पोरिया स्पाइनोसा	Celastraceae
बला	<i>Sida cordifolia</i> L.	सिडा कॉर्डिफोलिया	Malvaceae
बंकापास	<i>Thespesia lampas</i> Dalb. & Gibs.	थेस्पेसिया लंपास	Malvaceae
बापची	<i>Ocimum americanum</i> L.	ओसीमम अमेरिकेनम	Labiatae.
बासूनी	<i>Tephrosia hookeriana</i>	टेफोरोसिया हुकरियाना	Papilionaceae



स्थानीय / हिन्दी नाम	वानस्पतिक नाम		कुल
1	लेटिन	देवनागरी	2
बेकर	<i>Indigofera cardifolia</i> Heyne.	इन्डिगोफेरा कार्डीफोलिया	Papilionaceae
बेकरी	<i>Indigofera linifolia</i> Retz.	इन्डिगोफेरा लीनीफोलिया	Papilionaceae
बेकरीस	<i>Indigofera anabaptista</i> Steud. ex Baker	इन्डिगोफेरा एनाबेपिस्टा	Papilionaceae
बुई	<i>Aerva pseudotomentosa</i> Blatt. & Hallts.	एरवा सूडोटोमेन्टोसा	Amaranthaceae
भृंगराज, भांगरो	<i>Eclipta alba</i> (L.) Hassk.	एक्लिप्ता अल्बा	Asteraceae
भांगरो	<i>Echinops echinatus</i> Roxb.	इकीनोप्स इकीनेटस	Asteraceae
भूमी आवला	<i>Phyllanthus niruri</i> L.	फाइलेंथस निरुरी	Euphorbiaceae
भूई रिंगनी	<i>Solanum surattense</i> Burm.f.	सोलनम सूरटेस	Solanaceae
वन अरहड	<i>Flemingia semialata</i> Roxb.	फलेमिन्जिया सेमिअलाटा	Papilionaceae
शालपर्णी	<i>Desmodium dichotomum</i> (Willd.) DC	डेस्मोडियम डाईकोटोमम	Papilionaceae
शालपर्णी	<i>Desmodium gangeticum</i> (L.) DC	डेस्मोडियम गॅजेटिकम	Papilionaceae
शालपर्णी	<i>Desmodium rotundifolium</i> Baker	डेस्मोडियम रोटण्डिफोलियम	Papilionaceae
शालपर्णी	<i>Desmodium niomaxicum</i>	डेस्मोडियम नीओमेक्सिकम	Papilionaceae
	<i>Desmodium trifolium</i> (L.) DC	डेस्मोडियम ट्राईफोलियम	Papilionaceae
सत्यानाशी	<i>Argemone maxicana</i> Linn.	आरजीमोन मेक्सिकाना	Papavaraceae
सर्फेद, स्थानी, हारसिंगार	<i>Nyctanthes arbotristis</i> Linn.	निकटेन्थस आर्बोस्ट्रीस	Oleaceae
उंटकटेली	<i>Lepidagathis trinervis</i> Wall. ex Nees.	लेपिडेगेथिस ट्रान्निर्विस	Acanthaceae
उंचती	<i>Ageratum conyzoides</i> Linn.	एजीरेटम कोनिजोयडिस	Asteraceae

### ग - आरोही क्षुप एवं लताएँ

स्थानीय / हिन्दी नाम	वानस्पतिक नाम		कुल
1	लेटिन	देवनागरी	2
कतूम्बा	<i>Cayratia carnosa</i> Gagnep	केयरटिया कारनोसा	Vitaceae
काकमर्दिका	<i>Cardiospermum halicacabum</i> L.	कार्डियोस्पर्मम हेलीकाबम	Sapindaceae
कालादाना	<i>Ipomoea nil</i> (L.) Roth	आईपोमिया निल	Convolvulaceae

स्थानीय/हिन्दी नाम	वानस्पतिक नाम		कुल
1	लेटिन	देवनागरी	2
कालादाना	<i>Ipomoea pestigridis</i> L.	आईपोमिया पेस्टीग्रीडिस	Convolvulaceae
कालादाना	<i>Ipomoea sindica</i> Stapf.	आईपोमिया सिन्डिका	Convolvulaceae
कालादाना	<i>Ipomoea sinentica</i>	आईपोमिया सिनेन्टीका	Convolvulaceae
काकड बैल, तुरिया, गलका	<i>Luffa echinata</i> Roxb.	लफ्फा एचीनाटा	Cucurbitaceae
किर्कोड़ा	<i>Momordica dioica</i> Roxb. ex Willd.	मोमोरडिका डायोका	Cucurbitaceae
कुड बैल	<i>Dioscoria pentaphylla</i> L.	डायसकोरिया पेन्टाफेला	Dioscoriscaeae
केवच	<i>Mucuna prurita</i> Hook.	मुकुना प्रुरिता	Papilionaceae
खाटा लिम्बू	<i>Ampelocissus latifolia</i> (Roxb.) Planch.	एम्पीलोसिसस लेटिफोलिया	Vitaceae
गुडबेल	<i>Viscum orientale</i> Willd.	विसकम ओरियन्टेल	Loranthaceae
त्रिपत्ती, त्रिपत्ती	<i>Oxalis corniculata</i> L.	ऑक्जेलिस कोर्निकुलेटा	Oxaliadaceae
वृषी बैल (काली बैल)	<i>Ichnocarpus frutescens</i> (Linn) B.Br.	इक्नोकारपस फ्रुटेसेन्स	Apocynaceae
दुजनी	<i>Milletia auriculata</i> Baker.	मिलिशिया अरीकुलेटा	Papilionaceae
नागनीधोर	<i>Opuntia dillenii</i> (KerGawler) Haworth	ओपन्शिया डिलेनाई	Cactaceae
पहाडबैल	<i>Cissampelos pareira</i> Linn.	सीसामपेलोस परीरा	Menispermaceae
पलास बैल	<i>Butea superba</i> Roxb.	ब्यूटिया सुपरबा	Papilionaceae
पानी बैल	<i>Cissus repanda</i> Vahl	सीसस रिपण्डा	Vitaceae
पानी बैल	<i>Clitoria ternatea</i> L.	क्लिटोरिया टर्नेटा	Papilionaceae
भोईकंद	<i>Discoria hispida</i> Denn stedt	डायसकोरिया हिस्पीडा	Dioscoriscaeae
मालकांगनी	<i>Celastrus paniculata</i> Willd.	सिलेस्टस पेनीकुलेटा	Celastraceae
गेंडासिंगी, बांसबैल	<i>Cryptolepis buehanani</i> Roem.& Sch.	क्रिप्टोलेपिस बुकनानी	Periplocaceae
नीमगीलोय	<i>Tinospora cordifolia</i> Micrs.	टीनोस्पोरा कॉर्डिफोलिया	Menispermaceae
रत्ती चिरमू	<i>Abrus precatorius</i> Linn.	एब्रस प्रिकेटोरियस	Papilionaceae
वाराही कंद	<i>Discorea bulbifera</i> L.	डायसकोरिया बल्बीफेरा	Discoriaceae
वेवड़ी	<i>Cocculus hirsutus</i> L.	कोकुलस हिरसुटस	Menispermaceae
वेवड़ी	<i>Cosmostigma racemosum</i> (L.) Diels.	कोस्मोस्टिगमा रेसीमोसम	Asclepiadaceae
शतावरी	<i>Asparagus racemosus</i> Willd.	एस्प्रेगस रेसीमोसस	Liliaceae



स्थानीय / हिन्दी नाम	वानस्पतिक नाम		कुल
1	लेटिन	देवनागरी	4
हुक्का बैल	<i>Aristolochia bracteata</i> Retz.	एरिस्टोलोकिया ब्रेक्टिएटा	Aristolochiaceae

### घ-घास

स्थानीय / हिन्दी नाम	वानस्पतिक नाम		कुल
1	लेटिन	देवनागरी	4
अन्जन	<i>Cenchrus ciliaris</i> L.	सैंकरस सिलिएरिस	Poaceae
करड	<i>Dichanthium annulatum</i> Staff.	डाइकैन्थियम एनुलेटम	Poaceae
कांस	<i>Saccharum spontaneum</i> Linn.	सेकरम स्पोनटेनियम	Poaceae
खस	<i>Vetiveria zizanioides</i> (Linn.) Nesh.	वेटिवेरिया जिजेनीयोडिस	Poaceae
गन्देल	<i>Chrysopogon gryllus</i> (Linn) Trin.	क्राइसोपोगान ग्रेइलस	Poaceae
गडियाला	<i>Coix gigantea</i> Keen ex. Roxb.	कोइक्स जाइजेनशिया	Poaceae
ग्रामना	<i>Panicum antidotale</i> Petz.	पैनिकम एंटीडोटेल	Poaceae
दाब	<i>Imperata cylindrica</i> Linn.	इंपेरेटा सिलिन्ड्रीका	Poaceae
दूब	<i>Cynodon dactylon</i> (L.) Pers.	साइनोडोन डेक्टाइलोन	Poaceae
मूँज	<i>Saccharum munja</i> (Roxb.)	सेकरम मूँजा	Poaceae
पोलाई, पौलडी	<i>Apluda mutica</i> Linn.	एपल्यूडा म्यूटिका	Poaceae
बरु	<i>Sorghum halepense</i> Linn.	सोर्घम हेलेपेन्स	Poaceae
बामण	<i>Chloris dolichostachys</i> Linn.	क्लोरिस डोलिकोस्टेकिस	Poaceae
भरुट	<i>Cenchrus biflorus</i> Roxb.	सैंकरस बाइफ्लोरस	Poaceae
सू खाला	<i>Heteropogon contortus</i> (L.) Beauv. ex Roem & Schult.	हेट्रोपोगान कन्टोर्टस	Poaceae
सीवण	<i>Echinochloa colonum</i> Linn.	इक्नोक्लोया कोलोनम	Poaceae
सीण	<i>Sehima nervosum</i> Staff.	सेहिमा नरवोसम	Poaceae
रातरडा	<i>Themeda quadrivalvis</i> (L.) O. Ktze.	थेमेडा क्वाड्रीवेलविस	Poaceae
रोसा	<i>Cymbopogon martinii</i> (Roxb) Wats.	सिम्बोपोगान मार्टिनाइ	Poaceae
लापला	<i>Aristida depressa</i> Betz.	एरिस्टिडा डिप्रेस	Poaceae

### ड-बांस

स्थानीय / हिन्दी नाम	वानस्पतिक नाम		कुल
1	लेटिन	देवनागरी	4
बांस	<i>Dendrocalamus strictus</i> (Roxb.) Nees	डेन्ड्रोकेलेमस सिट्रक्टस	Poaceae
बांस	<i>Bambusa arundinacea</i> (Retz.) Roxb.	बेम्बुसा अरुन्डीनेसिया	Poaceae

### च-परजीवी

स्थानीय / हिन्दी नाम	वानस्पतिक नाम		कुल
1	लेटिन	देवनागरी	4
अमरबेल	<i>Cuscuta reflexa</i> Roxb.	कस्कुटा रिफ्लेक्सा	Cuscutaceae
अमरबेल	<i>Cuscuta Hyline</i>	कस्कुटा हाइलाइना	Cuscutaceae
बांदा	<i>Dendrophthoe falcata</i> (L.f.) Etting.	डेन्ड्रोफ्थो फल्काटा	Loranthaceae
वायहाकल	<i>Viscum articulatum</i> Burm. f.	विसकम अर्टीकुलेटम	Loranthaceae

### छ- थैलोफायटा (Thallophyta)

#### (I) Algae: (एलगी) :-

*Spirogyra* spp.

*Ulothrix* spp.

*Volvox* spp.

#### (II) Fungii : (फंगस) :-

S. No.	Name of Mashroom	Common Name	Family
1.	<i>Ganoderma lucidium</i>	-	Ganodermetaceae
2.	<i>Favolus canadensis</i>	-	Agaricaceae
3.	<i>Agaricus</i> spp.	-	Agaricaceae
4.	<i>Lepiota procera</i>	-	Agaricaceae
5.	<i>Auricularia arucula judae</i>	-	Hygrophoraceae
6.	<i>Pisolithus tinctoris</i>	-	Gasteromycetes
7.	<i>Mycenia</i> spp.	-	Agaricaceae
8.	<i>Tricholoma</i> spp	-	Tricholomataceae



9.	<i>Phellorinia inquinans</i>	Khumbi	Gasteromycetes
10.	<i>Podaxis pistillaris</i>	Khumbi	Gasteromycetes
11.	<i>Coprinus spp.</i>	-	Agaricaceae
12.	<i>Tulostoma spp.</i>	-	Gasteromycetes
13.	<i>Marasmius spp.</i>	-	Agaricaceae
14.	<i>Agaricus bisporus</i>	-	Agaricaceae
15.	<i>Panaeolus separatus</i>	-	Agaricaceae
16.	<i>Armillaria mellea</i>	-	Agaricaceae
17.	<i>Clitocybe eludens</i>	-	Agaricaceae
18.	<i>Clitocybe phyllophila</i>	-	Agaricaceae
19.	<i>Coltricia perenmi</i>	-	Agaricaceae

### ज- ब्रायोफायट्स (Bryophytes)

*Riccia spp.*

*Plageochasma spp.*

*Anthoceros spp.*

*Notothylus spp.*

*Funaria spp.*

### झ- टेरीडोफायट्स (Pteridophytes)

#### (Ferns)

<i>Ampelopteris prolifera</i>	-
<i>Ophioglossum costatum</i>	सर्पजीव्ही
<i>Ophioglossum petiolatum</i>	सर्पजीव्ही
<i>Seleganella rependa</i>	संजीवनी
<i>Adiantum caudatum</i>	-
<i>Adiantum lunulatum</i>	हंसराज
<i>Actinopteris radiatum</i>	मोरपंखी
<i>Chelanthus farinosa</i>	-
<i>Azola pinnata</i>	-

# कार्यालय उप वन संरक्षक, वन्यजीव, चित्तौड़गढ़

पता-प्रताप सर्किल, उदयपुर रोड, चित्तौड़गढ़ पिन कोड-312001

Phone No. 01472-244915,

E-mail ID - dcfwlchittorgarh@gmail.com

क्रमांक : एफ( ) सर्वे/उवसं/वजी/2021-22/ 2709

दिनांक : 26.04.22

निमित्त

मैसर्स हिन्दुस्तान जिंक लिमिटेड  
चंदेरिया

विषय :- आवेदित क्षेत्र के 10 किमी. परिधि में नेशनल पार्क/अभयारण्य होने या ना होने का प्रमाण-पत्र जारी करने के संबंध में।

प्रसंग :- आपका आवेदन दिनांक 15.03.2022 के क्रम में।

महोदय,

उपरोक्त विषयान्तर्गत लेख हैं कि आवेदित औद्योगिक उत्पादन क्षेत्र हेतु आवेदक- मैसर्स हिन्दुस्तान जिंक लिमिटेड चंदेरिया, औद्योगिक उत्पादन- रिफाईनेड लेड, जिंक व कॉपर मेटल इत्यादि, क्षेत्रफल-335.89 हैक्टेयर, निकट ग्राम-पुढोली, आजोलिया का खेड़ा व बिलिया, तहसील-गंगारार व चित्तौड़गढ़, जिला-चित्तौड़गढ़ में स्थित हैं, जिसमें अभयारण्य से 10 किमी. परिधि में स्थित होने या ना होने के आशय का प्रमाण-पत्र चाहा गया हैं, उक्त प्रस्तावित क्षेत्र के संबंध में क्षेत्रीय वन अधिकारी वन्यजीव बस्सी के पत्रांक 291 दिनांक 22.04.2022 से प्राप्त रिपोर्ट के आधार पर एवं आवेदन में संलग्न दस्तावेजों में अंकित जीपीएस निर्देशांक को गूगल अर्थ पर मार्क कर देखे जाने पर उक्त आवेदित क्षेत्र के 10 किमी. परिधि में वन्यजीव अभयारण्य/नेशनल पार्क नहीं आता हैं। आवेदित खनन क्षेत्र के जीपीएस निर्देशांक इस कार्यालय अधिनस्थ स्थित बस्सी वन्यजीव अभयारण्य की सीमा से निम्नानुसार दूरी पर स्थित हैं।

क्र.सं.	प्रस्तावित खनन क्षेत्र के पीलर संख्या	प्रस्तावित खनन क्षेत्र के जीपीएस निर्देशांक		बस्सी वन्यजीव अभयारण्य से हवाई दूरी (किमी. में)
		Latitude	Longitude	
1	A	24°57'21.29"N	74°38'34.39"E	14.44
2	B	24°58'21.03"N	74°40'43.43"E	10.61
3	C	24°57'20.33"N	74°38'37.46"E	13.05
4	D	24°58'35.69"N	74°39'16.22"E	14.34

(डॉ. टी. मोहनराज)  
उप वन संरक्षक  
वन्यजीव, चित्तौड़गढ़

दिनांक :

क्रमांक : एफ( ) सर्वे/उवसं/वजी/2021-22/

प्रतिलिपि : निम्नांकित को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित हैं-

1. उप वन संरक्षक चित्तौड़गढ़।
2. क्षेत्रीय वन अधिकारी वन्यजीव बस्सी।

(डॉ. टी. मोहनराज)  
उप वन संरक्षक  
वन्यजीव, चित्तौड़गढ़



Ref. HZL/CLZS/ENV/43/2022-23

Date: 8.11.2022

To,

Deputy Conservator of Forests,  
Forest Department Campus, Pratap Circle,  
Chittorgarh 312001, Raj.

**Subject:** Expansion within the existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Sets] at villages Putholi, Ajoliya Ka Khera & Biliya, Tehsil Gangrar & Chittorgarh, District Chittorgarh(Raj.)- Authentication of Wildlife Conservation Plan regarding;

**Ref:** ToR issued by MoEFCC, New Delhi vide Letter no. J-11011/279/2006-IA.II(I) dated 27<sup>th</sup> September 2021 and authenticated list issued by DCF Chittorgarh()Survey/DCF/2022-23/7233 dated 19.10.2022.

Respected Sir,

With reference to the aforesaid subject and reference matter, we would like to apprise your goodself that M/s. Hindustan Zinc Ltd. has applied for obtaining Environment Clearance for the above said project at MoEF&CC, New Delhi. The Terms of Reference for the abovesaid project has been issued by MoEF&CC, New Delhi vide Letter no. J-11011/279/2006-IA.II(I) dated 27<sup>th</sup> September 2021.(Copy enclosed as **Annexure - 1**).

As per the conditions stipulated in the ToR Point no. 5 (v), we are herewith submitting you Wildlife Conservation Plan (Copy enclosed as **Annexure- 2**) for conservation of **Eight Schedule - I fauna - Mor (Pavo cristatus), Baghera (Panthera pardus), Gidh (Gyps bengalensis), Laggar Falcon (Shikaaree Pakshee), Rusty Spotted Cat (Prionailurus rubiginosus), Common Monitor Lizard (Varanus bengalensis), Indian Crested Porcupine (Hystrix indica) and Northern Plains Langur**

Hindustan Zinc Limited, Registered Office: Yashad Bhawan, Udaipur-313 004, Rajasthan, INDIA.  
T. +91 294-6604000-02 www.hzindia.com CIN: L27204RJ1966PLC001208

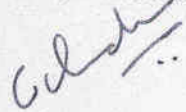
पेबक लिपिक-  
कार्यालय उप वन संरक्षक  
चित्तौड़गढ़ (राज.)

(*Semnopithecus entellus*) for authentication as per List issued by DCF Office, Chittorgarh (Raj.) dated 19.10.2022.

We earnestly request your goodself to kindly provide us authenticated Wildlife Conservation Plan by the Chief wildlife Warden as required for above mentioned subject.

Thanking you and with Regards,  
Yours faithfully,

For M/s. Hindustan Zinc Ltd.

  
C Chandru

Chief Executive Officer – Smelters, HZL

CC:

1. To Chief Wildlife Warden, Government of Rajasthan

Encl.:

1. ToR issued by MoEFCC, New Delhi vide Letter no. J-11011/279/2006-1A.II(I) dated 27<sup>th</sup> September, 2021
2. Wildlife Conservation Plan for Schedule-1 species





**WILDLIFE CONSERVATION PLAN FOR HINDUSTAN ZINC LTD.,  
CHANDERIYA LEAD ZINC SMELTER COMPLEX  
NOVEMBER 2022  
FINAL REPORT**



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# Executive Summary

## Introduction

This Wildlife management plan has been prepared as an integral part of Environmental Impact Assessment (EIA) study for “The existing Chanderiya Lead Zinc Smelter Complex (CLZS) in reference to the Terms of Reference (ToR) issued by MoEFCC, New Delhi vide their letter no. J-11011/279/2006-IA. II(I) dated 27.09.2021 at villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan)” by M/s. Hindustan Zinc Limited.

The main purpose of this management plan is to manage and conserve the wildlife within the existing CLZS Complex. 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 in 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 Putholi, Ajoliya Ka Khera & Biliya Villages of Gangrar & Chittorgarh tehsil of Chittorgarh District in the State of Rajasthan.

The site is approachable from by nearest city is Chittorgarh (~8.0 km in South direction from plant site), Nearest railway station is Chanderiya Railway station (~2.5 km in SW direction from plant site), Nearest NH is NH-79 (~0.5 km in West direction from plant site) and NH-76 (~2.5 km in ESE direction from plant site), Nearest Airport is Maharana Pratap Airport – Udaipur (~85 km in SW direction from plant site).

## Requirement for Expansion of Project and their Process

S.N.	Requirements	Materials
1.	Raw Material	Major raw material required for Lead and Zinc expansion project are Zinc concentrate, Lead concentrate, Coal, Limestone and various additives Fuel etc.
2.	Fuel Requirement	Fuel HSD/LDO/Propane, PNG, LPG, Oil, Imported Coal etc.
3.	Other Basic Requirement	Water, Power, Steam, Manpower etc.

## Process Description

The plant consists of the various units as given under:

- Pyro Plant (based on Imperial smelting process enabling simultaneous production of Zinc & Lead metals through Pyro-metallurgical process route)
- Ausmelt Plant (based on Top Submerged Lance Technology.
- Hydro-I Unit & Hydro-II Unit with Fumer (metallurgical zinc extraction process is conventionally known as Roast-Leach-Electro win process)
- Captive Power Plant Unit (Coal based thermal power plant)
- Minor Metal Complex [Recovery of minor metals like Copper, Cadmium, Cobalt and Nickel. Cobalt and Antimony Slag (on metal basis) from various processes of the CLZS complex]



## Environmental profile of the project area

### Baseline data collection (Post monsoon season – October to December 2020 & October 2021)

S. N.	Environmental component	Primary data				Secondary data
		Parameters	Frequency	Monitoring / Sampling Location	Methodology	
1.	Land	Agriculture Habitation Industry Stony waste / Quarries Forest area Plantation/ Vegetation Open scrub Water bodies Land use/ Land Cover	Once in a Study period 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.
2.	Meteorology	Temperature, Relative Humidity, Wind Speed, Wind Direction Rainfall	Daily	01 (Plant site)	Automatic weather monitoring station	IMD book (Climatological normal 1981-2010), Past year Rainfall data for Chittorgarh district.
3.	Air	PM10, PM2.5, SO2, NO2, CO, Lead, Nickel.	One season study (Twice a week) (As per NAAQS)	09 (Oct. to Dec.,2020) & 13 (Oct.,2021)	Sampling: CPCB Guidelines / NAAQ S / IS 5182 and Instrument Manual  Analysis: CPCB Guidelines / IS 5182	-
		O3, NH3, Benzene, Benzo(a)pyrene (BaP)-Particulate phase only, Arsenic, Zinc	Once in a season			
4.	Noise	Equivalent noise levels in Leq in dB (A) Day time & Night time	Once in a Season	09	Sampling: IS 9989 Analysis: CPCB Guidelines / IS 9989	-
5.	Water					
	A. Surface Water	Parameters as per IS 10500 - 2012	Once in a Season	05	Sampling: CPCB Guideline &	-

S. N.	Environmental component	Primary data				Secondary data
		Parameters	Frequency	Monitoring / Sampling Location	Methodology	
					APHA 22nd edition 2012	
	B. Ground Water		Once in a season	08	Analysis: IS 10500 - 2012 / IS 3025 / APHA 22nd edition 2012	-
7.	Soil	Parameters as per IS 2720 / USDA	Once in a Season	08	Sampling: USDA Analysis: As per IS 2720 / USDA	Indian Agricultural Research Institute Handbook
8.	Biological Environment	Flora and fauna	Once in a Season	Study area	Quadrat sampling method / random sampling	Forest working plan and Local Information <a href="https://forest.rajabhawan.gov.in/">https://forest.rajabhawan.gov.in/</a>
9.	Socio - Economic Environment	Socio – Economic Demography	Once in a Season	Study area	Economic Parameter Random Sampling of the villages. Survey Conduction, Through Questionnaire approach.	Demographic Data: Census data, 2011.  Basic amenities Data: Census data, 2011.
Source: EIA Report & EMP for Expansion within the existing Chanderiya lead zinc smelter complex, Chittorgarh (Rajasthan).						

### Environmental impacts of Project activities is listed below:

S.N.	Parameters	Anticipated Impact
1.	Air	<b>Construction Phase:</b> Increase in dust (Particulate Matter) and NOx concentration due to Leveling activity and Heavy vehicular movement.
		<b>Operation Phase:</b> The major air pollutants emitted from the CLZS complex include PM, SO <sub>2</sub> , Acid Mist, Lead, NOx, Hg & its compounds, NMHC & CO.
2.	Noise	<b>Construction Phase:</b> Noise increase due to construction equipment may cause disturbance, inconvenience, loss of concentration, hearing problems, etc.
		<b>Operation Phase:</b> • 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 & from vehicular movements for transportation of construction material.

S.N.	Parameters	Anticipated Impact
		<ul style="list-style-type: none"> <li>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.</li> </ul>
3.	Water	<p><b>Construction Phase:</b></p> <ul style="list-style-type: none"> <li>Increase in suspended solids due to soil run-off during heavy precipitation due to loose soil at construction site.</li> <li>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 &amp; unpleasant smell in nearby area.</li> </ul> <p><b>Operation Phase:</b></p> <ul style="list-style-type: none"> <li>No additional Fresh water will be required for the proposed expansion project.</li> <li>No ground water abstraction is being done and will not be done for the proposed expansion project.</li> <li>Total wastewater generated from CLZS complex is 7598 KLD, no additional waste water will generate after expansion as we will utilize internal water in expansion. At present we are treating average 7598 m3 or less effluent per day while we have treatment facility for 12600 m3/d so increment if any in waste water will be treated in existing system.</li> <li>Domestic Waste water is being / will be generated from the office toilets. Hence there will be no significant impact on ground water level &amp; quality.</li> </ul>
4.	Soil	<p><b>Construction Phase:</b></p> <p>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 &amp; Soil stockpiling which results in soil deterioration or reduce fertility of soil if not managed properly.</p> <p><b>Operation Phase:</b></p> <ul style="list-style-type: none"> <li>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.</li> <li>This may lead to change in physico-chemical characteristics of soil of the area.</li> </ul>
5.	<b>Biological Environment</b>	
	<b>a. Terrestrial Ecology</b>	Positive as greenbelt of appropriate width has been/will be developed and maintained in the Plant area
	<b>b. Aquatic Ecology</b>	No impact as no effluent is being / will be discharged outside the plant premises.
6.	<b>Socioeconomic Environment</b>	Overall development of the area in respect of the infrastructure development, educational growth, health facilities etc.
Source: EIA Report & EMP for Expansion within the existing Chanderiya lead zinc smelter complex, Chittorgarh (Rajasthan).		

## 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 Rs. 120.05 crores have been allotted for cost towards pollution control.

## Objectives of the Wildlife Conservation Plan

The main objective of Wildlife Management 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 mitigation 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 upscaled expansion 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 WMP 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.

8 faunal species found in the WCP area are included under the highest order of protection - Schedule I under the Indian Wildlife Protection Act (IWPA), 1972. 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, and

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

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 "Expansion within the existing Chanderiya Lead Zinc Smelter Complex [Expansion in Hydro Plant by adding 1 Induction Furnace, 1 Slab Casting Line & Integration of RZO Unit in Hydro-II, Change in Product Mix in Pyro Unit on total metal basis & Installation of 1 Lead Refinery, Expansion of CPP through Modernization and Installation of 1 BPTG, Recovery of Minor Metals & Installation of 5 DG Set] at villages: Putholi, Ajoliya Ka Khera & Biliya, Tehsil: Gangrar & Chittorgarh, District: Chittorgarh (Rajasthan)" by M/s. Hindustan Zinc Limited is carried out within the existing plant premises and no additional area is required.

### Project Benefits

The proposed expansion project will provide various benefits across the nearby areas which are attributed below: a) Environment b) Employment c) Social d) Economic.

The company is conscious of its obligations to society at large and will contribute in overall socioeconomic development of the area in the coming years by increasing its efforts for overall development of the WCP area. Benefits of the project clearly indicate environmental, social, economic, employment potential etc, are summarized below:

### Environmental Benefits

Till now, out of the total plant area i.e. 335.89 ha, 121.77 ha area has already been developed under green belt / plantation. The same will be maintained and enhanced via gap plantation to achieve the plantation density upto 2500 trees/ ha.

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. Ground covers 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. Trees 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.

### Employment Benefits (direct and indirect) due to the project

The expansion project will generate both direct & indirect employment. Existing manpower of the plant is 2919 persons. Additional manpower of 360 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 numerous 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 CLZS Complex as well as other nearby industries.

### Economic Benefits

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 socioeconomic 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.

### 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. 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

## 1.2. Applicable acts and Regulations in the WCP area

Following Environmental laws and regulations are pertinent to the WCP area

1. Wildlife (Protection) Act, 1972
2. The Environment Protection Act, 1986
3. Biological Diversity Act, 2002
4. The Forest (Conservation) Act, 1980
5. Wild Birds and Animals Protection Act, 1912
6. Environmental Impact Assessment Notification, 2006
7. The Water (Prevention and Control of Pollution) Act, 1974, (amended 1988)
8. The Air (Prevention and Control of Pollution) Act, 1981, (amended 1987)
9. The Mineral Concession Rules, 1960 (amended 2012)
10. The Mineral Conservation and Development Rules, 2017
11. Ash Content Notification, 1997 (amended 2015)
12. Disposal of Fly Ash Notification, 1999
13. Public Hearing Notification, 1997
14. Hazardous Wastes (Management & Handling) Rules, 1989 (amended May, 2003)
15. The Aravali Notification, 1992

## 1.3. Socio-economic environment of the WCP area

The WCP area comprise of 75 villages and 1 city (Chittorgarh) of the WCP area that covers a total area of 365.81 square kilometers giving approximately 72325 people residence. Following table entails brief information about demography structure at state level, district level and WCP area.

**Table 1.1: Demographic Profile of Rajasthan State, Chittorgarh District & WCP Area**

S.N.	Particular	Rajasthan State	Chittorgarh District	WCP area
1.	Area (in sq. km.)	342,239	7,882	365.81
2.	No. of Households	12651423	2,69,332	72325
3.	Population	68548437	15,44,338	343256
4.	Male	35550997	783,171	176121
5.	Female	32997440	61,167	167135
6.	Scheduled Tribes	9238534	41629	16309

S.N.	Particular	Rajasthan State	Chittorgarh District	WCP area
7.	Scheduled Castes	12221593	360709	49056
8.	Literacy (%)	66.11	74.13	63.3
9.	Sex Ratio (Females per 1000 Males)	928	950	949
Source: Census of India 2011.				

### 1.3.1. Demographic Composition

#### Zone wise population of WCP area

Census data suggests that the WCP area is composed of 51% of male population while 49% of female population. Following table entails information about basic demographic structure of villages/town lying in WCP area (buffer zone) as primary, secondary and outer zone.

**Table 1.2: Summary of Demographic Profile of WCP Area**

WCP Area Zone		0 - 3 km	3 - 7 km	7 - 10 km	Total
No. of Villages / Town		9	30	37	76
No. of Households		2180	4810	65335	72325
Total Population		10098	22506	310652	343256
SC Population		1779	5718	41559	49056
ST Population		689	3171	12449	16309
Total Literate Population		5112	10712	218672	234496
Workers	Main	4519	11047	101869	117435
	Marginal	1265	857	15054	17176
	Total	5784	11904	116923	134611
Non worker		4314	10087	193519	207920
Source: Census of India 2011.					

Above table highlights that 09 villages/towns comes under primary zone (0 – 3 km radius from plant site) with as much as 2180 houses resides with a total population of over 10098 people.

Secondary and outer zone both comprise of 30 village and 36 villages and 1 city (Chittorgarh) holding a total population of 22506 and 310652 respectively. Since secondary and outer zone comprise mostly of flowing streams and clustered ponds, most of these settlements are inhabited in and along these natural features.

#### Sex ratio

Sex ratio determine the Human Development Index (HDI) of an area thereby understanding the status of women in that region.

The sex ratio in the WCP area is 949 females per 1000 males (higher than state's average i.e. 928) with secondary zone having 956, following with primary zone as 972 and then outer zone as 947. This variation suggests that possible reason behind this variation is due to presence of service facility in each of these zones.

Below table gives brief insight about the sex ratio at different zones in WCP area suggesting that there is a lower proportion of females than male.

S.N.	Buffer zone	Sex Ratio of WCP area Female/1000 male
1.	Primary zone (0-3 Km)	972
2.	Secondary zone (3-7 Km)	956
3.	Outer zone (7-10 Km)	947
4.	Overall WCP area (0-10 Km)	949
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 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 that falls under the marginalized and vulnerable groups and special attention should be given towards these groups while making action plans. In the observed villages schedule caste (SC) population is ~14% and Schedule Tribe population ~5% in WCP area. ~81 % population observed as other.

#### **1.3.2. Literacy rate**

Literacy Rate is the percentage of people in a country with the ability to read and write. The analysis of the literacy levels is done in the WCP. The 10 km radius WCP area demonstrates a literacy rate of 63.3 % as per census data. The male literacy rate in the WCP area works out to be 77.0 % whereas the female literacy rate, which is an important indicator for social change, is observed to be 49.0 % in the WCP area as per the survey data. This indicates that there is an urgent need to focus in sociological aspect in the region and enhance further development. In the present plan, the total literacy rate observed to be less moderate in the WCP area and this is the area of concern and to be improved.

#### **1.3.3. Occupational profile**

The total marginal workers in the WCP area are 17176 (5 %), total main workers are 117435 (34%) and total non-working population is 207920 (61%). As per the surveyed villages analysis most of them are non-working population. A major portion of working age people is not ideal worker because of limited sectors in which they are engaged with less training and non-awareness of latest sectors in which maybe they can do better than other traditional work.

#### **1.3.4. Existing cropping pattern**

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 regions tobacco is also grown.

The project 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.

#### **1.3.5. Cattle population**

5% out of total land (within WCP area) are used by community for cattle population.

#### **1.3.6. Forest dependency**

No National Parks, Wildlife Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animal; exist within 10 km radius of the plant site. But 17 Reserve Forest lies within 10 km of the WCP area. (Annexure - I)

#### **1.3.7. Forest Impact of Project on forest growth in WCP area**

##### **Terrestrial Ecology**

Positive as greenbelt of appropriate width has been/will be developed and maintained in the Plant area.

##### **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.



## 1.4. Environment details

### 1.4.1. Topography

The district is characterized by undulating topography. The western, southern and northern parts are generally plain area. Hills are scattered in Chhoti Sadri, Bari Sadri and Pratapgarh tehsils. Hill ranges towards east of Chittaurgarh town runs north-south with intervening valleys parallel to each other.

Chittorgarh and Pratapgarh tehsils are partly hilly and partly plain. The district has the regional slope from south to north. The height varies from 317m to 637m, Pemakhera, Kanarkhera hill is the highest, having height of 637m. Geomorphologically the district is divided into following units:

**Table 1.3: Geomorphic Units of the WCP Area**

S.N.	Origin	Landform	Description
1.	Denudational	Buried Pediment	Pediment covers essentially with relatively thicker alluvial, colluvial or weathered materials.
		Intermontane Valley	Depression between mountains, generally broad & linear, filled with colluvial deposits.
		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.
2.	Fluvial	Alluvial Plain	Mainly undulating landscape formed due to fluvial activity, comprising of gravels, sand, silt and clay. Terrain mainly undulating, produced by extensive deposition of alluvium.
		Alluvial Plain (Sandy)	Flat to gentle undulating plain formed due to fluvial activity, mainly consists of gravels, sand, silt and clay with unconsolidated material of varying lithology, predominantly sand along river.
		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.
		Ravine	Small, narrow, deep, depression, smaller than gorges, larger than gully, usually carved by running water.
3.	Structural	Dissected Plateau	Plateau, crisscrossed by fractures forming deep valleys.
		Plateau	Formed over varying lithology with extensive, flat, landscapes, bordered by escarpment on all sides. Essentially formed horizontally layered rocky marked by extensive flat top and steep slopes. It may be criss crossed by lineament.
4.	Hills	Denudational, Structural Hill, Linear Ridge	Steep sided, relict hills undergone denudation, comprising of varying lithology with joints, fractures and lineaments. Linear to arcuate hills showing definite trend-lines with varying lithology associated with folding, faulting etc. Long narrow low-lying ridge usually barren, having high run off may form over varying lithology with controlled strike.
Source: EIA Report & EMP for Expansion within the existing Chanderiya lead zinc smelter complex, Chittorgarh (Rajasthan).			

Two third area of the district is covered by hilly terrain. The soils of the district falls under the following broad categories • Black Soils • Yellowish brown soils • Grayish brown alluvial soils • Hilly soils. Black soils are found in Dungla, Kapasan, Begun and parts and Rashmi tehsils. Yellowish brown soils are predominant in Chittaurgarh, Nimbahera, Bhopalsagar, Bhainsorgah and Bhadesar panchyat samities. The hilly soils occur in Bhainsorgarh, Begun, Chittaurgarh, Dungla, Chotti Sadri, and Nimbahera Panchayat samities. There are broad stretches of light sandy loam soils along banks of river.

The district has the regional slope from south to north. The height varies from 317m to 617m, amsl. Pal khera hill is the highest, having height of 617m.

The total plant area is 335.89 Ha. The terrain of the lease is usually flat having general sloping trend towards north direction. The highest elevation in the plant area is 419 mRL and lowest is 385 mRL. The highest altitude is in the west of the area and gradually sloping in all directions. The lowest altitude is in NE part of the area. The Geomorphological map of the core and buffer zone is shown in Figure 1.1.

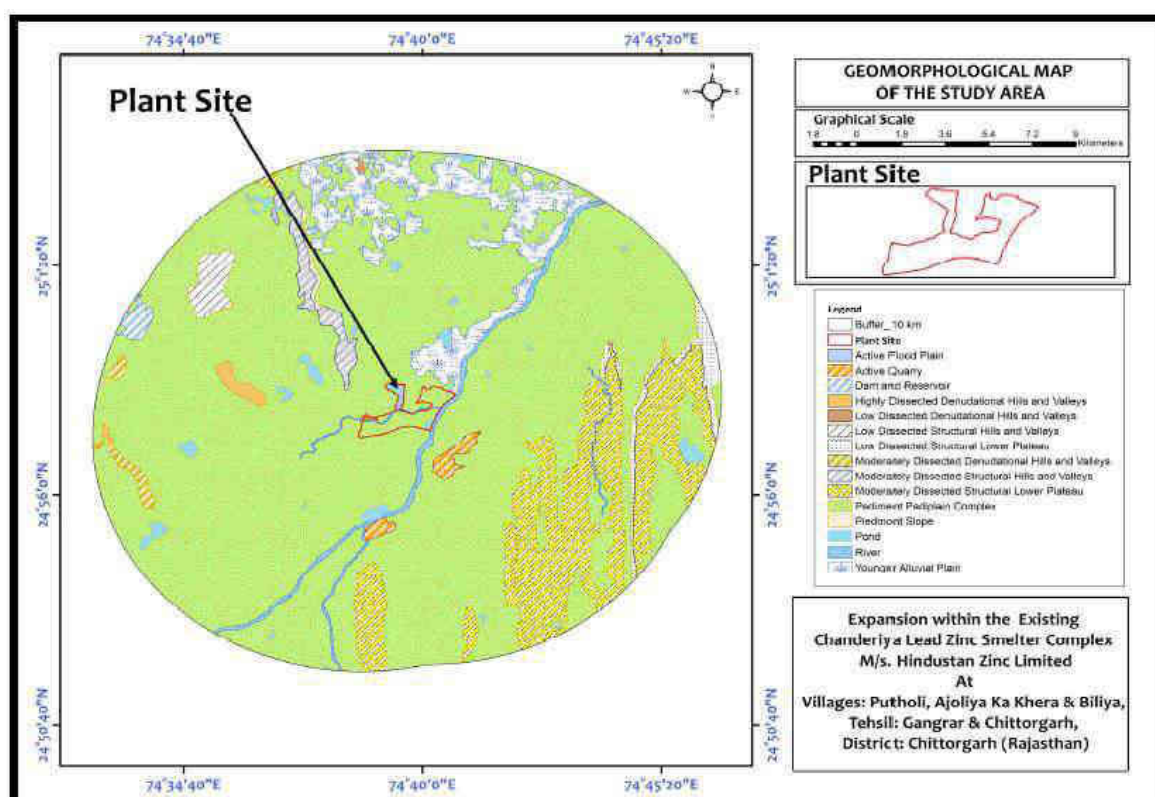


Figure 1.1: Map showing Geomorphology of 10km WCP area of Chanderiya Lead Zinc Smelter Complex (Source: Bhukosh)

## 1.4.2. Geology

### Regional Geology

The rock formations were first studied and mapped by Hacket C.A. in 1881 and then by Dr. A.M. Heron in 1936. Dr. A.M. Heron classified the limestone formations of the area under Nimbaheera limestone belt, equivalent to Semri series of lower Vindhyan. The regional stratigraphic sequence according to Dr. Heron is as follows:

Table 1.4: Regional Geology

AGE	GROUP	FORMATION
Recent to Sub-Recent	-	Alluvium & Soil
Pleistocene	-	Laterite
Upper Cretaceous	-	Deccan Trap
Vindhyan Super Group	Kaimur Group	Kaimur Sandstone
	KHORIP	SUKET SHALES NIMBAHERA LIMESTONE BARI
Source: EIA Report & EMP for Expansion within the existing Chanderiya lead zinc smelter complex, Chittorgarh (Rajasthan).		

The limestone named after its typical place of occurrence is continuously found from Jawad in Madhya Pradesh to Nimbaheera in Rajasthan and thereafter in patches in Chittorgarh, Binota, Khori and Sawa.

### Local Geology

Stratigraphically, the area form part of Berach Granite of Archean age which is Overlain by Semri group (Mesoproterozoic age) which belongs to vindhyan supergroup. The lithostratigraphy consists of Granite, Granitic gneiss of berach granite formation.

#### 1.4.3. Climate

The climate of the area is semi-arid except during south west monsoon season. The cold season is from December to February and is followed by summer from March to June. The summer season is from mid of March to middle of July. The monsoon season is from mid of July to mid-September or even less. The rainy days in a year varies from 26 to 30. Post monsoon season extends up to November and thereafter winter season continues up to February.

The maximum and minimum temperature during summer season is 48°C and 23°C and during winter season is 28°C and 2°C. The average humidity varies from 18% to 68% and goes up to 90% during rainy season. The predominant wind direction is from South-West to north east.

#### 1.4.4. Natural Disasters

Some of the probable emergencies include natural disasters like Bushfires, flooding and cyclones. The WCP area is included in Seismic Zone II. This is seismically least active region. Poor drainage of rain water can lead to flooding.

#### 1.4.5. Natural drainage and water bodies

The drainage system is well developed and drainage density varies from 0.3 to 1 km/sq.km. Chambal is the only perennial river. It enters the district near Gandhi Sagar and flows towards NE for about 50 km and then passes into Kota district. The other main rivers are Banas, Gambhiri, Gujjali, Bamani, Berach, Jakham and Wagon.

The Banas River originates in Udaipur district and enters Chittaurgarh through Rashmi tehsil. It passes through Somi, Sankhli, Pahunia, and Unchkia villages.

The Ghabhir River originating in Madhya Pradesh flowing through Nimbahera and Chittaurgarh tehsils joins Berach River. It passes through villages of Khor, Myara, Sarthal and Tai.

The local drainage pattern in and around the area is dendritic to sub-parallel in nature with low drainage density.

#### 1.4.6. Linear infrastructure that can affect Megafauna in the WCP area

Transport and Road infrastructure facilities: Village roads are connected with the two major highways such as NH-79, NH-76. 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.

#### Waterways and canals

WCP area carries 6 water bodies in and around plant area (within 10 km radius), In which Putholi Nala is passing through the plant site, Berach River is adjacent in East direction from the Plant site, Gambhir Nadi is approximately 4.0 km in South direction from the Plant site, Nagdi ka Nala is around 8.5 km in NNE direction from the Plant site, Devdan ka Nala is around 8 km in WNW direction from the Plant site and Canal is approximately 8 km in WNW direction from the Plant site.

#### 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.

#### 1.4.7. Flora

##### Inventory of floral diversity in WCP area of the Plant site

Based on authenticated data from Chittorgarh Forest Department

**Table1.5: Floral diversity of WCP area**

S.N.	Scientific name	Common name	Local name	Family	Origin	IUCN status
<b>Trees</b>						
1	<i>Adina cordifolia</i> (Roxb.) Brandis	Haldu	Haldu	Rubiaceae	Native	NA
2	<i>Ailanthus excelsa</i> Roxb.	Indian Tree of Heaven	Aradu, Paba	Simaroubaceae	Native	NA
3	<i>Alangium salviifolium</i> (L.f.) Wangerin	Sage Leaved Alangium	Akol	Cornaceae	Native	LC
4	<i>Balanites aegyptica</i> Wall.	Desert Date	Hingot	Balanitaceae	Exotic	NA
5	<i>Bauhinia variegata</i> L.	Varigated Bauhinia	Kachnar	Fabaceae	Native	LC
6	<i>Bridelia retusa</i> (L.) A.Juss.	Spinour Kino Tree	Agana, Lampan, Laampkana	Phyllanthaceae	Native	LC
7	<i>Buchanania cochinchinensis</i> (Lour.)	Lanzan Tree	Achar, Chironji	Anacardiaceae	Native	NA
8	<i>Butea monosperma</i> (Lam.) Kuntze	Flame of the Forest	Khaakhra, Palaas, Chheela, Dhaak	Fabaceae	Native	LC
9	<i>Capparis decidua</i> (Forssk.) Edgew.	Bare Caper	Kair, Kareel	Capparaceae	Native	LC
10	<i>Capparis grandis</i> L.f.	Cartilage Creeper	Kalvaariya, Kaabar	Capparaceae	Native	NA
11	<i>Cassia fistula</i> L.	Golden shower tree	Amaltaas, Bardaavan, Karamela	Fabaceae	Native	LC



S.N.	Scientific name	Common name	Local name	Family	Origin	IUCN status
12	<i>Cochlospermum religiosum</i> (L.) Alston	Buttercup Tree	Girnar, Jhenjena	Bixaceae	Native	NA
13	<i>Cordia myxa</i> L.	Assyrian Plum	Gunda, Lasoda	Boraginaceae	Native	LC
14	<i>Cordia sinensis</i> Lam.	Grey-leaved Cordia	Gundi	Boraginaceae	Native	LC
15	<i>Delonix regia</i> (Bojer ex Hook.) Raf.	Flame tree	Gulmohar	Fabaceae	Native	LC
16	<i>Dichrostachys cinerea</i> (L.) Wight & Arnt.	Sickle Bush	Goyakhair, Ameena	Fabaceae	Native	LC
17	<i>Erythrina suberosa</i> Roxb.	Corky Coral Tree	Bola, Bodliya	Fabaceae	Native	NA
18	<i>Eucalyptus</i> sp.	Eucalyptus	Nilgiri, Safeda	Myrtaceae	Exotic	NA
19	<i>Euphorbia nivulia</i> Buch.-Ham.	Leafy Milk Hedge	Ghotathaur, Thor	Euphorbiaceae	Native	NA
20	<i>Ficus hispida</i> L.f.	Hairy Fig	Katmur, Ghouter, Kaalmungari	Moraceae	Native	LC
21	<i>Ficus racemosa</i> L.	Cluster fig	Goolar, Umar	Moraceae	Native	LC
22	<i>Flacourtia indica</i> (Burm.f.) Merr.	Governor's Plum	Kaakan, Kaakon	Salicaceae	Native	LC
23	<i>Gymnosporia spinosa</i> (Blanco) Merr. & Rolfe	Mountain Spike Thorn	Benkal	Celastraceae	Native	NA
24	<i>Holarrhena pubescens</i> Wall. ex G.Don	Indrajao	Kadua, Indrajao, Doodhi	Apocynaceae	Native	LC
25	<i>Kydia calycina</i> Roxb.	Kydia	Kapaasiya, Pula, Rabadi	Malvaceae	Native	LC
26	<i>Lagerstroemia parviflora</i> Roxb.	Small-flowered Crepe Myrtle	Kalhaariya, Kaakadiyo	Lythraceae	Native	LC
27	<i>Lannea coromandelica</i> (Houtt.) Merr.	Indian Ash Tree	Godal, Gurjan	Anacardiaceae	Native	LC
28	<i>Lawsonia inermis</i> L.	Henna	Mehndi	Lythraceae	Native	LC
29	<i>Limonia acidissima</i> L.	Wood Apple	Kaith	Rutaceae	Native	NA
30	<i>Mangifera indica</i> L.	Mango	Aam	Anacardiaceae	Exotic	DD
31	<i>Miliusa tomentosa</i> (Roxb.) Finet & Gagnep.	Hoom	Umbyia, Kari	Annonaceae	Native	NA
32	<i>Millingtonia hortensis</i> L.f.	Indian Cork Tree	Akash Neem	Bignoniaceae	Exotic	NA
33	<i>Mitragyna parvifolia</i> (Roxb.) Korth.	Kaim	Kalam, Keemda	Rubiaceae	Native	NA

S.N.	Scientific name	Common name	Local name	Family	Origin	IUCN status
34	<i>Monoon longifolium</i> (Sonn.) B.Xue & R.M.K.Saunders	Mast Tree	Ashok, Aasaapaala	Annonaceae	Native	NA
35	<i>Morinda coreia</i> Buch.-Ham.	Indian Mulberry	Aal	Rubiaceae	Native	NA
36	<i>Murraya paniculata</i> (L.) Jack	Orange Jasmine	Kamini, Kunti	Rutaceae	Native	NA
37	<i>Nyctanthes arbor-tristis</i> L.	Coral Jasmine	Taamat, Haarsingaar	Oleaceae	Native	LC
38	<i>Phoenix sylvestris</i> (L.) Roxb.	Wild Date Palm	Khajur	Arecaceae	Native	NA
39	<i>Phyllanthus emblica</i> L.	Indian Gooseberry	Aavla	Phyllanthaceae	Native	LC
40	<i>Pongamia pinnata</i> (L.) Pierre	Pongam tree	Karanj, Kanaji	Fabaceae	Native	LC
41	<i>Prosopis cineraria</i> (L.) Druce	Khejri Tree	Samela, Khejadi	Fabaceae	Native	NA
42	<i>Sapindus emarginatus</i> Valh	Soapnut	Aritha	Sapindaceae	Native	NA
43	<i>Schleichera oleosa</i> (Lour.) Oken	Ceylon Oak Tree	Kusum	Sapindaceae	Native	LC
44	<i>Senegalia catechu</i> (L.f.) P.J.H.Hurter & Mabb.	Black Catechu	Khair, Kheda	Fabaceae	Native	LC
45	<i>Senegalia senegal</i> (L.) Britton	Gum Acacia	Kumatha	Fabaceae	Native	NA
46	<i>Senna siamea</i> (Lam.) H.S.Irwin & Barneby	Pheasantwood	Kassod	Fabaceae	Exotic	LC
47	<i>Sterculia urens</i> Roxb.	Ghost Tree	Kadaaya	Malvaceae	Native	NA
48	<i>Tamarindus indica</i> L.	Tamarind	Imli	Fabaceae	Exotic	LC
49	<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn.	Arjun	Arjun	Combretaceae	Native	NA
50	<i>Terminalia coronata</i> (Stapf) Gere & Boatwr	Axlewood Tree	Dhavada	Combretaceae	Native	NA
51	<i>Terminalia pendula</i> (Edgew.) Gere & Boatwr.	Buttontree	Dhonk, Kalthi	Combretaceae	Native	NA
52	<i>Vachellia leucophloea</i> (Roxb.) Maslin, Seigler & Ebinger	White Bark Acacia	Ronz, Aruziya	Fabaceae	Native	LC
53	<i>Vitex negundo</i> L.	Five Leaved Chaste	Negad, Nirgundi	Lamiaceae	Native	LC

S.N.	Scientific name	Common name	Local name	Family	Origin	IUCN status
54	<i>Wendlandia heynei</i> (Schult.) Santapau & Merchant	Heyne's Wendlandia	Tilbam, Tilakah	Rubiaceae	Native	LC
55	<i>Wrightia arborea</i> (Dennst.) Mabb.	Woolly Dyeing Rosebay	Khirmi, Doodhi, Vera, Khanni	Apocynaceae	Native	LC
56	<i>Wrightia tinctoria</i> (Roxb.) R.Br.	Sweet Indrajao	Khirma, Doodhi, Khanni	Apocynaceae	Native	LC
57	<i>Ziziphus xylopyrus</i> (Retz.) Willd.	Katber	Ghatbor	Rhamnaceae	Native	NA
<b>Shrubs</b>						
1	<i>Abutilon indicum</i> (L.) Sweet	Indian Mallow	Ban kukra	Malvaceae	Native	NA
2	<i>Abutilon ramosum</i> (Cav.) Guill. & Perr.	Mallow	Pithariya	Malvaceae	Native	NA
3	<i>Achyranthes aspera</i> L.	Prickly Chaff Flower	Aadhi Jaada	Amaranthaceae	Native	NA
4	<i>Azanza lampas</i> (Cav.) Alef.	Common Mallow	Ban Kapaas	Malvaceae	Native	NA
5	<i>Barleria prionitis</i> L.	Porcupine flower	Vajradanti (Pili)	Acanthaceae	Native	NA
6	<i>Calotropis gigantea</i> (L.) W.T.Aiton	Crown Flower	Aakada, Shivaark	Apocynaceae	Native	NA
7	<i>Calotropis procera</i> R.Br.	Giant Milkweed	Aakada	Apocynaceae	Native	NA
8	<i>Capparis sepiaria</i> L.	Wild Caper Bush	Kanther, Kanthaar	Capparaceae	Native	LC
9	<i>Capparis spinosa</i> L.	Cartilage Creeper	Kalvaariya, Kaabar	Capparaceae	Native	LC
10	<i>Carissa spinarum</i> L.	Wild Karanda	Kamadi, Karonda	Apocynaceae	Native	LC
11	<i>Clerodendrum phlomidis</i> L.f.	Arni	Arni	Lamiaceae	Native	LC
12	<i>Commiphora wightii</i> (Arn.) Bhandari	Guggal	Gugal	Burseraceae	Native	CR
13	<i>Cosmostigma cordatum</i> (Poir.) M.R.Almeida	Green Milkweed	Marvel	Apocynaceae	Native	NA
14	<i>Cryptolepis buchananii</i> R.Br. ex Roem. & Schult.	Indian Sarsaparilla	Krishnasariva	Apocynaceae	Native	NA
15	<i>Datura metel</i> L.	Thorn Apple	Dhatura	Solanaceae	Native	NA
16	<i>Dendrophthoe falcata</i> (L.f.) Ettingsh.	Honey Suckle Mistletoe	Baada	Loranthaceae	Native	NA
17	<i>Euphorbia neriifolia</i> L.	Indian Spurge Tree	Thor	Euphorbiaceae	Native	LC

S.N.	Scientific name	Common name	Local name	Family	Origin	IUCN status
18	<i>Euphorbia royleana</i> Boiss.	Sullu Spurge	Thor	Euphorbiaceae	Native	NA
19	<i>Flemingia semialata</i> Roxb. ex W.T.Aiton	Winged Stalk Flemingia	Van Arhad	Fabaceae	Native	NA
20	<i>Flueggea leucopyrus</i> Willd.	Bushweed	Ghat Baur	Phyllanthaceae	Native	LC
21	<i>Grewia flavescens</i> Juss.	Donkey Berry	Kaali Syaali	Malvaceae	Native	LC
22	<i>Grewia hirsuta</i> Vahl.	Kukurbicha	Farangani	Malvaceae	Native	NA
23	<i>Grewia tenax</i> (Forssk.) Fiori	White Crossberry	Gengasi, Gangedan	Malvaceae	Native	LC
24	<i>Grewia villosa</i> Willd.	Hairy Leaf Crossberry	Dolkan, Ban Phalsa	Malvaceae	Native	LC
25	<i>Gymnosporia emarginata</i> (Willd.) Thwaites	Thorny Staff Tree	Benkal	Celastraceae	Native	NA
26	<i>Indigofera oblongifolia</i> Forek	NA	Kuaara	Fabaceae	Native	LC
27	<i>Indigofera tinctoria</i> L.	True Indigo	Neel	Fabaceae	Native	NA
28	<i>Jatropha curcas</i> L.	Barbados nut	Ratanjot	Euphorbiaceae	Native	LC
29	<i>Jatropha gossypifolia</i> L.	Cotton-leaf Physic Nut	Ratanjoti	Euphorbiaceae	Exotic	LC
30	<i>Justicia adhatoda</i> L.	Malabar Nut	Adulsa	Acanthaceae	Native	LC
31	<i>Leptadenia pyrotechnica</i> (Forssk.) Decne.	Broom Brush	Khimpara	Apocynaceae	Native	LC
32	<i>Lycium europaeum</i> L.	European Tea Tree	Morali	Solanaceae	Exotic	NA
33	<i>Mimosa rubicaulis</i> Lam.	Hooked Mimosa	Bandar ki Raakhi, Leepti	Fabaceae	Native	NA
34	<i>Opuntia dillenii</i> (Ker Gawl.) Haw.	Erect Prickly Pear	Naagfani, Thaapaathor	Cactaceae	Exotic	NA
35	<i>Periploca aphylla</i> Decne.	Leafless Silkflower Shrub	Kheeni	Apocynaceae	Native	LC
36	<i>Pleurolobus gangeticus</i> (L.) J.St.-Hil. ex H.Ohashi & K.Ohashi	Sal Leaved Desmodium	Dhruva	Fabaceae	Native	NA
37	<i>Ricinus communis</i> L.	Castor Bean Tree	Arand	Euphorbiaceae	Native	NA
38	<i>Senna auriculata</i> (L.) Roxb.	Tanner's Cassia	Tarwar	Fabaceae	Native	NA



S.N.	Scientific name	Common name	Local name	Family	Origin	IUCN status
39	<i>Senna tora</i> (L.) Roxb.	Stinking Cassia	Panwariya, Fawaad	Fabaceae	Native	NA
40	<i>Tephrosia hookeriana</i> Wight & Arn.	White Hoary Pea	Baasuni	Fabaceae	Native	NA
41	<i>Viscum articulatum</i> Burm.f.	Leafless Mistletoe	Bonda	Santalaceae	Native	NA
42	<i>Viscum orientale</i> Willd.	Oriental Mistletoe	Baandaa	Santalaceae	Native	NA
43	<i>Woodfordia fruticosa</i> (L.) Kurz	Fireflame Bush	Dhaay	Lythraceae	Native	LC
44	<i>Ziziphus nummularia</i> (Burm.f.) Wight & Arn.	Jhar Beri	Chanbaur, Zadi Bair	Rhamnaceae	Native	NA
45	<i>Ziziphus oenopolia</i> (L.) Mill.	Jackal Jujube	Bor	Rhamnaceae	Native	LC
<b>Herbs</b>						
1	<i>Abelmoschus manihot</i> (L.) Medik.	Sweet Hibiscus	Jungli Bhindi	Malvaceae	Native	NA
2	<i>Abrus precatorius</i> L.	Rosary Pea	Ratti Chiramu	Fabaceae	Native	NA
3	<i>Aerva pseudotomentosa</i> Blatt. & Hallb.	-	Bui	Amaranthaceae	Native	NA
4	<i>Ageratum conyzoides</i> L.	Goat weed	Uchat, Bhakumbar	Asteraceae	Exotic	LC
5	<i>Aloe vera</i> (L.) Burm. F.	Aloe	Gwaarpaatha	Asphodelaceae	Exotic	NA
6	<i>Alysicarpus hamosus</i> Edgew.	Round-Leaf Alyce Clover	Patha	Fabaceae	Native	NA
7	<i>Alysicarpus longifolius</i> (Rottler ex Spreng.) Wight & Arn.	Longleaf Alyce Clover	Patha	Fabaceae	Native	NA
8	<i>Alysicarpus racemosus</i> Benth.	Raceme Alyce Clover	Patha	Fabaceae	Native	NA
9	<i>Alysicarpus tetragonolobus</i> Edgew.	Red Alyce Clover	Patha	Fabaceae	Native	NA
11	<i>Alysicarpus vaginalis</i> (L.) DC	Alyce Clover	Patha	Fabaceae	Native	NA
12	<i>Argemone maxicana</i> L.	Mexican Prickly Poppy	Satyaanaasi, Pila Dhatura	Papaveraceae	Native	NA
13	<i>Baccharoides anthelmintica</i> (L.) Moench	Ironweed	Kali Jiri	Asteraceae	Native	NA

S.N.	Scientific name	Common name	Local name	Family	Origin	IUCN status
14	<i>Bacopa monnieri</i> (L.) Wettst.	Brahmi	Brahmi	Plantaginaceae	Native	LC
15	<i>Bouffordia dichotoma</i> (Willd.) H.Ohashi & K.Ohashi	Chikta	Shalparni	Fabaceae	Native	NA
16	<i>Brassica juncea</i> (L.) Czern.	Mustard	Kali Rai	Brassicaceae	Exotic	NA
17	<i>Cannabis sativa</i> L.	Marijuana	Bhang	Cannabaceae	Native	NA
18	<i>Centella asiatica</i> (L.) Urb.	Indian Pennywort	Brahmi-Booti, Mandukparni	Apiaceae	Native	LC
19	<i>Cuscuta hyalina</i> Roth	-	Amarbel	Convolvulaceae	Native	NA
20	<i>Drimia indica</i> (Roxb.) Jessop	Indian Squill	jungli piaj	Asparagaceae	Native	NA
21	<i>Echinops echinatus</i> Roxb.	Indian Globe Thistle	Bhangaro	Asteraceae	Native	NA
22	<i>Eclipta prostrata</i> (L.) L.	False Daisy	Bhringaraj	Asteraceae	Native	LC
23	<i>Euphorbia hirta</i> L.	Asthma Weed	Dudhi	Euphorbiaceae	Native	NA
24	<i>Grona triflora</i> (L.) H.Ohashi & K.Ohashi	Creeping Tick Trefoil	Kudaliya	Fabaceae	Native	NA
25	<i>Hypertelis cerviana</i> (L.) Thulin	Thread-Stem Carpetweed	Chiriy Ro Khet	Molluginaceae	Native	NA
26	<i>Indigofera cordifolia</i> B.Heyne ex Roth	Heart-Leaf Indigo	Bekar	Fabaceae	Native	NA
27	<i>Indigofera hochstetteri</i> Baker	Sind Indigo	Bekaris	Fabaceae	Native	LC
28	<i>Indigofera linifolia</i> (L.f.) Retz.	Narrowleaf Indigo	Bekar	Fabaceae	Native	LC
29	<i>Lepidagathis trinervis</i> Nees.	Filly Lepidagathis	Unti-kateli	Acanthaceae	Native	NA
30	<i>Ocimum americanum</i> L.	Hoary Basil	Jungli Tulsi	Lamiaceae	Native	NA
31	<i>Ocimum tenuiflorum</i> L.	Tulsi	Tulsi	Lamiaceae	Native	NA
32	<i>Oxalis corniculata</i> L.	Creeping Wood Sorrel	Tripatti	Oxalidaceae	Exotic	NA
33	<i>Papaver somniferum</i> L.	Opium Poppy	Tijara	Papaveraceae	Exotic	LC
34	<i>Phyllanthus niruri</i> L.	Carry Me Seed	Bhui Aonla	Phyllanthaceae	Exotic	NA
35	<i>Plumbago arabica</i> (Boiss.) Christenh. & Byng	Indian Desert Statice	Chitawal	Plumbaginaceae	Native	NA
36	<i>Plumbago zeylanica</i> L.	Chitrak	Chitrak	Plumbaginaceae	Native	NA

S.N.	Scientific name	Common name	Local name	Family	Origin	IUCN status
37	<i>Pogostemon benghalensis</i> (Burm.f.) Kuntze	Bengal Shrub-Mint	Van Tulsi	Lamiaceae	Native	NA
38	<i>Sida cordifolia</i> L.	Heart-Leaf Sida	Bala	Malvaceae	Native	NA
39	<i>Solanum nigrum</i> L.	Black Nightshade	Makoy	Solanaceae	Native	NA
40	<i>Solanum virginianum</i> L.	Thorny Nightshade	Bhui Ringini	Solanaceae	Native	NA
41	<i>Tribulus terrestris</i> L.	Puncture Vine	Gokharu	Zygophyllaceae	Native	LC
42	<i>Tridax procumbens</i> L.	Tridax Daisy	Kali Mehndi	Asteraceae	Exotic	NA
43	<i>Xanthium strumarium</i> L.	Common Cocklebur	Aadhashshi	Asteraceae	Native	NA
44	<i>Zygophyllum creticum</i> (L.) Christenh. & Byng	-	Damasa	Zygophyllaceae	Exotic	NA
<b>Grasses</b>						
1	<i>Apluda mutica</i> L.	Mauritian Grass	Polard, Poladi	Poaceae	Native	NA
2	<i>Aristida adscensionis</i> L.	Common Needle Grass	Lapala	Poaceae	Native	NA
3	<i>Bambusa bambos</i> (L.) Voss	Indian Thorny Bamboo	Bans	Poaceae	Native	NA
4	<i>Cenchrus biflorus</i> Roxb.	Indian Sandbur	Bharut	Poaceae	Native	NA
5	<i>Cenchrus ciliaris</i> L.	Buffalo Grass	Anjan	Poaceae	Native	LC
6	<i>Chrysopogon gryllus</i> (L.) Trin.	Scented Grass	Gandel	Poaceae	Native	NA
7	<i>Chrysopogon zizanioides</i> (L.) Roberty	Khas	Khas	Poaceae	Exotic	NA
8	<i>Coix aquatica</i> Roxb.	Aquatic Job's Tears	Gadiyala	Poaceae	Native	NA
9	<i>Cymbopogon martini</i> (Roxb.) W. Watson	Palmarosa Grass	Rosa	Poaceae	Native	NA
10	<i>Cynodon dactylon</i> (L.) Pers.	Bermuda Grass	Doob Ghaas	Poaceae	Native	NA
11	<i>Dendrocalamus strictus</i> (Roxb.) Nees	Calcutta Bamboo	Bans	Poaceae	Native	NA
12	<i>Dichanthium annulatum</i> (Forssk.) Stapf	Sheda Grass	Karad	Poaceae	Native	NA
13	<i>Echinochloa colonum</i> (L.) Link	Jungle Rice	Sivan	Poaceae	Native	LC

S.N.	Scientific name	Common name	Local name	Family	Origin	IUCN status
14	<i>Enteropogon dolichostachyus</i> (Lag.) Keng	Long-Spike Finger Grass	Manthanaka	Poaceae	Native	NA
15	<i>Heteropogon contortus</i> (L.) P.Beauv. ex Roem. & Schult.	Black Speargrass	Su Khala	Poaceae	Native	NA
16	<i>Imperata cylindrica</i> (L.) P.Beauv.	Cogon Grass	Daab	Poaceae	Exotic	LC
17	<i>Panicum antidotale</i> Retz.	Panicum antidotale	Gramna	Poaceae	Native	NA
18	<i>Saccharum spontaneum</i> L.	Kans Grass	Kans	Poaceae	Native	LC
19	<i>Sehima nervosa</i> (Rottler) Stapf	Rat-tail Grass	Seen	Poaceae	Native	NA
20	<i>Sorghum halepense</i> (L.) Pers.	Johnson Grass	Baru	Poaceae	Native	NA
21	<i>Themeda quadrivalvis</i> (L.) Kuntze	Kangaroo Grass	Ratarada	Poaceae	Native	NA
22	<i>Tripidium bengalense</i> (Retz.) H.Scholz	Sarkanda	Moonj	Poaceae	Native	NA
<b>Climbers</b>						
1	<i>Ampelocissus latifolia</i> (Roxb.) Planch	Wild Grape	Khaatolimbo, Moosal	Vitaceae	Native	NA
2	<i>Aristolochia bracteolata</i> Lam.	Dutchman's Pipe	Hukkabel	Aristolochiaceae	Native	NA
3	<i>Asparagus racemosus</i> Willd.	Buttermilk Root	Naaharkaanta, Shataavari	Asparagaceae	Native	NA
4	<i>Butea superba</i> Roxb. ex Willd.	NA	Palash Bel	Fabaceae	Native	NA
5	<i>Cardiospermum halicacabum</i> L.	Balloon Vine	Kaakmardika	Sapindaceae	Native	LC
6	<i>Causonis trifolia</i> (L.) Mabb. & J.Wen	Bush Grape	Katumba, Chaar	Vitaceae	Native	NA
7	<i>Celastrus paniculatus</i> Willd.	Black Oil Plant	Maal Kangani	Celastraceae	Native	NA
8	<i>Cissampelos pareira</i> L.	Velvet Leaf	Pahad bel, Paadbel	Menispermaceae	Native	NA
9	<i>Cissus repanda</i> (Wight & Arn.) Vahl	Weavy-leaved Cissus	Khaatolimbo, Bhaansaataat	Vitaceae	Native	NA
10	<i>Clitoria ternatea</i> L.	Butterfly Pea	Gokarna	Fabaceae	Exotic	NA
11	<i>Cocculus hirsutus</i> (L.) W.Theob.	Broom Creeper	Jal Jamani, Baajarbel	Menispermaceae	Native	NA



S.N.	Scientific name	Common name	Local name	Family	Origin	IUCN status
12	<i>Cuscuta reflexa</i> Roxb.	Giant Dodder	Amarbel	Convolvulaceae	Native	LC
13	<i>Dioscorea bulbifera</i> L.	Air Yam	Kaanda Giloy, Gaithi	Dioscoreaceae	Native	NA
14	<i>Dioscorea hispida</i> Dennst.	Intoxicating Yam	Alithi	Dioscoreaceae	Native	NA
15	<i>Dioscorea pentaphylla</i> L.	Five Leaf Yam	Alithi	Dioscoreaceae	Native	NA
16	<i>Hemidesmus indicus</i> (L.) R.Br.	Indian Sarsaparilla	Anantamool, Sariva, Doodhi	Apocynaceae	Native	NA
17	<i>Ichnocarpus frutescens</i> (L.) W.T.Aiton	Black Creeper	Doodhibel, Kaali Doodhi	Apocynaceae	Native	NA
18	<i>Ipomoea biflora</i> (L.) Pers.	Chinese Morning Glory	Karnaful	Convolvulaceae	Native	NA
19	<i>Ipomoea eriocarpa</i> R.Br.	Tiny Morning Glory	Kaaldana	Convolvulaceae	Native	NA
20	<i>Ipomoea nil</i> (L.) Roth	Blue Morning Glory	Kaalaadaana	Convolvulaceae	Exotic	NA
21	<i>Ipomoea pes-tigridis</i> L.	Tiger Foot Morning Glory	Gheta	Convolvulaceae	Native	NA
22	<i>Luffa echinata</i> Roxb.	Bitter Sponge Gourd	Kakad Bel, Turiya, Galka	Cucurbitaceae	Native	LC
23	<i>Millettia extensa</i> (Benth.) Benth. ex Baker	Large-Leaf Pongam Creeper	Gauj, Gonj	Fabaceae	Native	NA
24	<i>Momordica dioica</i> Roxb. ex Willd.	Ban Karela	Kinkoda, Kakoda	Cucurbitaceae	Native	NA
25	<i>Mucuna pruriens</i> (L.) DC.	Velvet Bean	Kemach, Kaunch	Fabaceae	Native	LC
26	<i>Tinospora cordifolia</i> (Willd.) Hook.f. & Thomson	Gulbel	Giloy	Menispermaceae	Native	NA
<b>Lower Plants</b>						
1	<i>Actiniopteris radiata</i>	Ray Fern	Morpankhi	Pteridaceae	-	NA
2	<i>Adiantum caudatum</i>	Tailed Maidenhair	-	Pteridaceae	-	NA
3	<i>Adiantum lunulatum</i>	-	Hansraaj	Pteridaceae	-	NA
4	<i>Ampelopteris prolifera</i>	Riverine Scrambler	-	Pteridaceae	-	NA
5	<i>Azolla pinnata</i>	Mosquito-fern	-	Salviniaceae	-	NA
6	<i>Cheilanthes farinosa</i>	-	-	Pteridaceae	-	NA
7	<i>Ophioglossum costatum</i>	-	Sarpajhivhi	Ophioglossaceae	-	NA

S.N.	Scientific name	Common name	Local name	Family	Origin	IUCN status
8	<i>Ophioglossum petiolatum</i>	Stalked Adder's - Tongue	Sarpajhivhi	Ophioglossaceae	-	NA
9	<i>Selaginella repanda</i>	Spiked Moss	Sanjivani	Selaginellaceae	-	NA

Source: Authenticated list of Rajasthan Forest Department.

#### 1.4.8. Fauna

The WCP area exhibits significant faunal diversity, listed in Table 1.6.

**Table1.6: Faunal diversity of WCP area**

S.N.	Common name	Local name	Scientific name	Family	IUCN Status	WPA
<b>Mammals</b>						
1	Common Palm Civet	Bijju	<i>Paradoxurus hermaphroditus</i>	Viverridae	LC	II
2	Five-striped Palm Squirrel	Gilahari	<i>Funambulus pennantii</i>	Sciuridae	LC	II
3	Golden Jackal	Siyaar	<i>Canis aureus</i>	Canidae	EN	II
4	Grey Wolf	Bhediya	<i>Canis lupus</i>	Canidae	LC	II
5	House Rat	Choocha	<i>Rattus rattus</i>	Muridae	LC	V
6	Indian Crested Porcupine	Sehi	<i>Hystrix indica</i>	Hystricidae	LC	I
7	Indian Flying Fox	Vaagal	<i>Pteropus giganteus</i>	Pteropodidae	LC	IV
8	Indian Fox	Lomadi	<i>Vulpes bengalensis</i>	Canidae	LC	II
9	Indian Giant Flying Squirrel	Udan Gilahari, Ravaaya	<i>Petaurista philippensis</i>	Sciuridae	LC	II
10	Indian Grey Mongoose	Nevla	<i>Herpestes edwardsii</i>	Herpestidae	LC	II
11	Indian Hare	Khargos	<i>Lepus nigricollis</i>	Leporidae	LC	-
12	Indian Hedgehog	Zau chooha	<i>Paraechinus micropus</i>	Erinaceidae	LC	-
13	Jhaumusa	Hedgehog	<i>Hemiechinus auritus</i>	Erinaceidae	LC	-
14	Jungle Cat	Jungli Billi	<i>Felis chaus</i>	Felidae	LC	II
15	Leopard	Baghera, Tendua	<i>Panthera pardus</i>	Felidae	VU	I
16	Nilgai	Neel Gaay	<i>Boselaphus tragocamelus</i>	Bovidae	LC	III
17	Northern Plains Langur	Langur	<i>Semnopithecus entellus</i>	Cercopithecidae	LC	I
18	Rusty-spotted Cat	Jungli Billi	<i>Prionailurus rubiginosus</i>	Felidae	NT	I
19	Sambar	Sambhar	<i>Rusa unicolor</i>	Cervidae	VU	III
20	Shortnosed Fruit Bat	Chamgaadad (Phal Khaanewali)	<i>Cynopterus sphinx</i>	Pteropodidae	LC	IV
21	Small Indian Civet	Bijju Chhota	<i>Viverricula indica</i>	Viverridae	LC	II
22	Striped Hyaena	Jarakh	<i>Hyaena hyaena</i>	Hyaenidae	NT	II
23	Wild Boar	Jungli Suar	<i>Sus scrofa</i>	Suidae	LC	III

S.N.	Common name	Local name	Scientific name	Family	IUCN Status	WPA
<b>Birds</b>						
1	Alexandrine Parakeet	Tota	<i>Palaeornis eupatria</i>	Psittaculidae	LC	IV
2	African Darter	Pandubbi	<i>Anhinga rufa</i>	Anhingidae	LC	-
3	Ashy-crowned Sparrow-lark	-	<i>Eremopterix griseus</i>	Alaudidae	LC	IV
4	Asian Green Bee-eater	Pataranga	<i>Meros orientalis</i>	Meropidae	LC	IV
5	Asian Openbill	-	<i>Anastomus oscitans</i>	Ciconiidae	LC	IV
6	Barn Swallow	-	<i>Hirundo rustica</i>	Hirundinidae	LC	-
7	Baya Weaver	Baya, Chatakali	<i>Ploceus philippinus</i>	Ploceidae	LC	IV
8	Black Drongo	Kotvaal	<i>Dicrurus macrocerous</i>	Dicruridae	LC	IV
9	Black Kite	Cheel	<i>Milvus migrans</i>	Accipitridae	LC	-
10	Black-crowned Night-heron	-	<i>Nycticorax nycticorax</i>	Ardeidae	LC	IV
11	Black-crowned Sparrow-lark	-	<i>Eremopterix nigriceps</i>	Alaudidae	LC	IV
12	Black-headed Bunting	-	<i>Emberiza melanocephalo</i>	Emberizidae	LC	IV
13	Black-headed Ibis	-	<i>Threskiornis melanocephalus</i>	Threskiornithidae	NT	IV
14	Black-rumped Flameback	Kathfoda	<i>Dinopium benghalense</i>	Picidae	LC	IV
15	Black-winged Stilt	Teendhur	<i>Himantopus himantopus</i>	Recurvirostridae	LC	IV
16	Blue-tailed Bee-eater	Bada Pataringa	<i>Merops philippinus</i>	Meropidae	LC	IV
17	Bronze-winged Jacana	-	<i>Metopidius indicus</i>	Jacanidae	LC	IV
18	Cattle Egret	Surkhiya Bagla	<i>Bubulcus ibis</i>	Ardeidae	LC	IV
19	Chestnut-bellied Sandgrouse	-	<i>Pterocles exustus</i>	Pteroclididae	LC	IV
20	Chestnut-shouldered Bush-sparrow	-	<i>Gymnoris xanthocollis</i>	Passeridae	LC	IV
21	Common Babbler	Chilaachil	<i>Argya caudata</i>	Leiothrichidae	LC	IV
22	Common Barn-owl	-	<i>Tyto alba</i>	Tytonidae	LC	IV
23	Common Coot	Aari	<i>Fulica atra</i>	Rallidae	LC	IV
24	Common Crane	-	<i>Grus grus</i>	Gruidae	LC	IV
25	Common Hawk-cuckoo	Papeeha	<i>Hierococcyx varius</i>	Cuculidae	LC	IV
26	Common Hoopoe	Hud hud	<i>Upupa epops</i>	Upupidae	LC	IV
27	Common Iora	Shobigi	<i>Aegithina tiphia</i>	Aegithinidae	LC	IV
28	Common Kestrel	Kosatiya	<i>Falco tinnunculus</i>	Falconidae	LC	IV
29	Common Kingfisher	Chhota Kilkila	<i>Alcedo atthis</i>	Alcedinidae	LC	IV

S.N.	Common name	Local name	Scientific name	Family	IUCN Status	WPA
30	Common Moorhen	Jalmurgi, Bodur	<i>Gallinula chloropus</i>	Rallidae	LC	IV
31	Common Myna	Desi Maina, Kaabar	<i>Acridotheres tristis</i>	Sturnidae	LC	IV
32	Common Quail	Chhupkash	<i>Coturnix coturnix</i>	Phasianidae	LC	IV
33	Common Sandpiper	-	<i>Actitis hypoleucos</i>	Scolopacidae	LC	IV
34	Common Tailorbird	Darji	<i>Orthotomus sutorius</i>	Cisticolidae	LC	IV
35	Common Teal	-	<i>Anas crecca</i>	Anatidae	LC	IV
36	Common Woodshrike	-	<i>Tephrodornis pondicerianus</i>	Vangidae	LC	IV
37	Crested Bunting	Pahaar Chidiya	<i>Emberiza lathami</i>	Emberizidae	LC	IV
38	Dusky Eagle-owl	-	<i>Bubo coromandus</i>	Strigidae	LC	IV
39	Eastern Spotted Dove	Parki, Holi	<i>Spilopelia chinensis</i>	Columbidae	LC	IV
40	Egyptian Vulture	-	<i>Neophron percnopterus</i>	Accipitridae	LC	IV
41	Eurasian Collared-dove	Dhor, Faakhta, Holi	<i>Streptopelia decaocto</i>	Columbidae	LC	IV
42	Eurasian Eagle-owl	-	<i>Bubo bubo</i>	Strigidae	LC	-
43	Eurasian Spoonbill	Chamcha	<i>Platalea leucorodia</i>	Threskiornithidae	LC	IV
44	Eurasian Thick-knee	-	<i>Burhinus oedicephalus</i>	Burhinidae	LC	IV
45	Fork-tailed Drongo	-	<i>Dicrurus adsimilis</i>	Dicruridae	LC	-
46	Great Cormorant	-	<i>Phalacrocorax carbo</i>	Phalacrocoracidae	LC	IV
47	Great Tit	Ramgangara	<i>Parus major</i>	Paridae	LC	-
48	Greater Coucal	Bharadwaj	<i>Centropus sinensis</i>	Cuculidae	LC	IV
49	Grey Francolin	-	<i>Francolinus pondicerianus</i>	Phasianidae	LC	IV
50	Grey Heron	-	<i>Ardea cinerea</i>	Ardeidae	LC	IV
51	Grey Junglefowl	-	<i>Gallus sonneratii</i>	Phasianidae	LC	IV
52	Grey Wagtail	-	<i>Motacilla cinerea</i>	Motacillidae	LC	IV
53	House Crow	Kota Kaagla	<i>Corvus splendens</i>	Corvidae	LC	V
54	House Sparrow	Goreya	<i>Passer domesticus</i>	Passeridae	LC	IV
55	Indian Golden Oriole	Peelak	<i>Oriolus kundoo</i>	Oriolidae	LC	IV
56	Indian Grey Hornbill	-	<i>Ocyrceros birostris</i>	Bucerotidae	LC	IV
57	Indian Nightjar	-	<i>Caprimulgus asiaticus</i>	Caprimulgidae	LC	IV
58	Indian Paradise-flycatcher	Shaah Bulbul	<i>Terpsiphone paradisi</i>	Monarchidae	LC	IV
59	Indian Peafowl	Mor(Nar), Dheladi (Mada)	<i>Pavo cristatus</i>	Phasianidae	LC	I



S.N.	Common name	Local name	Scientific name	Family	IUCN Status	WPA
60	Indian Pitta	-	<i>Pitta brachyura</i>	Pittidae	LC	IV
61	Indian Pond-heron	Anjan	<i>Ardea grayii</i>	Ardeidae	LC	IV
62	Indian robin	-	<i>Saxicoloides fulicatus</i>	Muscicapidae	LC	IV
63	Indian Roller	Neelkanth	<i>Coracias benghalensis</i>	Coraciidae	LC	IV
64	Intermediate Egret	-	<i>Egretta intermedia</i>	Ardeidae	LC	IV
65	Jacobin Cuckoo	Papiya	<i>Clamator jacobinus</i>	Cuculidae	LC	IV
66	Jungle Babbler	-	<i>Argya striata</i>	Leiothrichidae	LC	IV
67	Laggar Falcon	-	<i>Falco jugger</i>	Falconidae	NT	I
68	Large-billed Crow	Jangli Kouaa	<i>Corvus macrorhynchos</i>	Corvidae	LC	IV
69	Laughing Dove	Chhota Faakhta, Holi	<i>Spilopelia senegalensis</i>	Columbidae	LC	IV
70	Little Cormorant	Pankoa, Kagali	<i>Microcarbo niger</i>	Phalacrocoracidae	LC	IV
71	Little Egret	Kalchhiya	<i>Egretta garzetta</i>	Ardeidae	LC	IV
72	Little Grebe	Pandubbi, Dubdubi	<i>Tachybaptus ruficollis</i>	Procellariidae	LC	IV
73	Oriental Honey-buzzard	-	<i>Pernis ptilorhynchus</i>	Accipitridae	LC	-
74	Oriental Magpie-robin	Daya	<i>Copsychus saularis</i>	Muscicapidae	LC	IV
75	Painted Francolin	-	<i>Francolinus pictus</i>	Phasianidae	LC	IV
76	Painted Stork	Kokari	<i>Mycteria leucocephala</i>	Ciconiidae	LC	IV
77	Pale-billed Flowerpecker	-	<i>Dicaeum erythrorhynchos</i>	Dicaeidae	LC	IV
78	Pheasant-tailed Jacana	Peeho	<i>Hydrophasianus chirurgus</i>	Jacanidae	LC	IV
79	Pied Kingfisher	Koriyala Kilila	<i>Ceryle rudis</i>	Alcedinidae	LC	IV
80	Plaintive Cuckoo	-	<i>Cacomantis merulinus</i>	Cuculidae	LC	IV
81	Plum-headed Parakeet	Tui	<i>Himalayapsitta cyanocephala</i>	Psittaculidae	LC	IV
82	Purple Heron	-	<i>Ardea purpurea</i>	Ardeidae	LC	IV
83	Purple Sunbird	Shakkar Khora	<i>Cinnyris asiaticus</i>	Nectariniidae	LC	IV
84	Purple Swampphen	Karma, Khareen	<i>Porphyrio porphyrio</i>	Rallidae	LC	IV
85	Purple-rumped Sunbird	-	<i>Leptocoma zeylonica</i>	Nectariniidae	LC	IV
86	Red Collared dove	Girvi Faakhta, Holi	<i>Streptopelia tranquebarica</i>	Columbidae	LC	-
87	Red Spurfowl	-	<i>Gallus spadicea</i>	Phasianidae	LC	IV
88	Red-headed Bullfinch	-	<i>Pyrrhula erythrocephala</i>	Fringillidae	LC	IV
89	Red-naped Ibis	-	<i>Pseudibis papillosa</i>	Threskiornithidae	LC	IV
90	Red-vented Bulbul	Bulbul	<i>Pycnonotus cafer</i>	Pycnonotidae	LC	IV

S.N.	Common name	Local name	Scientific name	Family	IUCN Status	WPA
91	Red-wattled Lapwing	Titahari	<i>Vanellus indicus</i>	Charadriidae	LC	IV
92	River Tern	Kuri	<i>Sterna aurantia</i>	Laridae	VU	IV
93	Rock Dove	Kabootar, Paareva	<i>Columba livia</i>	Columbidae	LC	-
94	Rose-ringed Parakeet	Raay Tota, Gaagron, Jungli Tota	<i>Alexandrinus krameri</i>	Psittaculidae	LC	IV
95	Rufous Treepie	Mahaalar, Ganela	<i>Dendrocitta vagabunda</i>	Corvidae	LC	IV
96	Sarus Crane	Saaras	<i>Grus antigone</i>	Gruidae	LC	IV
97	Scarlet Minivet	Pahadi	<i>Pericrocotus flammeus</i>	Campephagidae	LC	IV
98	Shikra	Shikra	<i>Accipiter badius</i>	Accipitridae	LC	-
99	Short-toed Snake-eagle	-	<i>Circaetus gallicus</i>	Accipitridae	LC	-
100	Small Minivet	Saheli	<i>Pericrocotus cinnamomeus</i>	Campephagidae	LC	IV
101	Spotted Owlet	Chhapeda, Chheebada	<i>Athene brama</i>	Strigidae	LC	IV
102	Tawny Eagle	-	<i>Aquila rapax</i>	Accipitridae	VU	-
103	Vernal Hanging-parrot	-	<i>Loriculus vernalis</i>	Psittaculidae	LC	IV
104	Western Koel	Koyal	<i>Eudynamis scolopacea</i>	Cuculidae	LC	IV
105	Western Reef-egret	-	<i>Egretta gularis</i>	Ardeidae	LC	IV
106	White Wagtail	-	<i>Motacilla alba</i>	Motacillidae	LC	IV
107	White-breasted Kingfisher	-	<i>Halcyon smyrnensis</i>	Alcedinidae	LC	IV
108	White-breasted Waterhen	Jalmurgi	<i>Amaurornis phoenicurus</i>	Rallidae	LC	IV
109	White-browed Fantail	-	<i>Rhipidura aureola</i>	Rhipiduridae	LC	IV
110	White-browed Wagtail	Khanjan	<i>Motacilla maderaspatensis</i>	Motacillidae	LC	IV
111	White-rumped Vulture	-	<i>Gyps bengalensis</i>	Accipitridae	CR	I
112	Wire-tailed Swallow	Leeshra	<i>Hirundo smithii</i>	Hirundinidae	LC	-
113	Yellow-crowned Woodpecker	-	<i>Leiopicus mahrattensis</i>	Picidae	LC	IV
114	Yellow-footed Green-pigeon	Hariyal	<i>Treron phoenicopterus</i>	Columbidae	LC	IV
115	Yellow-wattled Lapwing	Jardi	<i>Vanellus malabaricus</i>	Charadriidae	LC	IV
Reptiles						

S.N.	Common name	Local name	Scientific name	Family	IUCN Status	WPA
1	Asian Chameleon	Haalniya	<i>Chamaeleo zeylanicus</i>	Chamaeleonidae	LC	II
2	Bengal Monitor lizard	Goh	<i>Varanus bengalensis</i>	Varanidae	NT	I
3	Brooke's house gecko	-	<i>Hemidactylus brookii</i>	Gekkonidae	LC	-
4	Changeable Lizard	Girgit	<i>Calotes versicolor</i>	Draconinae	LC	-
5	Checkered Keelack	-	<i>Fowlea piscator</i>	Colubridae	LC	II
6	Common Bronzeback Tree Snake	-	<i>Dendrelaphis tristis</i>	Colubridae	LC	IV
7	Common Dotted Garden Skink	-	<i>Lygosoma punctata</i>	Lygosominae	LC	-
8	Common Indian Krait	-	<i>Bungarus caeruleus</i>	Elapidae	LC	IV
9	Indian Spiny-tailed Lizard	-	<i>Saara hardwickii</i>	Uromastycina	VU	II
10	Indian Star Tortoise	Kachhua (Bhoomika)	<i>Geochelone elegans</i>	Testudininae	VU	III
11	Keeled Indian Mabuaya	Naagar Baamni	<i>Eutropis carinata</i>	Mabuyinae	LC	-
12	Oriental Rat Snake	Dhaaman	<i>Ptyas mucosa</i>	Colubridae	LC	II
13	Pondichéry Fan-throated Lizard	-	<i>Sitana ponticeriana</i>	Draconinae	LC	-
14	Red Sand Boa	Dumuha	<i>Eryx johnii</i>	Acrochordidae	NT	IV
15	Russell's Viper	Chitti	<i>Daboia russelii</i>	Viperidae	LC	II
16	Spectacled Cobra	Naag	<i>Naja naja</i>	Elapidae	LC	II
17	Spotted Leaf-toed Gecko	-	<i>Hemidactylus maculatus</i>	Gekkonidae	LC	-
18	Termite Gecko	-	<i>Hemidactylus triedrus</i>	Gekkonidae	LC	-
19	Yellow-bellied House Gecko	Chhipkali	<i>Hemidactylus flaviviridis</i>	Gekkonidae	LC	-
<b>Fishes</b>						
1	Butter Catfish	Pabada	<i>Ompok bimaculatus</i>	Siluridae	NT	-
2	Catla	Catla	<i>Labeo catla</i>	Cyprinidae	LC	-
3	Common carp	Common carp	<i>Cyprinus carpio</i>	Cyprinidae	VU	-
4	Fringed-lipped peninsula carp	Mamola	<i>Labeo fimbriatus</i>	Cyprinidae	LC	-
5	Gangetic Mystus	Katerana	<i>Mystus cavasius</i>	Bagridae	LC	-
6	Giant River-catfish	Singhada	<i>Sperata seenghala</i>	Bagridae	LC	-
7	Grass carp	Grass carp	<i>Ctenopharyngodon idella</i>	Cyprinidae	LC	-
8	Great Snakehead	Saval	<i>Channa marulius</i>	Channidae	LC	-
9	Kuria Labeo	Sarsi	<i>Labeo gonius</i>	Cyprinidae	LC	-

S.N.	Common name	Local name	Scientific name	Family	IUCN Status	WPA
10	Mrigala	Migal	<i>Cirrhinus mrigala</i>	Cyprinidae	LC	-
11	Reba Carp	Bhagal	<i>cirrhinus reba</i>	Cyprinidae	LC	-
12	Rohu	Rohu	<i>Labeo rohita</i>	Cyprinidae	LC	-
13	Silver carp	Silver carp	<i>Hypophthalmichthys molitrix</i>	Cyprinidae	NT	-
14	Spiny Eel	Bam	<i>Mastacembelus armatus</i>	Mastacembelidae	LC	-
15	Spotted Snakehead	Girae	<i>Channa punctata</i>	Channidae	LC	-
16	Wallago Catfish	Lachi	<i>Wallago attu</i>	Siluridae	VU	-
<b>Invertebrates</b>						
<b>Arachnids</b>						
1	Giant Daddy Long-legs Spider	-	<i>Artema atlanta</i>	Pholcidae	NA	-
2	Jumping Spider	-	<i>Plexippus paykulli</i>	Salticidae	NA	-
3	Long-jawed Orb-weavers Spider	-	<i>Tetragnatha mandibulata</i>	Tetragnathidae	NA	-
4	Orb-web Spider	-	<i>Argiope arcuata</i>	Araneidae	NA	-
5	Tailed Daddy Longlegs Spiders	-	<i>Crossopriza lyoni</i>	Pholcidae	NA	-
<b>Insects</b>						
1	Silverfish	-	<i>Lepisma saccharinum</i>	Lepismatidae	NA	-
2	Cockroach	-	<i>Periplaneta americana</i>	Blattidae	NA	-
3	House Cricket	-	<i>Acheta domesticus</i>	Gryllidae	LC	-
4	Giant Honeybee	-	<i>Apis dorsata</i>	Apidae	NA	-
5	Indian Honeybee	-	<i>Apis cerana indica</i>	Apidae	NA	-
6	Six-spot Ground Beetle	-	<i>Anthia sexguttata</i>	Carabidae	NA	-
7	Blue Pansy	-	<i>Junonia orithya</i>	Nymphalidae	LC	-
8	Striped Tiger	-	<i>Danaus genutia</i>	Pieridae	NA	-
9	Common Crow	-	<i>Euploea core</i>	Pieridae	LC	IV
10	Common Grass Yellow	-	<i>Eurema hecabe</i>	Pieridae	NA	-
11	Common Mormon	-	<i>Papilio polytes</i>	Papilionidae	NA	-
12	Lime Swallowtail	-	<i>Papilio domoleus</i>	Papilionidae	NA	-
13	Plain tiger	-	<i>Danaus chrysippus</i>	Pieridae	LC	-
14	Yellow Orange-tip	-	<i>Ixias pyrene</i>	Pieridae	NA	-
15	Lac insect	-	<i>Kerria lacca</i>	Kerriidae	NA	-
16	-	-	<i>Cimex sp.</i>	Cimicidae	NA	-
<b>Molluscs</b>						
1	-	-	<i>Filopaludina bengalensis</i>	Viviparidae	LC	-
2	-	-	<i>Lymnaca acuminata</i>	Lymnaeidae	LC	-



S.N.	Common name	Local name	Scientific name	Family	IUCN Status	WPA
3	-	-	<i>L. (P) a. f. patula</i>	Lymnaeidae	NA	-
4	-	-	<i>Indoplanorbis exustus</i>	Planorbidae	LC	-
5	-	-	<i>Macrochlamys indica</i>	Ariophantidae	NA	-
<b>Others</b>						
1	-	-	<i>Scolopendra sp.</i>	Scolopendridae	NA	-

Source: Authenticated list of Rajasthan Forest Department.

## 1.5. Description of forest and habitat conditions and wildlife scenario of WCP area

The forest type in WCP area is Dry deciduous rainforest along with Scrublands. It is mainly comprises of Agricultural land (44.96 %), Open Scrub land (29.25%) & Forest Land (14.72 %) respectively, of the total WCP area. Rest of the covers only 11.7% of the WCP area including Water Body, River/Nala, Plantation, Mine Quarry, Waste disposal site, industry, Human Settlement, Railway and Road. 17 no. of RFs are there within the WCP area as mentioned below. The buffer zone studied has no ecological sensitive area (National Park, Wildlife Sanctuary, Biosphere Reserve/ etc.). 0.35 % of the total WCP area is majorly occupied by Chanderiya Lead Zinc Smelter complex.

However, 17 Reserve Forest lies within 10 km of the WCP area which are given as below:

- Dadiya RF (~9.5 km in NNW direction from plant site)
- Baramagra RF (~9.5 km in NNW direction from plant site)
- Shikargarh Salera RF (~1.5 km in NW direction from plant site)
- RF (~7.5 km in NNW direction from plant site)
- Kabra RF (~4.0 km in NW direction from plant site)
- Modia Magra RF (~3.5 km in WNW direction from plant site)
- Era RF (~6.5 km in NW direction from plant site)
- RF (~3.5 km in SSW direction from plant site)
- Bir Salarmala RF (~1.5 km in WNW direction from plant site)
- Nilia Block RF (~4.5 km in East direction from plant site)
- Samra RF (~6.5 km in East direction from plant site)
- Dundaniya RF (~9.0 km in East direction from plant site)
- Bhugariya Block RF (~10 km in East direction from plant site)
- Barkhera Block RF (~8 km in SE direction from plant site)
- Reserved Forest (~4 km in SSE direction from plant site)
- Chittorgarh Fort RF (~5.5 km in South direction from plant site)
- Sadi Block RF (~10 km in SE direction from plant site)

### 1.5.1. Population status of Wildlife

The Wild Mammals population outside Protected Areas in Chittorgarh District is as presented Table 1.7. 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 1.7: Population status of Mammals in Chittorgarh Forest Division**

SN.	Common Name	Local name	Scientific name	2018	2019	2020	WPA Schedule
1.	Indian Leopard	Baghera	<i>Panthera pardus</i>	6	5	6	I
2.	Sloth Bear	Bhaloo	<i>Melursus ursinus</i>	10	8	2	I

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SN.	Common Name	Local name	Scientific name	2018	2019	2020	WPA Schedule
3.	Indian Wolf	Bhedia	<i>Canis lupus pallipes</i>	13	24	30	I
4.	Civets	Bijju	<i>Viverridae spp.</i>	18	33	15	II
5.	Indian Gazelle	Chinkara	<i>Gazelle gazelle benetti</i>	34	52	24	
6.	Hyena	Jarakh	<i>Hyaena hyaena</i>	47	85	50	III
7.	Jungle cat	Junglee Billi	<i>Felis chaus</i>	288	57	65	II
8.	Wild Boar	Junglee Suar	<i>Sus scrofa</i>	340	440	384	III
9.	Common Langur	Langur	<i>Presbytis entellus</i>	1062	693	1275	
10.	Fox/ Desert Fox	Lomdi	<i>Vulpes bucapus</i>	52	85	52	
11.	Mongoose	Nevla	(All species of genus)	134	65	0	
12.	Nilgai	Nilgai	<i>Boselaphus tragocamelus</i>	1445	1009	1103	III
13.	Indian Porcupine	Sehil (Sehi)	<i>Hystrix indica</i>	12	18	14	IV
14.	Jackal	Siyaar/Geedar	<i>Canis aureus</i>	493	546	482	II

Source: <https://forest.rajasthan.gov.in/content/raj/forest/en/home.html#>

## 1.6. Movement of Wildlife in WPC area

As per the field survey and List of Flora; no endemic species of flora have been observed. Total of 64 trees, 28 shrubs, 43 herbs, 11 species of grass have been recorded in the WCP area based on primary observation as well as based on information collected from the secondary data.

Among fauna, 22 species of mammals, 20 species of reptiles & amphibians and 30 species of Butterfly and Arthropods were recorded from the WCP area. Among avifauna, 64 species were recorded in the WCP area. No National Park, Sanctuary, Biosphere Reserve, Migratory Corridor of wild animals exists within 10 km radius WCP area (Annexure - I).

## 1.7. Man-animal conflict

During the social survey, every respondent confirmed the presence of Nilgai in the project area. Its presence was also confirmed during the ecological assessment. Many farmers reported that Nilgai is a 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, Nilgai nuisance 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.

Apart from Nilgai secondary sources also suggest that other animals who are involved in the Man- animal conflicts in the area are the leopard and Sloth bear. The attacks have been reported on both humans as well as livestock.

## 1.8. Other projects in the WCP area

Details of the major Industries falling within WCP area are as given below:

**Table 1.8: List of major industries falling WCP area.**

SN.	Industries	Type of Industries	Approx. Distance from the project boundary (km)	Direction from center of the project site
1.	Swastik Polytex Pvt.Ltd.	Fabric	~ 1.9	North
2.	Chittor cement works	Cement	~ 2.69	SW
3.	Birla cement works	Cement	~ 3	SW
4.	RIICO Industrial area		~ 4.5	SW
5.	Chittor Polyfab Pvt.Ltd.	Fabric Synthetic	~ 5.8	South
6.	Star Cotspin LTD.	Synthetic	~ 5.8	North

SN.	Industries	Type of Industries	Approx. Distance from the project boundary (km)	Direction from center of the project site
7.	Inani marbles & granites	Marble & Granites	~ 6	WSW
8.	Wonder cement - Basant Enterprises	Cement	~ 10	SSW
9.	Apart from the above, various medium & small industrial units are there within the WCP area			
Source: EIA Report & EMP for Expansion within the existing Chanderiya lead zinc smelter complex, Chittorgarh (Rajasthan).				

## 1.9. Experts in Wildlife Conservation Plan

SN.	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 Biodiversity, 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

## 1.10. Field visits and data collection Methodologies

Baseline data was collected for the WCP area by monitoring and surveying of various environmental components / parameters in the core as well as buffer zone during the study period i.e., post monsoon Season (Oct. to Dec., 2020) and One Month additional study for AAQ during (October, 2021). Details are given in the Table 1.8. given below.

Sampling, preservation, transportation/storage and analysis of samples were carried out by J.M. EnviroLab Pvt. Ltd. under the supervision of respective EC/FAE concerned.

**Table 1.9: Baseline data collection (Post monsoon season – October to December 2020 & October 2021)**

S. N.	Environmental component	Primary data				Secondary data
		Parameters	Frequency	Monitoring / Sampling Location	Methodology	
1.	Land	Agriculture Habitation Industry Stony waste / Quarries Forest area Plantation/ Vegetation Open scrub Water bodies Land use/ Land Cover	Once in a Study period Season	10 km radius WCP 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.
2.	Meteorology	Temperature,	Daily	01 (Plant site)	Automatic weather	IMD book (Climatological)

S. N.	Environmental component	Primary data				Secondary data
		Parameters	Frequency	Monitoring / Sampling Location	Methodology	
		Relative Humidity, Wind Speed, Wind Direction Rainfall			monitoring station	normal 1981-2010), Past year Rainfall data for Chittorgarh district.
3.	Air	PM10, PM2.5, SO2, NO2, CO, Lead, Nickel.	One season study (Twice a week) (As per NAAQS)	09 (Oct. to Dec.,2020) & 13 (Oct.,2021)	Sampling: CPCB Guidelines / NAAQ S / IS 5182 and Instrument Manual  Analysis: CPCB Guidelines / IS 5182	-
		O3, NH3, Benzene, Benzo(a)pyrene (BaP)-Particulate phase only, Arsenic, Zinc	Once in a season			
4.	Noise	Equivalent noise levels in Leq in dB (A) Day time & Night time	Once in a season	09	Sampling: IS 9989 Analysis: CPCB Guidelines / IS 9989	-
5.	Water					
a.	Surface Water	Parameters as per IS 10500 - 2012	Once in a season	05	Sampling: CPCB Guideline & APHA 22nd edition 2012	-
B.	Ground Water		Once in a season	08	Analysis: IS 10500 - 2012 / IS 3025 / APHA 22 <sup>nd</sup> edition 2012	-
7.	Soil	Parameters as per IS 2720 / USDA	Once in a season	08	Sampling: USDA Analysis: As per IS 2720 / USDA	Indian Agricultural Research Institute Handbook
8.	Biological Environment	Flora and fauna	Once in a season	WCP area	Quadrat sampling method / random sampling	Forest working plan and Local Information <a href="https://forest.rajabhadrachhatra.gov.in/">https://forest.rajabhadrachhatra.gov.in/</a>
9.	Socio -	Socio – Economic	Once in a season	WCP area	Economic Parameter	Demographic Data:



S. N.	Environmental component	Primary data				Secondary data
		Parameters	Frequency	Monitoring / Sampling Location	Methodology	
	Economic Environment	Demography			Random Sampling of the villages. Survey Conduction, Through Questionnaire approach.	Census data, 2011.  Basic amenities Data: Census data, 2011.
Source: EIA Report & EMP for Expansion within the existing Chanderiya lead zinc smelter complex, Chittorgarh (Rajasthan).						

## 1.11. Literature review

### 1.11.1. 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. 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 (Sylvia 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).

### 1.11.2. Relevant research on WCP area

A 'Biodiversity Management Plan' focuses on the flora and fauna found in the area in 10 km radius of CLZS Complex. Ecological field surveys were conducted in two 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.

### 1.12. Geographical information of WCP area

Geographical information regarding the geology, other projects, topography, water and drainage patterns, land use, transport routes in the WCP area are included in Chapter 1. Biodiversity sensitivity map, water bodies for implementing conservation measures for some of the faunal species.

## Chapter 2

### 2.1 Threat analysis

#### 2.1.1. Impact of project on environment and other factors

The anticipated environmental impacts of the Expansion within the existing Chanderiya Lead Zinc Smelter Complex 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, and 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-liftment of people, there is need for establishment of industries, but these have to be environmental 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.

#### Basis of impact assessment

The impact of the proposed expansion within the CLZS Complex would be assessed on the basis of their characteristics i.e. nature, type, extent, duration, intensity & frequency and its significance.

#### Impact on Topography & 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 Chanderiya Lead Zinc Smelter Complex is 335.89 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 CLZS complex.
- 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 (335.89 ha), 121.77 ha area has already been developed under greenbelt/ plantation. The same will be maintained and enhanced by doing gap plantation to achieve the plantation density @2500/ha.

#### Impact on Air quality

Increase in dust (Particulate Matter) and NO<sub>x</sub> concentration due to Leveling activity and Heavy vehicular movement.

- The main sources of dust emission are the movement of equipment at site, leveling, 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<sub>2</sub>, NO<sub>x</sub>, 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.

## 2.1.2. Pollutants from the project and their effect on environment

Pollutants released from the project activity and their effects on biological environment of the WCP area is presented in Table 2.1.

**Table 2.1: Pollutants from the beneficiation project and their impact on biological environment**

SN.	Floral	Faunal
SO <sub>x</sub>	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.	Alterations in the tracheal epithelium
NO <sub>x</sub>		
Particulate Matter (PM)		
Source: EIA Report & EMP for Expansion within the existing Chanderiya lead zinc smelter complex, Chittorgarh (Rajasthan).		

These impacts are strictly based on Literature Review and are not Site specific. Laboratory analysis and sampling is required for site specific data and not within the scope of this study.

## 2.2. Quantification of degradation of environmental parameters due to project activities

### 2.2.1. Soil

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 Expansion within existing CLZS Complex, 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 project site. Standard procedures were followed for the sampling and analysis of physicochemical parameters. Details of Location of soil sampling stations along analysis results are given in Table 2.2.

The pH in all the soil samples varies from 7.35 to 7.92 which show that the soil is slightly Alkaline to moderately alkaline in nature which is an optimal range for the various principle crops such as wheat, mustard, Bajra, guar; pulses such as Gram, Moong, chaula and commercial crops such as Methi, onion, chillies, etc. (District census Handbook, Chittorgarh, 2011). The soil samples majorly exhibit different colour of soil viz. Brownish, Brown, Blackish brown, Reddish Brown & the textures of the soil samples majorly was Silty Loam, Loam Clay, Silt Clay Loam & Sandy clay Loam. The samples have rich content of organic matter comprising of 0.84 % to 1.41 % for the plant growth. Examined essential nutrients required for an ideal plant growth are Nitrogen, Phosphorus, Potassium, Magnesium, Sulfur and calcium. All the essential nutrients were observed to be Nitrogen (196.81 to 350.14 kg/ha), Phosphorous (39.74 to 58.64 kg/ha), Potassium (186.61 to 329.86 kg/ha), Magnesium (362.95 to 499.32 mg/kg), Calcium (1692.5 to 3096.5 mg/kg). As observed the Nitrogen content in the soil sampled was observed to be present in the better to sufficient quantity, where the values for phosphorus and potassium indicate the medium to better range. Optimum calcium values in the soil sample have resulted in alkaline nature of the soil within the area which makes it suitable for the plant to grow well in both the seasons. The SAR value was observed with maximum value of 0.75 at Village Nagari to minimum value of 0.47 at Chittorgarh (Zinc Nagar), which indicates the soil samples do not have any presence of Sodidity which can affect the plant growth and indicates the suitability of water used for irrigation purpose in the area.

From the results, it can be concluded that the quality of the soil within the study area varies from medium to good range and contains sufficient macro and micro nutrients which are vital for the healthy plant.



**Table 2.2: Soil Quality Analysis Results - Study Period –Post Monsoon Season (Oct. to Dec., 2020)**

S. No.	Parameters	Unit	Sampling Locations							
			Plant site	Putholi	Nagari	Village- Biliya	Village- Semalpura	Chittorgarh (Zinc Nagar)	Village- Khuntiya	Ajoliyan Ka Khera
1	pH (at 25°C) (1:2.5 soil water sus.)	-	7.35	7.86	7.82	7.42	7.69	7.92	7.45	7.76
2	Conductivity (1:2 soil water sus)	mS/cm	0.44	0.39	0.53	0.37	0.47	0.49	0.41	0.42
3	Soil Texture	-	Sandy clay loam	Loam clay	Silt Clay Loam	Loam clay	Sandy Clay Loam	Silty Loam	Silty Loam	Silty Loam
4	Colour	-	Brownish	Reddish Brown	Brown	Brown	Brown	Blackish Brown	Blackish Brown	Blackish Brown
5	Water holding capacity	%	41.61	37.16	40.44	34.32	35.48	42.70	39.79	40.37
6	Bulk density	gm/cc	1.37	1.39	1.35	1.40	1.33	1.30	1.34	1.32
7	Soluble Chloride	mg/kg	77.13	66.86	114.60	81.24	104.03	96.40	114.20	110.19
8	Exchangeable Calcium	mg/kg	2356.3	1956.8	3096.5	1692.5	2303.7	2686.2	2411.0	2231.6
9	Exchangeable Sodium	mg/kg	114.7	131.3	165.2	121.3	98.3	101.4	108.1	96.5
10	Available Potassium	kg/hect	327.21	186.61	205.51	189.37	265.89	311.30	329.86	286.99
11	Organic matter	%	1.29	1.23	0.99	1.41	1.16	1.38	0.84	1.38
12	Exchangeable Magnesium as Mg	mg/kg	400.47	418.86	362.95	499.32	394.05	488.37	401.92	367.83
13	Available Nitrogen as N	kg/hect	277.33	196.81	239.60	213.16	208.08	350.14	218.54	241.71
14	Available Phosphorus	kg/hect	48.73	43.07	41.93	51.60	39.74	58.64	42.91	50.05
15	Total Zinc as Zn	mg/kg	45.28	39.09	39.43	38.47	38.59	38.21	31.31	30.89
16	Total Manganese as Mn	mg/kg	342.25	329.67	321.08	267.05	240.73	344.12	253.33	302.58
17	Total chromium as Cr	mg/kg	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)
18	Total Lead as Pb	mg/kg	18.58	21.00	19.93	20.24	20.70	20.00	16.94	24.13
19	Total Cadmium as Cd	mg/kg	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)
20	Total Copper as Cu	mg/kg	39.80	19.88	22.17	25.48	22.37	34.72	21.81	37.55
21	Organic Carbon	%	0.75	0.71	0.57	0.82	0.67	0.80	0.49	0.80
22	SAR Value	-	0.58	0.70	0.75	0.67	0.50	0.47	0.54	0.50

Source: EIA Report & EMP for Expansion within the existing Chanderiya lead zinc smelter complex, Chittorgarh (Rajasthan).

## 2.2.2. Air

Ambient air quality monitoring has been carried out within the 10 km study area of the Expansion in existing CLZS Complex 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. Details of these sampling stations are presented in Table 2.3:

**Table 2.3: Sampling stations within WCP area**

S. N.	Monitoring Location	Approx. Distance & Direction from Project Site		Selection criteria for Project Site
		Aerial Distance	Direction	
1	Plant Site	-	-	• Core zone
2	Ghosundi	7.0 km	NE	• Upwind of pre-dominant direction • Near NH 76
3	Putholi	0.5 km	SW	• Downwind of pre-dominant direction • Habitation in buffer zone • Near NW railway line
4	Chanderiya	2.5 km	SW	• Downwind of pre-dominant direction • Habitation in buffer zone • Near existing industry
5	Ajoliyan Ka Khera	1.0 km	West	• Near NH 79 • Near PF & RF • Habitation in thbuffer zone
6	Biliya	Adjacent	North	• Adjacent to plant site • Habitation in buffer zone
7	Mungava ka khera	1.0 km	South	• Habitation in buffer zone
8	Chogawadi	5.0 km	North	• Habitation in buffer zone
9	Chittorgarh (Zinc Nagar)	7.0 km	SSW	• Near Chittorgarh fort RF • Mostly populated area
Source: EIA Report & EMP for Expansion within the existing Chanderiya lead zinc smelter complex, Chittorgarh (Rajasthan).				

Table 2.4 (A) and Table 2.4 (B) below shows the maximum and minimum concentrations of the air pollutants monitored at different monitoring locations during the study period.

**Table 2.4 (A): Ambient Air Quality Monitoring Results**  
**Study Period: Post Monsoon Season (Oct. to Dec., 2020)**

S. N.	Sampling location	Parameters													
		PM2.5 (µg/m3)		PM10 (µg/m3)		NO2 (µg/m3)		SO2 (µg/m3)		CO (mg/m3)		Pb (µg/m3)		Ni (ng/m3)	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	Plant Site	55.4	40.7	92.4	76.2	38.6	24.1	19.7	11.2	1.13	0.74	0.59	0.26	14.3	6.6
2	Village-Ghosundi	38.6	27.6	78.3	58.2	25.6	15.7	14.0	6.3	0.69	BDL	0.08	BDL	BDL	
3	Putholi	47.2	35.0	89.2	72.4	31.5	19.6	16.7	9.2	0.99	0.67	0.12	BDL	5.4	1.9
4	Village-Chanderiya	48.2	36.8	87.3	71.8	32.0	20.3	17.6	9.9	0.89	0.63	0.41	0.17	9.6	4.1
5	Ajaliyan Ka Khera	41.3	31.2	82.5	63.9	27.8	14.3	14.2	6.8	0.78	0.59	0.31	0.12	6.6	2.6
6	Village-	45.1	34.1	83.7	66.5	28.9	18.2	14.8	7.7	0.84	0.56	0.23	0.06	4.3	BDL

S. N.	Sampling location	Parameters													
		PM2.5 (µg/m3)		PM10 (µg/m3)		NO2 (µg/m3)		SO2 (µg/m3)		CO (mg/m3)		Pb (µg/m3)		Ni (ng/m3)	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	Biliya														
7	Mungava ka khera	37.9	27.6	76.9	61.2	24.1	14.5	14.1	7.1	0.79	BDL	BDL		BDL	
8	Chogawadi	36.9	26.1	73.7	60.8	22.2	13.8	12.3	5.8	BDL		BDL		BDL	
9	Chittorgarh (Zinc Nagar)	37.2	26.8	71.2	59.6	24.4	16.3	13.6	5.9	0.66	BDL	BDL		3.5	BDL
										0.5		0.02		1	
	NAAQS*	60		100		80		20		4		1		20	

Source: EIA Report & EMP for Expansion within the existing Chanderiya lead zinc smelter complex, Chittorgarh (Rajasthan).

**Remark** - BDL - Below Detectable Limit, DL - Detection Level & Detection limit for CO - 0.5 mg/ m<sup>3</sup>

**\*NAAQS** - National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009 As per Std. ToR issued by MOEF&CC, New Delhi remaining 6 AAQ parameters (viz. O<sub>3</sub>, NH<sub>3</sub>, Benzene,B(a)P, Arsenic as per NAAQS, 2009 and Zn) were also monitored once and were found far below the prescribed standards. Monitoring results are given as under Table 2,4 (B):

**Table 2.4 (B): Ambient Air Quality Monitoring Results**  
**Study Period: Post Monsoon Season (Oct. to Dec., 2020)**

S. N.	Sampling Location	Parameters					
		O <sub>3</sub> (µg/m <sup>3</sup> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	C <sub>6</sub> H <sub>6</sub> (µg/m <sup>3</sup> )	BaP-Particulate phase only (ng/m <sup>3</sup> )	As (ng/m <sup>3</sup> )	Zn (µg/m <sup>3</sup> )
1	Plant Site	29.4	15.6	0.78	0.84	BDL	8.6
2	Village-Ghosundi	9.8	5.6	BDL	BDL	BDL	BDL
3	Putholi	26.5	12.4	BDL	BDL	BDL	0.93
4	Village-Chanderiya	23.6	13.4	0.59	BDL	BDL	5.4
5	Ajaliyan ka Khera	26.7	10.7	BDL	BDL	BDL	6.2
6	Village-Biliya	17.9	7.2	BDL	BDL	BDL	1.1
7	Mungava ka khera	11.1	6.8	BDL	BDL	BDL	BDL
8	Village-Chogawadi	10.3	4.6	BDL	BDL	BDL	BDL
9	Chittorgarh (Zinc Nagar)	12.3		BDL	BDL	BDL	2.3
			8.9				
	Detection Limit	1	1	1	0.5	0.5	0.5
	NAAQS*	180	400	5	1	6	-

Source: EIA Report & EMP for Expansion within the existing Chanderiya lead zinc smelter complex, Chittorgarh (Rajasthan).

**\*NAAQS** - National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009

**Remark** - Detection limits for Ozone - 1.0 (µg/m<sup>3</sup>), Lead – 0.02 (µg/m<sup>3</sup>), ammonia – 1.0 (µg/m<sup>3</sup>), Benzene - 1.0 (µg/m<sup>3</sup>), Arsenic – 0.5 (ng/m<sup>3</sup>), Nickel – 1.0 (ng/m<sup>3</sup>), BaP – 0.5 (ng/m<sup>3</sup>), Zinc – 0.5(µg/m<sup>3</sup>).

Ambient Air Quality Monitoring reveals that the concentrations of PM<sub>2.5</sub> and PM<sub>10</sub> for all the 9 AAQM stations were in range of 26.1 to 55.4 µg/m<sup>3</sup> and 58.2 to 92.4 µg/m<sup>3</sup> respectively and were found to be within the prescribed limits. As far as the gaseous pollutants SO<sub>2</sub> and NO<sub>2</sub> are concerned, the prescribed CPCB limit of 80 µg/m<sup>3</sup> has never surpassed at any station. The concentrations of SO<sub>2</sub> and NO<sub>2</sub> were found to be in range of 5.8 to 19.7 µg/m<sup>3</sup> and 13.8 to 38.6 µg/m<sup>3</sup> respectively. The concentration of CO was found to be in range of BDL to 1.13 mg/m<sup>3</sup>. The concentration of Pb was found to be in range of BDL to 0.59 µg/m<sup>3</sup>. The concentration of Ni was found to be in range of BDL to 14.3 ng/m<sup>3</sup>. The prime contributors for the air pollutants within the 10 km study area include human activities such as construction and vehicular movement. The maximum concentration of air pollutants was found in plant site which may be due to plant operation. 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 proper mitigation measure will be adopted to mitigate the additional air pollution load. As per Project specific ToR point no. 1 vide letter no. F.No. J-11011/279/2006-IA.II(I) dated 27<sup>th</sup> September, 2021, i.e “One-month Ambient Air Quality (AAQ) data shall be collected additionally at locations near old stations and new location selected / corrected based on wind rose”

Additional one month baseline study was conducted in October, 2021.

**Table 2.5: Air Quality Monitoring Stations selected for (Oct., 2021)**

**No. of Monitoring Stations: 13**

S. N.	Monitoring stations	Approx. Distance & Direction from		Selection criteria for Project Site
		Project Site		
		Aerial Distance	Direction	
1	Plant Site	-		• Core Zone
2	Ghosundi	~7.0 km	NNE	• Upwind of pre-dominant direction • Near NH 76
3	Putholi (Near PHC)	~0.5 km	SW	• Downwind of pre-dominant direction • Habitation in buffer zone • Near NW Railway line
4	Chanderiya	~2.5 km	SW	• Downwind of pre-dominant direction • Habitation in buffer zone • Near existing industry
5	Ajoliyan ka Khera	~1.0 km	WNW	• Near NH 79 • Near PF & RF • Habitation in buffer zone
6	Village- Biliya	Adjacent	NNE	• Adjacent to plant site • Habitation in Buffer Zone
7	Mungava Ka Khera	~1.0 km	SSW	• Habitation in Buffer Zone
8	Chogawadi	~5.0 km	North	• Habitation in Buffer Zone
9	Zinc Nagar	~ 7.0 km	SW	• Mostly Populated area
10	Near Nagari Village (RIICO Road)	~0.8 km	NE	• Nearest Highway around the • Hindustan Zinc Colony



S. N.	Monitoring stations	Approx. Distance & Direction from		Selection criteria for Project Site
		Project Site		
		Aerial Distance	Direction	
				• Local Traffic
11	Manpura (Near Chittorgarh RF)	~5.7 km	South	• Near Stone Crusher
12	Hokampura	~2.5 km	East	• Near NH 79 • Habitation in Buffer Zone
13	Chittorgarh	~8.0 km	SSW	• NH and SH at the center of the city
Source: EIA Report & EMP for Expansion within the existing Chanderiya lead zinc smelter complex, Chittorgarh (Rajasthan).				

**Table 2.6: Additional Ambient Air Quality Monitoring Results - Study Period: (October,2021)**

Sampling Location	Parameters													
	PM <sub>2.5</sub> (µg/m <sup>3</sup> )		PM <sub>10</sub> (µg/m <sup>3</sup> )		Nitrogen Dioxide (µg/m <sup>3</sup> )		Sulphur Dioxide (µg/m <sup>3</sup> )		Carbon Monoxide (mg/m <sup>3</sup> )		Lead (µg/m <sup>3</sup> )		Nickel (ng/m <sup>3</sup> )	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Plant Site	53.2	41.3	90.9	77.3	36.9	23	20.1	10.9	1.08	0.67	0.57	0.23	12.7	6.5
Village-Chanderiya	47.9	35.6	86.8	72	30.2	19.8	18	9.2	0.9	0.64	0.43	0.19	9	3.2
Ajaliyan ka Khera	42.3	32.2	83.6	60.8	28	15	15	6.6	0.77	0.58	0.26	0.11	6	2.3
Village-Biliya	44	35	84.1	64.7	27.8	18	14.6	7.5	0.81	0.54	0.22	0.04	4	BDL
Mungava ka khera	38.6	28.9	78	60.6	25.3	14	14.8	6.8	0.76	BDL	BDL		BDL	
Putholi	48.7	34.4	88.7	70.5	32	19	17.1	9.4	1.02	0.65	0.11	BDL	5.6	2
Village-Chogawadi	37.6	28.7	75.2	61.3	24.3	14.2	12.3	6	BDL		BDL		BDL	
Village-Ghosundi	40	30.2	80.3	60.2	23.6	16.1	14.2	6.6	BDL		0.07	BDL	BDL	
Chittorgarh (Zinc Nagar)	36.8	26.3	70.8	57.1	23.9	15.8	13.3	5.6	0.68	BDL	BDL		3.3	BDL
Vill. Hokampur	40	31.2	82.1	64.5	26.7	14	16.8	8	0.88	0.53	BDL		2	BDL
Manpura	35.6	25.4	68.9	55.4	19.8	12.3	11.2	5.5	BDL		BDL		BDL	
Gusai Khera	41.2	33.8	84	63.1	26.9	16	15.9	7.4	0.8	BDL	BDL		1.8	BDL

Chittorgarh	53.9	38.7	91.5	79.2	36	23.4	22.1	8.9	1.15	0.71	0.47	0.18	7.8	2
Detection Limit									0.5		0.02		1	
NAAQS*	60		100		80		20		4		1		20	
Source: EIA Report & EMP for Expansion within the existing Chanderiya lead zinc smelter complex, Chittorgarh (Rajasthan).														

**Table 2.7: Additional Ambient Air Quality Monitoring Results - Study Period: (October,2021)**

Sampling Location	Parameters					
	Ozone (µg/m³)	Ammonia (µg/m³)	Benzene (µg/m³)	Benzo(a)pyrene (BaP)-Particulate phase only (ng/m³)	Arsenic (ng/m³)	Zinc (µg/m³)
Plant Site	26.8	14.2	0.73	0.81	BDL	8
Village- Chanderiya	24.9	13.1	0.51	BDL	BDL	5.9
Ajaliyan ka Khera	28	11.2	BDL	BDL	BDL	6
Village- Biliya	18.2	7.4	BDL	BDL	BDL	0.6
Mungava ka khera	12	6.4	BDL	BDL	BDL	BDL
Putholi	24.7	13	BDL	BDL	BDL	1.11
Village- Chogawadi	11.2	4.7	BDL	BDL	BDL	BDL
Village- Ghosundi	9.4	5.2	BDL	BDL	BDL	BDL
Chittorgarh (Zinc Nagar)	12	8.6	BDL	BDL	BDL	2.4
Vill. Hokampur	10.2	6.7	BDL	BDL	BDL	BDL
Manpura	4.1	3.8	BDL	BDL	BDL	BDL
Gusai Khera	8	4.6	BDL	BDL	BDL	BDL
Chittorgarh	22.6	10.2	BDL	BDL	BDL	6.5
Detection Limit	1	1	1	0.5	0.5	0.5
NAAQS*	180	400	5	1	6	-
Source: EIA Report & EMP for Expansion within the existing Chanderiya lead zinc smelter complex, Chittorgarh (Rajasthan).						

\*NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009

Additional 1 Month Baseline Study (Oct., 2021) for AAQ monitoring has been carried out at 13 stations in the study area on Project Specific TOR point 1. The concentration of PM2.5 ranges between 25.4 to 53.9 µg/m³, PM10 ranges between 55.4 to 91.5 µg/m³, SO2 ranges between 5.5 to 22.1 µg/m³ and NO2 ranges between 12.3 to 36.9 µg/m³. CO concentration was observed as BDL to 1.15 mg/m³. The concentration of Pb was found to be in range of BDL to 0.57 µg/m³. The concentration of Ni was found to be in range of BDL to 12.7 ng/m³.

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### 2.2.3. Water

Water quality was assessed for the WCP area to understand current status of pollution and anticipate impact of the proposed expansion project. The surface water sources and ground water sources were examined to evaluate the physico-chemical, heavy metals and bacteriological parameters

In the WCP area, 5 surface water and 8 ground water samples were collected. The details of sample collection are presented in Table 2.8.

**Table 2.8 - Water sampling locations in the WCP area**

S. N.	Sampling Location	Approx. aerial distance from Plant Site	Direction
<b>Surface water</b>			
1	Putholi Nallah near western boundary of the plant (Upstream) *	-	-
2	Putholi Nallah near Eastern boundary of the plant (Downstream)*	-	-
3	Gambhir River near Manpura	~4.5 Km	South
4	Berach River Near Mungava Ka Khera (Upstream)*	~1.5 Km	South
5	Berach River Near Nagri (downstream)*	~1.0 Km	NNE
<b>Ground water</b>			
1	Plant Site	-	-
2	Putholi	~0.5 Km	SW
3	Nagari	~0.5 Km	NE
4	Village- Biliya	Adjacent	North
5	Chittorgarh (Zinc Nagar)	~7.0 Km	SW
6	Semalpura	~6.0 Km	SSE
7	Khuntiya	~7.5 Km	NE
8	Ajoliyan Ka Khera	~1.0 Km	West
Source: EIA Report & EMP for Expansion within the existing Chanderiya lead zinc smelter complex, Chittorgarh (Rajasthan).			

The results of water sampling analysis are presented in Table 2.9 (A) and Table 2.9 (B)

**Table 2.9 (A): Water analysis of surface water samples in WCP area**

S. N.	Parameters	Unit	Putholi Nallah (Downstream)	Putholi Nallah (Upstream)	Gambhir River (Near Manpura)	Berach River (Upstream)	Berach River (Downstream)
1	pH (at 25°C)	--	7.58	7.52	7.64	7.76	7.63
2	Colour	Hazen	20	20	BDL (DL 5.0)	5	5
3	Turbidity	NTU	9	8	14	10	13
4	Odour	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5	Total Hardness as CaCO <sub>3</sub>	mg/l	330	336.8	170	290	302
6	Calcium as Ca	mg/l	84.2	87.5	30.1	64.1	60.12
7	Alkalinity as CaCO <sub>3</sub>	mg/l	228.85	223.14	154.2	278.6	271.32
8	Chloride as Cl	mg/l	128.12	136.87	79.9	154.9	163.4
9	Magnesium as Mg	mg/l	29.16	28.79	23.09	31.59	36.94
10	Total Dissolved Solids	mg/l	629	616	371	619	627
11	Sulphate as SO <sub>4</sub>	mg/l	132.4	121.65	56.3	78.64	83.4
12	Fluoride as F	mg/l	0.93	0.96	0.84	1.32	1.26
13	Nitrate as NO <sub>3</sub>	mg/l	1.03	1.54	3.06	6.87	5.05
14	Iron as Fe	mg/l	0.06	0.03	0.09	0.26	0.21
15	Boron	mg/l	0.56	BDL (DL-0.50)	0.78	0.68	0.62
16	Total Suspended Solid	mg/l	6.5	6	8.7	11.4	12
17	Biochemical oxygen demand	mg/l	7	6.1	12	16	16
18	Chemical oxygen demand	mg/l	26.9	26.9	43	56	59
19	Sodium as Na	mg/l	62.1	57.2	54.3	88.7	92.1
20	Potassium as K	mg/l	7.6	7.8	7.8	7.5	7.9



21	Conductivity	µS/cm	982	971	608	953	978
22	Dissolve Oxygen	mg/l	5.9	6	7.4	7.1	7
<i>Source: EIA Report &amp; EMP for Expansion within the existing Chanderiya lead zinc smelter complex, Chittorgarh (Rajasthan).</i>							

BDL - Below Detectable Limit, DL - Detection Level

Note: Apart from the above, various parameters viz. Colour (DL 5.0 Hazen Unit), Residual free Chlorine (DL 0.2 Hazen Unit), Cyanide as CN (DL 0.02 mg/l), Aluminum as Al (DL 0.03 mg/l), Boron (DL 0.20 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), Copper as Cu (DL 0.02 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), Selenium as Se (DL 0.002 mg/l), Arsenic as As (DL 0.002 mg/l), Mercury as Hg (DL 0.001 mg/l), Nickel (DL 0.005 mg/l), were analyzed in the water samples but the same were not detected.

(Source: Surface Water Analysis Report)

The above mentioned chemical analysis of surface water samples reveals that there is a variation in a chemical composition of water samples from the nearby water bodies. The pH of the water bodies ranges from 7.52 to 7.76 indicating slightly alkaline in nature. The water bodies are rich in Calcium, potassium, magnesium and bicarbonates. The colour and turbidity were of permissible range and odour was found agreeable at all the locations. Total hardness (170.0 to 336.8 mg/l), Total dissolved solids (371.0 to 629.0 mg/l), Alkalinity (154.2 to 278.6 mg/l) and conductivity (608 to 982.0  $\mu$ S/cm). The COD (26.9 to 59.0 mg/l) and BOD (6.1 to 16.0 mg/l). The nutrients were also found low viz. sulphate (56.3 to 132.4 mg/l), nitrate (1.03 to 6.87 mg/l), calcium (30.1 to 87.5 mg/l), magnesium (23.09 to 36.94 mg/l). The Dissolved oxygen (5.9 to 7.4 mg/l) indicated that the water bodies are safe for aquatic biodiversity. The CPCB has classified the inland surface water into five categories A to E on the basis of their designated best use and desired class.

Conclusion: Thus, it can be inferred from the above data that water quality of all the sampling stations seems to be clean. Also, the physical quality and chemical quality is good and safe for aquatic biodiversity.

**Table 2.9 (B): Water analysis of ground water samples in WCP area**

S. N.	Parameters	Unit	Plant Site	Village-Putholi	Village-Nagari	Village-Biliya	Chittorgarh (Zinc Nagar)	Village-Semalpura	Village-Khuntiya	Ajoliyan Ka Khera	Specification as per IS10500- 2012	
											Requirement Acceptable Limit	Permissible Limit in the Absence of Alternate Source
1	pH (at 25°C)	-	7.34	7.79	8.02	7.49	7.61	7.75	7.92	8.02	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 <sub>3</sub>	mg/l	250	545	1005	970	320	420	895	730	200	600
5	Calcium as Ca	mg/l	42.08	142.3	276.5	248.4	97.4	130.2	210.4	176.4	75	200
6	Alkalinity as CaCO <sub>3</sub>	mg/l	169.15	368.15	666.65	293.5	203.9	288.5	402.9	417.9	200	600
7	Chloride as Cl	mg/l	140.44	186.32	501.46	289.9	137.97	142.9	394.2	320.29	250	1000
8	Magnesium as Mg	mg/l	35.24	46.16	76.58	85.11	18.71	23.12	89.92	70.47	30	100
9	Total Dissolved Solids	mg/l	468	926	1923	1487	498	646	1336	1219	500	2000

S. N.	Parameters	Unit	Plant Site	Village-Putholi	Village-Nagari	Village-Biliya	Chittorgarh (Zinc Nagar)	Village-Semalpura	Village-Khuntiya	Ajoliyan Ka Khera	Specification as per IS10500- 2012	
											Requirement Acceptable Limit	Permissible Limit in the Absence of Alternate Source
10	Sulphate as SO <sub>4</sub>	mg/l	34.5	184.5	301.3	485.4	59.7	88.2	233.04	231.08	200	400
11	Fluoride as F	mg/l	0.81	1.19	1.09	1.06	1.23	0.98	0.97	1.06	1	1.5
12	Nitrate as NO <sub>3</sub> - N	mg/l	12.43	15.96	19.64	14.32	11.03	12.36	12.4	8.75	45	No Relaxation
13	Iron as Fe	mg/l	0.11	0.16	0.18	0.19	0.13	0.14	0.17	0.15	1	No Relaxation
14	Zinc as Zn	mg/l	0.62	0.23	0.46	0.23	BDL(0.0005)	0.05	0.23	0.15	5	15
15	Manganese as Mn	mg/l	BDL(DL0.10)	BDL(DL0.10)	0.06	0.06	BDL(DL0.10)	BDL(DL0.10)	BDL(DL0.10)	BDL(DL0.10)	0.1	0.3
16	Sodium as Na	mg/l	54.2	89.6	202.3	62.3	32.1	36.5	69.3	89.9	--	--
17	Potassium as K	mg/l	5.1	5.8	27.8	6.7	4.1	5.1	13.4	20.1	--	--
18	Conductivity	μS/cm	754	1342	2530	2064	791	993	1881	1766	--	--
Source: EIA Report & EMP for Expansion within the existing Chanderiya lead zinc smelter complex, Chittorgarh (Rajasthan).												

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 (DL 0.02 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 PO<sub>4</sub> (DL 0.02 mg/l), Nickel (DL 0.005 mg/l), Total Suspended Solids (DL 1.0 mg/l) were analyzed in the water samples but the same were not detected.

## Interpretation & Conclusion

The physico-chemical quality of groundwater was compared with drinking water standard (IS: 10500-2012). The pH of the water samples ranged from 7.34 to 8.02 indicating alkaline in nature; and maximum pH was recorded at Village Nagari and Ajoliyan ka khera. 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 Hardness (250.00 to 1005.00 mg/l), Alkalinity (169.15 to 666.65 mg/l), and Total Dissolved Solids (468.00 to 1923.00 mg/l) however, maximum hardness, total dissolved solid and alkalinity were found in the sample of villages Nagari. The concentration of chloride was found to be (137.97 to 501.46 mg/l) and sulphate was (34.50 to 485.40 mg/l), Nitrate (8.75 to 19.64 mg/l), Calcium (42.08 to 276.50 mg/l), Magnesium (18.71 to 89.92 mg/l). The value of Zinc in the ground water is found to be BDL to 0.62 mg/l, the conductivity is observed to be minimum i.e., 754.00  $\mu\text{S}/\text{cm}$  at plant site and maximum i.e 2530.00  $\mu\text{S}/\text{cm}$  at village Nagari. 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 Nagari, Village Biliya, Village Khuntiya and Village Ajoliyan ka khera where Total Hardness, Calcium and Alkalinity are out of the prescribed limit.

### 2.2.4. Noise

The noise monitoring in the study area is done to establish the baseline noise levels and assess the impact of the total noise generated by the mine operations. The locations in WCP area were identified based on the activities in the village area, agricultural area, ambient noise due to traffic etc. Following are locations of noise monitoring stations presented in Table 2.10.

**Table 2.10: Locations of Noise Monitoring Stations**

S. N.	Monitoring Location	Approx. Distance & Direction from Plant Site Aerial Distance	Direction
1	Plant Site- SW Boundary near Railway track	Core zone	-
2	Plant Site - NE boundary	Core zone	-
3	NH- 79 near Putholi Village	~1.2 km	West
4	Ajoliyan ka Khera	~1.0 km	West
5	Chanderiya RS	~2.5 km	SSW
6	Mungava ka Khera	~1.0 km	South
7	NH-76 near Hokampura	~3.0 km	East
8	Near Chittorgarh Fort RF	~6.0 km	South
Source: EIA Report & EMP for Expansion within the existing Chanderiya lead zinc smelter complex, Chittorgarh (Rajasthan).			

Ambient noise levels monitored at different locations (as mentioned in Table 2.11) during the study period are given in Table 2.11.

**Table 2.11: Ambient Noise Level Monitoring Results  
Study Period: Post Monsoon Season (Oct. – Dec. 2020)**

S. N.	Monitoring Locations	Noise Level Leq. dB (A)		CPCB Standards Limits in Leq. dB (A)	
		Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 6:00 am)	Day Time (06.00 am– 10.00 pm)	Night Time (10.00 pm– 6.00 am)
1	Plant Site (SW Boundary, Near Railway Track)	68.9	62.3	75	70
2	Plant Site (NE)	67.2	60.5		

S. N.	Monitoring Locations	Noise Level Leq. dB (A)		CPCB Standards Limits in Leq. dB (A)	
		Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 6:00 am)	Day Time (06.00 am–10.00 pm)	Night Time (10.00 pm–6.00 am)
3	Putholi	54.1	44.2	55	45
4	Ajoliyan ka khera	54	43.5		
5	Chanderiya RS	53.4	44.3	65	55
6	Mungava ka khera	53.1	43.7	55	45
7	Hokampura	53.9	43.8		
8	Near Chittorgarh	53.6	43.3		
Source: EIA Report & EMP for Expansion within the existing Chanderiya lead zinc smelter complex, Chittorgarh (Rajasthan).					

#### Interpretation and Conclusion:

- Ambient noise levels were measured at 08 locations in and around the plant site during the day and night time.
- Within the 10 km radius of study area the noise levels at the sampling locations are under the prescribed limits as given by the CPCB.
- Noise level varies from 53.1 to 68.9 Leq dB (A) during day time and from 43.3 to 62.3 Leq dB (A) during night time.
- The highest value of noise level as monitored in day as well as night time were observed at plant site (SW boundary, near railway track) due to more vehicle transportation and other plant activities. The minimum noise levels were observed at Village Mungava ka khera during day time and near Chittorgarh fort RF at the night time as there is less habitation and there is no other major source of noise pollution near that area.
- The noise is mainly caused due to the plant operation and within the complex as well as nearby anthropogenic activities such as industries, vehicular movement, habitation, etc.

#### 2.2.5. Increase in vehicular traffic and its impacts

Additional Traffic due to Expansion Project Major raw materials for Zinc Lead Smelter Plant manufacturing is Zinc and Lead concentrate; which will be transported from HZL mines- RA, SK & Zawar 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.

S. No.	Type of Vehicle	No. of vehicles / day
1	Motor Cycle / Scooter/Cycles	8049
2	Passenger Car / Van / Auto-rickshaw	4712
3	Tractors	408
4	Buses/ Truck	2192
5	Trailer	507
<b>Total</b>		<b>15969</b>
Source: EIA Report & EMP for Expansion within the existing Chanderiya lead zinc smelter complex, Chittorgarh (Rajasthan).		

- Increase in traffic density may lead to air pollution.
- Movement of vehicles may cause noise pollution.

- Increase in number of roadkills of wildlife as well as domesticated animals
- Increased traffic may cause accidental incidences and public health problems.

## 2.3. Impacts on Ecology and Biodiversity

### 2.3.1. Impact on flora

Mechanical and physical disturbance associated with project activities whether it is created by Site Clearing and Civil works such as earth moving and building structures including temporary structures, transportation of materials or processing of raw material create dust problems. A lot of dust particles get suspended in the air and potentially affect the surrounding vegetation. Dust effects can be chemical and/or physical in nature. Chemically active dust, such as highly alkaline dust or a highly acidic dust, can affect the pH of the soil and the plant surfaces and thus become toxic to the plant. If the dust, however, is not chemically active, the effects may be physical in nature, for example leaf surface abrasion. Increase in dust may also result in restricted plant growth, less regeneration and degradation of sensitive vegetation.

#### **Impact on 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 study area.

### 2.3.2. Impact on fauna

#### **Impact of soil pollution on faunal diversity**

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 animals.

Survey of soil samples from the study area showed that the quality of the soil within the study area varies from medium to good range and contains sufficient macro and micro nutrients which are vital for a healthy plant. Assurance of the maintenance of these conditions of soil 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**

The data collected during the survey indicates that water quality of all the sampling stations seems to be clean. Also, the physical quality and chemical quality is good and safe for aquatic biodiversity. The existing plant is also a Zero discharge Facility and after expansion, it will continue to be a zero discharge facility. Hence, minimal impact is expected on the aquatic diversity in the study area.

#### **Impact of noise pollution on faunal diversity**

Increased noise level due to running of machinery may scare the wild fauna and force them to migrate to other areas. Restricting of the noise levels up to 75 db will aid reducing the impacts of noise.

### 2.3.3. Impact on habitat – Water body

The existing plant is a Zero discharge Facility and after expansion, it will continue to be a zero discharge facility. No water bodies in the existing 10 km radius are impacted due to the zero discharge. Industrial effluent is being / will be treated in two existing ETPs (8400 KLD and 4200 KLD, respectively). All the Treated trade effluent is being used for Slag Granulation and Lime slurry preparation and remaining treated trade effluent will be further treated through three stage reverse osmosis (R.O.) plants and R.O. permeate will be recycled/ reused in the process within the premises. RO reject is being evaporated in solar evaporation pond and also used for spraying on waste disposal area; and Mist evaporators are already installed at site. Effluent treatment plant followed with Three stage RO Plant and Multiple Effect Evaporator (MEE/MVR) Plant is already in operation; Blow down water from CPP is



being/will be treated in neutralization pit and further reused in dust suppression. Domestic waste water will be treated in Sewage Treatment Plant and treated water will be used in process/Plantation.

#### **2.3.4. Impact on habitats – Terrestrial**

Expansion will take place in the existing premises so there will be no potential effect on land use. Hence, no significant impact is expected on the terrestrial habitats and vegetation cover.

#### **2.3.5. Impact on biological environment due to increase due to 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.

#### **2.3.6. 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 roadkills.

Considering the avifaunal diversity of WCP area, it is found that numerous migratory bird species visit the area in during their migration period. But there are no project activities that disrupt or obstruct the routes of these birds. Hence, minimal disturbance is expected to the displacement/ movement of faunal diversity of WCP area.

## Chapter 3

### 3.1. Objective on 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 the adverse impact of project activities

#### Impact due to proposed expansion activity

The impacts of expansion project on various environmental attributes were assessed during construction & operation phase of the project and are given in Table 3.1 along with their mitigation measures.

**Table 3.1: Project activity anticipated impact and their mitigation measures**

S.N.	Parameter	Anticipated impact	Mitigation measures
1.	<b>Topography &amp; Land use Pattern</b>	<p>1) The total area of Chanderiya Lead Zinc Smelter Complex is 335.89 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 CLZS complex.</p> <p>2) 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.</p> <p>3) The present land use of the plant site is industrial; expansion will be done within the existing plant premises; therefore, there will be</p>	<p>1) Out of the total existing plant area i.e. 335.89 ha, 121.77 ha (36.25%) area has already been covered under greenbelt development / plantation. The same will be maintained and enhanced by doing gap plantation to achieve the plantation density @ 2500/ha.</p> <p>2) Plantation outside plant area to be maintained for improvement in the land use of the study area.</p>

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S.N.	Parameter	Anticipated impact	Mitigation measures
		<p>no permanent change in land use, only intensity will increase due to expansion project.</p> <p>4) Out of the total plant area (335.89 ha), 121.77 ha area has already been developed under greenbelt/ plantation. The same will be maintained and enhanced by doing gap plantation to achieve the plantation density @2500/ha.</p>	<p>3) The greenbelt and plantation will increase aesthetic beauty and prevent soil erosion.</p>
2.	Air	<p><b>Construction Phase:</b>            Increase in dust (Particulate Matter) and NO<sub>x</sub> concentration due to Leveling activity and Heavy vehicular movement.            1) The main sources of dust emission are the movement of equipment at site, leveling, grading, earthwork and foundation works.            2) 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<sub>2</sub>, NO<sub>x</sub>, PM, CO and un-burnt hydrocarbons.            3) 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 a 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.</p>	<p><b>Construction Phase:</b>            1) Extensive dust extraction network are provided.            2) Water spraying on roads and construction site will prevent fugitive dust.            3) Proper maintenance of vehicle and construction equipment will help in controlling the emissions.            4) Construction equipment having PUC Certificate will be deployed during the activity to restrict exhaust emission.            5) Vehicles having construction materials will be covered with tarpaulin.            6) A separate storage area will be demarcated for construction material to confine the dust dispersion.            7) Proper PPEs will be provided to workers to avoid accumulation of dust in respiratory tracts and prevent air borne diseases.            8) Proper greenbelt development and plantation inside and outside the plant premises.</p>
		<p><b>Operation Phase:</b>            The major air pollutants due to expansion in CLZS complex are the PM (Pyro: 150mg/Nm<sup>3</sup>, Ausmelt: 50mg/Nm<sup>3</sup>, Hydro: 30 mg/Nm<sup>3</sup>, DG Sets: 75mg/Nm<sup>3</sup>), SO<sub>2</sub> (Pyro &amp; Ausmelt: 2kg/ton of 100% conc. Acid produced; Hydro: 1kg/ton of acid produced; CPP: 600mg/Nm<sup>3</sup>), Acid Mist (Pyro &amp; Ausmelt: 50mg/Nm<sup>3</sup>; Hydro: 30mg/Nm<sup>3</sup>); Lead (Sinter &amp; Ausmelt: 10m/Nm<sup>3</sup>); NO<sub>x</sub> (CPP: 300 mg/Nm<sup>3</sup>, DG Sets: 710mg/Nm<sup>3</sup>), Hg &amp; its compounds (CPP: 0.03mg/Nm<sup>3</sup>); NMHC (DG Sets: 100mg/Nm<sup>3</sup>) &amp; CO (DG Sets: 150mg/Nm<sup>3</sup>).</p>	<p><b>Operation Phase:</b>            1) Extensive dust extraction network consisting of Venturi Scrubbers and Bag Filters are provided.            2) Gas wash tower and Thiessen Disintegrator are provided to capture Furnace Gas            3) Continuous monitoring system for SO<sub>2</sub></p>

S.N.	Parameter	Anticipated impact	Mitigation measures
		<p>The operational phase of the proposed expansion project comprises of various activities and the same will impact the air quality due to:</p> <ol style="list-style-type: none"> <li>1) Fugitive emissions</li> <li>2) Stack emissions</li> </ol>	<ol style="list-style-type: none"> <li>4) Cansolv technology for Sulphur capture from Ausmelt Lead Furnace.</li> <li>5) Spraying of water is being continuously carried out at the various location viz., Lead concentrated bays, Belt conveyors, etc., to suppress the dust particles.</li> <li>6) Ventilation system followed by bag filters, are provided in the metal tapping area to control work zone emissions</li> <li>7) State-of-The-Art DCDA Acid Plants &amp; Tail Gas Treatment Plant.</li> <li>8) Concentrate shed, Coal yard and Ash handling unit disposal area, concentrate unloading point area are provided with water sprinklers to arrest the dust and fugitive sources of dust.</li> <li>9) In order to minimize fugitive emissions Zn concentrate containing 8-10% moisture is being handled</li> <li>10) All existing Stacks are connected to CPCB &amp; RSPCB Server.</li> <li>11) 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</li> <li>12) Vehicular emissions is maintained as per standard and More than 33% of the area is covered with greenbelt / plantation at site.</li> </ol>
3.	Soil	<p><b>Construction Phase:</b></p> <ol style="list-style-type: none"> <li>1) During construction activity, the impact on soil will be limited to the construction site only and would be mainly due to the left-out construction material used resulting in soil deterioration.</li> <li>2) Compaction is a common problem during the construction activity due to the movement of</li> </ol>	<p><b>Construction Phase:</b></p> <ol style="list-style-type: none"> <li>1) Careful design, planning and good site management would minimize wastage of materials such as concrete, mortars and cement grouts.</li> </ol>



S.N.	Parameter	Anticipated impact	Mitigation measures
		<p>large number of heavy machineries over the soil.</p> <p>3) 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.</p>	<p>2) 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.</p> <p>3) Litter disposal and collection points will be established around the work sites.</p> <p>4) The construction spoils will be temporarily stored at designated dumpsite located inside the plant premises.</p> <p>5) To reduce the soil compaction, working on the wet soil will be avoided.</p>
		<p><b>Operation Phase:</b></p> <p>1) 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.</p> <p>2) This may lead to change in physico-chemical characteristics of soil of the area.</p>	<p><b>Operation Phase:</b></p> <p>1) Efficient Air Pollution Control Equipment (APCE) like Reverse Bag House / Bag House / Bag Filter / ESP is being / will be installed at all major stacks of all the units (Including Pyro &amp; Ausmelt unit, Hydro-I &amp; II, Minor Metal Recovery unit, etc.) to keep the emissions within 50 mg/Nm<sup>3</sup>. Adequate stack height helps to control dust emissions.</p> <p>2) No waste water is being / will be discharged outside the plant premises.</p> <p>3) Solid and hazardous waste is being/will be disposed of as per prevailing rules.</p> <p>4) 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.</p> <p>4) Besides, soil samples 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.</p>
4.	Water	<b>Construction Phase:</b>	<b>Construction Phase:</b>

S.N.	Parameter	Anticipated impact	Mitigation measures
		<p>1) Increase in suspended solids due to soil run-off during heavy precipitation due to loose soil at construction site.</p> <p>2) 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 &amp; unpleasant smell in nearby area.</p>	<p>1) Storm water drains have been 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.</p> <p>2) 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.</p> <p>3) Domestic Waste water generated due to construction activities is being/will be treated in existing STP (1000 KLD) and treated water is being /will be used in process/Plantation.</p>
		<p><b>Operation Phase:</b></p> <p>1) Total existing water requirement for the project is 38570 KLD. After the expansion project, 500 KLD additional water will be required for the Minor Metal Unit; which will be sourced from RO permeate water from ETP. Therefore no additional water Fresh water will be required for the proposed expansion project.</p> <p>2) The water is being / will be sourced from Gosunda Dam (Fresh Water) &amp; Proposed STP Chittorgarh/ Udaipur/ other proposed STP's (Recycled Water).</p> <p>3) No ground water abstraction is being done and will not be done for the proposed expansion project.</p> <p>4) 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. At present we are treating average 7598m3 or less effluent per day while we have treatment facility for 12600m3/d so increment if any in waste water will be treated in existing system.</p> <p>5) Domestic Waste water is being / will be generated from the office toilets.</p>	<p><b>Operation Phase:</b></p> <p>1) The existing plant is a zero discharge Facility and after expansion it will continue to be a zero discharge facility.</p> <p>2) Industrial effluent is being / will be treated in two existing ETPs (8400 KLD and 4200 KLD, respectively).</p> <p>3) All the Treated trade effluent is being used for Slag Granulation and Lime slurry preparation and remaining treated trade effluent will be further treated through three stage reverse osmosis (R.O.) plants and R.O. permeate will be recycled/ reused in the process within the premises.</p> <p>3) RO reject is being evaporated in solar evaporation pond and also used for spraying on waste disposal area and Mist evaporators are already installed at site.</p> <p>4) Effluent treatment plant followed with Three stage RO Plant and Multiple Effect Evaporator (MEE/MVR) Plant is already in operation; Blow down water from CPP is being/will be</p>

S.N.	Parameter	Anticipated impact	Mitigation measures
			<p>treated in neutralization pit and further reused in dust suppression.</p> <p>5) Domestic waste water will be treated in Sewage Treatment Plant and treated water will be used in process/Plantation.</p> <p>6) Storm water management practice will be continue as existing.</p>
5.	Noise	<p><b>Construction Phase:</b> An increase in noise level due to construction equipment may cause disturbance in sleep, hearing problems, etc.</p> <ol style="list-style-type: none"> <li>1) Movement /operation of transport and construction vehicles / equipment.</li> <li>2) Transportation of equipment, materials and people.</li> <li>3) Other important activities involved in construction stage such as drill, hammering, Cement mixing, heavy vehicle transportation, welding, excavation, Cut &amp; fill during construction of expansion project. Earth work will be done for the construction purpose for installation of RZO, Lead Refinery Plant, Minor Metal Recovery units, Induction Furnace &amp; Slab Casting Line, Back Pressure Turbine Generator and new DG Sets.</li> <li>4) Piling work during laying down of foundation for infrastructure.</li> </ol> <p>The noise generation during the construction phase will be temporary and will be limited to the active construction site within the complex.</p> <p><b>Operation Phase:</b> 1) 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 RZO plant at Hydro-II, Lead Refinery unit at Pyro Plant, Back Pressure Turbine Generator at CPP unit and D.G. Set, etc.; and from vehicular movements for transportation of construction material.</p> <p>2) 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.</p> <p>3) However, noise level at the plant boundary is being/will be maintained below 75 dB (A) in day</p>	<p><b>Construction Phase:</b> 1) Equipment will be kept in good condition to keep the noise level within 90 dB(A).</p> <p>2) Acoustic enclosures for machines &amp; equipment, providing PPEs (Ear plugs/ Ear defenders) to persons working just close to machines, lubrication &amp; maintenance of machineries/equipment's/ Vehicles.</p> <p>3) Greenbelt for attenuation of noise propagation and Periodical noise monitoring is being/ will be carried out.</p> <p><b>Operation Phase:</b> 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.</p> <ol style="list-style-type: none"> <li>1) Machine operators and Persons working just close to machine are being / will be provided with personal protective equipment viz. Ear plugs / Ear muffs etc.</li> <li>2) Proper maintenance, oiling and greasing of machines at</li> </ol>

S.N.	Parameter	Anticipated impact	Mitigation measures
		time and below 70 dB (A) in night time but near to the machineries i.e. DG sets and Back Pressure Turbine Generator etc. is comparatively high which is likely to have impact on the ear drums of the persons working in high noise area.	<p>regular intervals is being / will be done to reduce generation of noise.</p> <p>3) Greenbelt along the plant boundary has been developed. The same will enhanced w.r.t area &amp; density.</p> <p>4) Regular monitoring of noise level is being / will be carried out and corrective measures in concerned machinery will be adopted accordingly.</p> <p>5) The predominant noise levels are confined to the work zones in the plant. This will be further attenuated by vegetation. The following noise management measures are carried at CLZS</p> <p>6) Provision for insulating caps and aids at the exit of noise source on the machinery is available</p> <p>7) The use of damping materials such as thin rubber/ Lead sheet for wrapping the work places like MBF platform, DG set etc.</p> <p>8) Shock absorbing techniques are adopted to reduce impact; All the noise sources are sealed with covers, partitions are acoustically sealed; 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</p> <p>9) PPE/Ear plugs are provided to all the workers in high noise areas. Safety officer ensures the safety of the workers along with the security</p> <p>10) Cumulative noise exposure of workers never exceed 90 dB (A) for 8-hrs shifts.</p> <p>11) Effective equipment maintenance like periodic lubrication, replacement of gears and dedusting should be done.</p>



S.N.	Parameter	Anticipated impact	Mitigation measures
			12) The plant boundary is thickly vegetated with species of wide canopy.
6.	<b>Biological Environment</b>	<p>1) Particulate matter emissions from stack and fugitive emissions due to transportation activity &amp; material handling may degrade the soil quality of surrounding environment that may affect the biodiversity of surrounding environment.</p> <p>2) Particulate matter emission may cause migration of wild animals and birds.</p> <p>3) 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.</p> <p>4) Increased noise level due to running of machinery may scare the wild fauna and force them to migrate to other areas.</p>	<p>1) Scaling up the greenbelt development and plantation in and around the project site to control the spread of particulate emissions and noise.</p> <p>2) The total plant area is 335.89 Ha. Out of which 121.77 ha area has already been developed under greenbelt/ plantation. The same will be maintained and enhanced by doing gap plantation to achieve the plantation density @ 2500/ha.</p> <p>3) Efficient Air Pollution Control Equipment (APCE) like Bag House / Bag Filter / ESP/ Venturi Scrubbers has been / will be installed at all major stacks to keep the emissions within the permissible limits.</p> <p>4) Use of water sprinkler on the haul road to control fugitive emissions in the surrounding environment.</p> <p>5) Use of water sprinkler on the haul road to control fugitive emissions in the surrounding environment.</p> <p>6) Using paved roads for transportation to minimize fugitive emissions.</p> <p>7) Transporting material in covered truck and storing it under tarpaulin cover.</p> <p>8) Transport vehicles and machinery will be properly maintained and periodically checked for pollution level to reduce noise and gaseous emission in the surrounding environment.</p>
7.	<b>Socio-Economic Environment</b>	<p><b>Construction Phase:</b></p> <p>1) About 360 nos. of people i.e. (150 in Pyro Plant + Ausmelt, 60 in Hydro –I &amp; Hydro –II (Including Fumer Plant and 150 in Minor Metal Unit) will get employment during the construction stage resulting in the ancillary development and growth. Unskilled/semi-</p>	<p><b>Construction Phase:</b></p> <p>1) Deploying of mobile toilets or the construction of temporary toilets will be done near to the construction site with the adequate water supply.</p>

S.N.	Parameter	Anticipated impact	Mitigation measures
		<p>skilled manpower will be sourced from the local area and skilled manpower will be sourced from outside/local. Local people will be given preference for employment on the basis of their skill and experience.</p> <p>2) 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.</p> <p>3) 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.</p> <p>4) Rapid diverse population influx at the plant site might create unusual behavioral activity such as worker-community conflicts, increase violence such as theft/ stabbing, and increased consumption of drugs/alcohol within the area.</p> <p>5) 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.</p> <p>6) 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.</p>	<p>2) Awareness programme will be conducted before the monsoon season regarding the spread of water borne/ vector diseases.</p> <p>3) Mosquito repellents will be provided in the nearby villages and at construction site to avoid the spread of diseases.</p> <p>4) To overcome behavioral 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.</p> <p>5) To overcome behavioral 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.</p> <p>6) 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.</p> <p>7) Hindustan Zinc Limited is committed to contribute in the development of basic needs of the local area like education, Health &amp; family welfare, women empowerment, skill development, Natural resource management, water conservation, roads etc. through its socio-economic development plan.</p>
		<p><b>Operation Phase:</b></p> <p>1) Long term exposure to the pollutants such as PM, SO<sub>x</sub>, NO<sub>x</sub>, Acid Mist, Hg 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.</p>	<p><b>Operation Phase:</b></p> <p>1) In order to mitigate the long term health impacts, efficient Air Pollution Control Equipment (APCE) like Bag House / Bag Filter / ESP/ Venturi Scrubber are / will be installed at all major stacks to keep the</p>

S.N.	Parameter	Anticipated impact	Mitigation measures
		<p>2) Other impacts, associated with the expansion of CZLS Complex 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.</p> <p>3) Additionally, 360 people will be given employment on a contractual basis during the operational phase, thereby generating employment and improving living standards.</p>	<p>emissions within the permissible limits. To reduce fugitive emission from vehicles and machineries will be regularly monitored and maintained.</p> <p>2) M/s. HZL have a well develop occupational health centre at site and a Hospital at Colony for its employees.</p> <p>3) CEMS have been / will be installed at all major stacks for manual pollution under check.</p> <p>4) 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 &amp; house-keeping contract work etc.</p> <p>5) Increased revenue to the State &amp; Central exchequer from the plant and it's interlinked captive mine.</p>

## Chapter 4

The WCP area shows considerable floral and faunal diversity, presented in Table 1.5 and Table 1.6, respectively.

According to authenticated list of flora by the Chittorgarh Forest Department, all plant species found in the CLZS complex 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.

23 species of mammals, 115 species of avifauna, 19 species of reptiles, 16 species of fishes, and 27 species of invertebrates are listed down according to authenticated data from the Chittorgarh FD. Out of this 4 species of mammals, 3 species of avifauna and 1 species of reptile are included in schedule - I of the WPA, 1972, respectively.

Thus, for the benefit of existing biodiversity and enhancement of the same, the following interventions can be implemented within the mine lease 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.



## Chapter 5

Biodiversity survey was carried out in the core and buffer area of the WCP area, which provided the aforementioned list of floral and faunal species. Some of those species are of conservation significance and hence are included in 'Schedule I' (Species of highest importance) in the Indian Wildlife Protection Act, 1972 (IWPA). These faunal species require attention for their crucial role in their ecosystem, low population, and sensitivity to changing habitat, and climate or endemic distribution.

Table 5.1 enlists the faunal species found in the WCP areas that are included under Schedule - I of the Indian Wildlife Protection Act, 1972 (IWPA).

**Table 5.1: List of Faunal species included under Schedule – I**

S. N.	Common name	Local name	Scientific name	Family	IUCN status	WPA
<b>Mammals</b>						
1	Indian Crested Porcupine	Sehi	<i>Hystrix indica</i>	Hystricidae	LC	I
2	Leopard	Baghera, Tendua	<i>Panthera pardus</i>	Felidae	VU	I
3	Northern Plains Langur	Langur	<i>Semnopithecus entellus</i>	Cercopithecidae	LC	I
4	Rusty-spotted Cat	Jungli Billi	<i>Prionailurus rubiginosus</i>	Felidae	NT	I
<b>Avifauna</b>						
1	Indian Peafowl	Mor(Nar), Dheladi (Mada)	<i>Pavo cristatus</i>	Phasianidae	LC	I
2	Laggar Falcon	Shikaaree Pakshee	<i>Falco jugger</i>	Falconidae	NT	I
3	White-rumped Vulture	Giddh	<i>Gyps bengalensis</i>	Accipitridae	CR	I
<b>Reptiles</b>						
1	Bengal Monitor lizard	Goh	<i>Varanus bengalensis</i>	Varanidae	NT	I
Source: Authenticated list of Chittorgarh Forest Department, Rajasthan.						

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 Indian Wildlife Protection Act - 1972, 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 Chittorgarh FD area in which the WCP area comes.

### 5.1. Indian Crested Porcupine

#### 5.1.1. 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 CLZS Complex.

Indian Crested Porcupine is listed in the Schedule - I of Indian Wildlife Protection Act - 1972 and it is listed in the Least Concern Category of IUCN – International Union for Conservation of Nature - LC in the 'Red List'.

### **5.1.2. 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 night time (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.

### **5.1.3. 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.

### **5.1.4. Distribution in the WCP Area**

According to the authenticated data from Chittorgarh FD, The Indian Crested Porcupine is found in the WCP area of the buffer zone of the CLZS Complex.

### **5.1.5. 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.

### **5.1.6. Conservation Action Plan for Indian Crested Porcupine**

In India, it is given the utmost protection by inclusion in Schedule - I of the Indian Wildlife Protection Act, 1972.

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 Leopard

### 5.2.1. 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 *Panthera*, 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 CLZS Complex.

Indian Leopard is listed in the Schedule I of Indian Wildlife Protection Act, 1972 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.

### 5.2.2. 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 coloured 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 coloured in desert populations, more gray in colder climates, and of a darker golden hue in rainforest habitats.

### 5.2.3. 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 massive skulls and powerful jaw muscles.

### 5.2.4. Distribution in the WCP Area

According to the authenticated data from Chittorgarh FD, The Indian Leopard is found in the WCP area of the buffer zone of the CLZS Complex.

### 5.2.5. 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.

### 5.2.6. Conservation Action Plan for Indian Leopard

Indian Leopard is listed in the Schedule- I of Indian Wildlife (Protection) Act, 1972 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.

## 5.3. Northern Plains Langur

### 5.3.1 Systematic position

Kingdom: Animalia

Phylum: Chordata

Class: Mammalia

Order: Primates

Suborder: Haplorhini

Family: Cercopithecidae

Genus: *Semnopithecus*

Species: *Semnopithecus entellus*

The Northern Plains Langur is listed in the Schedule - I of Indian Wildlife Protection Act, 1972 and it is listed in the Least concern Category of IUCN – International Union for Conservation of Nature- LC in the 'Red List' Northern Plains Langur are also listed in Appendix –I of CITES (Convention on International Trade in Endangered Species of wild fauna and wild flora), 1973.

### 5.3.2. Description





Northern Plains Langurs have brownish gray fur, with a tinge of red on their dorsal surface and white fur on their ventral surface. Their feet, hands, face, and ears are black, and their face is framed with white fur. Their tail is usually longer than the body, with a white tip. Infants are born with fine, dark brown or black fur. Their skin is pale, but darkens to black by three months old. They are sexually dimorphic, with males being slightly larger than females. Males weigh about 13 kg and females weigh about 9.9 kg. Excluding their tail, males are about 64 cm long, and females are about 58.5 cm long. Male Northern Plains Langur tails average 91.0 cm and those of female average 86 cm.

### **5.3.3. Ecology and Behavior**

Northern Plains Langurs are diurnal and semi-arboreal, spending 80% of their time on the ground using quadrupedal locomotion. They use trees primarily for sleeping. Dominance hierarchies play an important role in tree use behavior. The highest ranking male sleeps at the highest position in the tree, because it is the safest. Directly below the dominant male are females and their offspring, then younger females, with adolescent males at the lowest position. Hanuman langurs are gregarious and form groups ranging from 2 to over 100 members. They can be both polygynous and polygynandrous and sometimes form bachelor groups. During summer they are more active in the morning and evening, whereas in the winter they are more active during midday.

### **5.3.4. Distribution in the WCP Area**

According to the authenticated data from Chittorgarh FD, The Northern Plains Langurs is found in the WCP area of the buffer zone of the CLZS Complex.

### **5.3.5. Reproduction and Growth**

Northern Plains Langurs live in both polygynous and polygynandrous groups, and unpaired males form bachelor groups. Male dominance is usually determined through fighting, whereas younger, sexually mature females are higher ranking, and decrease in rank with age. Females advertise estrous via head shaking and presenting the anogenital region to potential mates. Females continue mating during gestation to prevent infanticide by dominant males. Females typically reach sexual maturity by 2.9 years of age, with males reaching sexual maturity by 5 years of age. Hanuman langurs breed between July and October, and parturition occurs between February and April.

### **5.3.6. Conservation Action Plan for Indian Leopard**

Northern Plains Langurs is listed in the Schedule- I of Indian Wildlife Protection Act, 1972 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.

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## 5.4. Rusty-spotted Cat

### 5.4.1 Systematic position

Kingdom: Animalia

Phylum: Chordata

Class: Mammalia

Order: Carnivora

Suborder: Feliformia

Family: Felidae

Genus: *Prionailurus*

Species: *Prionailurus rubiginosus*

Rusty-spotted Cat (*Prionailurus rubiginosus*) is listed in the Schedule - I of Indian Wildlife Protection Act, 1972 and it is listed in the Near Threatened category of IUCN - International Union for Conservation of Nature - NT in the 'Red List'. Rusty-spotted Cat are also listed in Appendix - II of CITES (Convention on International Trade in Endangered Species of wild fauna and wild flora), 1973.

### 5.4.2. Description

The fur of Rusty-spotted Cats is short and brownish gray in color with a rusty tinge. The coat of the Sri Lankan subspecies is less gray and has more of a russet color. The underside and throat are white with darker spots and stripes. The back and sides are covered by rusty brown spots. There are four dark stripes running from above the eyes, between the ears and onto the shoulders. The cheeks of the face are marked by two streaks of darker fur and the ears are small and rounded. The soles of the feet are black and the tail is about half the length of the head and body. At about half the size of a domestic cat, this is considered the smallest cat species.

### 5.4.3. Ecology and Behavior

Rusty-spotted Cats are solitary animals, living alone in forests, and more recently in human dominated agricultural areas. The species is considered terrestrial, but has arboreal tendencies. When rusty-spotted cats were first brought to the Frankfurt Zoo, they were presumed to be nocturnal because most sightings had been at night or at early dawn and late evening. They were then placed in a nocturnal environment in the zoo, but after monitoring the behavior of the cats, it was shown that the species may not be strictly nocturnal or crepuscular. Sexually active animals were more active during daylight hours.

### 5.4.4. Distribution in the WCP Area

According to the authenticated data from Chittorgarh FD, The Rusty-spotted Cat is found in the WCP area of the buffer zone of the CLZS Complex.

### 5.4.5. Reproduction and Growth

Though the mating system of Rusty-spotted Cats has not been explicitly studied, but in zoos rusty-spotted cat males have been allowed to stay with females after mating and after the birth of kittens. The West Berlin Zoo recorded a male protecting young from zoo keepers and bringing meat to the kittens. These behaviors suggest their mating system may be monogamous. Rusty-spotted Cats mate year-round. Data indicate that 50% of young are born between July and October, which is not enough to consider rusty-spotted cats seasonal breeders. Captive individuals are recorded to begin mating activity at anywhere from 1 to 72 days after introduction (on average 7.8 days). In 49% of first introductions, mating occurred within 4 days.

### 5.4.6. Conservation Action Plan for Rusty-spotted Cat

Rusty-spotted Cat is listed in the Schedule - I of Indian Wildlife Protection Act, 1972 and it is listed in the Near Threatened category of IUCN – International Union for Conservation of Nature- NT in the 'Red List'.

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.

## 5.5. Indian Peafowl

### 5.5.1 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 Indian Wildlife Protection Act, 1972 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

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 coloured 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.

### 5.5.3. 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 in the open early in the mornings and tend to stay in cover during the heat of the day. They are fond of dust-bathing and at dusk, groups walking in single file to waterhole. When disturbed, they usually escape by running and rarely take to 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.

### 5.5.4. Distribution in the WCP Area

According to the authenticated data from Chittorgarh FD, The Indian Peafowl is found in the WCP area of the buffer zone of the CLZS Complex.

### 5.5.5. 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.

### 5.5.6. Conservation Action Plan for Conservation of Indian Peafowl

The Indian Peafowl (*Pavo cristatus*) is a large pheasant declared as the National Bird of India in 1963 due to its flagship position in mythology and its widespread distribution. In India, it is given the utmost protection by inclusion in Schedule - I of Indian Wildlife Act, 1972 (2002).

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 of 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 also 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 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.

## 5.6. Laggar Falcon

### 5.6.1. Systematic position

Kingdom: Animalia

Phylum: Chordata

Class: Aves

Order: Falconiformes

Family: Falconidae

Genus: *Falco*

Species: *Falco jugger*

Laggar Falcon (*Falco jugger*) is listed in the Schedule - I of Indian Wildlife Protection Act, 1972 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

Falcons are carnivorous, migratory birds with wide distribution all over the temperate and tropical regions of the world. The Laggar Falcon is resident in the Indian Subcontinent. The Laggar Falcon is a medium sized, slender falcon. The adult has whitish to buff-whitish underparts, plain on throat and upper breast. The juvenile Laggar Falcon can be confused with Saker Falcon or Peregrine Falcon.

### 5.6.3. Ecology and Behavior

The diet consists of field rats, bats, lizards, small birds, e.g. mynahs, babblers, drongos, quails and partridges, also grasshoppers and locusts. It is the commonest falcon in the Subcontinent, although it is now thought to be declining rapidly and has been listed in Appendix I of the Convention on International Trade in Endangered Species (CITES).

### 5.6.4. Distribution in the WCP Area



According to the authenticated data from Chittorgarh FD, The Laggar Falcon is found in the WCP area of the buffer zone of the CLZS Complex.

#### 5.6.5. Reproduction and Growth

The Laggar Falcon breeding season is from January to May. They have been observed to use the stick nest of other birds and tree holes. The clutch consists of three to five eggs.

#### 5.6.6. Conservation Action Plan for Laggar Falcon

The Laggar Falcon 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 Indian Wildlife Act, 1972.

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 of tree groves in the area. Some local species such as Neem, Siris, Peepal, Shesham etc. can be planted.
- 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 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 the animal along the state highway and damaged to precious habitat by people to start movement towards areas.

### 5.7. White-rumped Vulture

#### 5.7.1. Systematic position

Kingdom: Animalia

Phylum: Chordata

Class: Aves

Order: Accipitriformes

Family: Accipitridae

Genus: *Gyps*

Species: *Gyps bengalensis*

White-rumped Vulture (*Gyps bengalensis*) is listed in the Schedule - I of Indian Wildlife Protection Act, 1972 and it is listed in the Critically Endangered category of IUCN – International Union for Conservation of Nature - CR in the ‘Red List’.

#### 5.7.2. Description

The white-rumped vulture is a typical, medium-sized vulture, with an unfeathered head and neck, very broad wings, and short tail feathers. It is much smaller than the Eurasian Griffon. It has a white neck ruff. The adult's whitish back, rump, and underwing coverts contrast with the otherwise dark plumage. The body is black and the secondaries are silvery grey. The head is tinged in pink and bill is silvery with dark cere. The nostril openings are slit-like. Juveniles are largely dark and take about four or five years to acquire the adult plumage. In flight, the

adults show a dark leading edge of the wing and has a white wing-lining on the underside. The undertail coverts are black.

It is the smallest of the *Gyps* vultures, but is still a very large bird. It weighs 3.5–7.5 kg (7.7–16.5 lb), measures 75–93 cm (30–37 in) in length, and has a wingspan of 1.92–2.6 m (6.3–8.5 ft). Like other vultures it is a scavenger, feeding mostly on carcasses, which it finds by soaring high in thermals and spotting other scavengers.

### 5.7.3. Ecology and Behavior

White-rumped vultures usually become active when the morning sun is warming up the air so that thermals are sufficient to support their soaring. They were once visible above Calcutta in large numbers.

When they find a carcass, they quickly descend and feed voraciously. They perch on trees nearby and are known to sometimes descend also after dark to feed. At kill sites, they are dominated by red-headed vultures *Sarcogyps calvus*. In forests, their soaring often indicated a tiger kill. They swallow pieces of old, dry bones such as ribs and of skull pieces from small mammals. Where water is available they bathe regularly and also drink water. A pack of vultures was observed to have cleaned up a whole bullock in about 20 minutes. Trees on which they regularly roost are often white from their excreta, and this acidity often kills the trees. This made them less welcome in orchards and plantations.

### 5.7.4. Distribution in the WCP Area

According to the authenticated data from Chittorgarh FD, the White-rumped Vulture is found in the WCP area of the buffer zone of the CLZS Complex.

### 5.7.5. Reproduction and Growth

There are no morphological differences in the male and female White rumped vultures. They usually pair for life. White-rumped Vultures are bred from October to April. The parents invest their energy for 8 months to raise a single chick. Both the parents share the incubation duties. The incubation period is of 40–45 days. After spending 45 months in the nest, the fledglings join adults and sub-adults in foraging and other activities such as sun basking after feeding and roosting.

### 5.7.6. Conservation Action Plan for White-rumped Vulture

The White-rumped Vulture is classified as Critically Endangered on the IUCN Red List of Threatened Species and it is given the utmost protection by inclusion in Schedule - I of Indian Wildlife Act, 1972.

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 nesting. This can be achieved by planting of tree groves in the area. Some local species such as Neem, Siris, Peepal, Shesham etc. can be planted. They always build the nest of big old trees.
- 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.

## 5.8. Bengal Monitor Lizard

### 5.8.1. Systematic position

Kingdom: Animalia

Phylum: Chordata

Class: Reptilia

Order: Squamata

Sub-order: Lacertilia

Family: Varanidae

Genus: *Varanus*

Species: *Varanus bengalensis*

### 5.8.2. Description

The Bengal monitor lizard is dorsally dark brownish or olive brown with blackish dots and ventrally yellowish, spotted with numerous black spots. Tail is quite long and compressed. It always preferring undisturbed places far from human settlements, the Bengal monitor lizard is active during the summer.

### 5.8.3. Ecology and Behavior

The organism is mainly ground dweller, but a busy climber as well. Bengal Monitor Lizards are solitary and usually found on the ground although the young are often seen on trees. They shelter and spend nights in burrows or crevices in rocks and buildings, also make use of abandoned termite mounds. In their body temperature drops below ambient. During day time their body temperatures by basking before commencing activity.

### 5.8.4. Distribution in the WCP Area

According to the authenticated data from Chittorgarh FD, The Bengal Monitor Lizard is found in the WCP area of the buffer zone of the CLZS Complex.

### 5.8.5. Reproduction and Growth

Breeding season is June to September. Males begin to show combat behavior in April. Females dig a hole for nesting in level ground or a vertical bank and lay a clutch of about 20 eggs. The eggs hatch in 168 to 254 days. Only 40% to 80% eggs in the clutch hatch.

### 5.8.6. Conservation Action Plan for Bengal Monitor Lizard

- The Bengal Monitor Lizard is classified as Near Threatend on the IUCN Red List of Threatened Species and it is given the utmost protection by inclusion in Schedule - I of Indian Wildlife Act, 1972.
- 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 of tree groves in the area. Some local species such as Neem, Siris, Peepal, Shesham etc. can be planted.
- 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.

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- 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 Wildlife conservation is as per the formulae –

**Formula 1: 1 % of the total project cost**

or

**Formula 2: 0.50 lakhs per hectare of the core area (project area) + Rs. 5 lakhs 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 1: Possible costings for WCP**

Project Cost (in Crores)	Cost as per Formula 1 (in Crores)	Cost as per Formula 2 (in Crores)
786	7.86	2.08

Owing to the facts –

1. Chanderiya lead zinc smelter complex area being only 335.89 Ha.,

According to **Formula 1, 7.86 Crores or 786 Lakhs** need to be implemented for the Wildlife Conservation plan of HZL. The total cost of wildlife conservation interventions that need to be implemented in the core and buffer of the WCP area is presented in **Table 2**.

**Table 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)	Buffer area (Rs. In Lakhs)	Recurring cost till 2032 (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%	393.0	Habitat Improvement – Plantation of suitable plant species & weed eradication in buffer zone under Silvopastoral Plantation Programme (SPP)	94.32	102.18	0.0	<b>196.50</b>
				Development of Water Holes/ Lake Construction of Water Tank	58.95	58.95	0.0	<b>117.90</b>

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)	Buffer area (Rs. In Lakhs)	Recurring cost till 2032 (Rs. In Lakhs)	Total cost (Rs. In Lakhs)
				Construction of parapet /boundary wall in abandoned well /Pond to avoid fall of wild animals (Wells, Approx @ Rs. 52,000/- each)	19.65	19.65	0.0	39.30
				Fencing of habitat sites	19.65	19.65	0.0	39.30
2	Awareness and extension (Forest staff will also be invited for various activities to ensure participation)	10%	78.6	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	31.44	31.44	15.72	78.60
3	Support to Forest department for monitoring, rescue and rehabilitation of Wildlife (Veterinary care, animal health, rescue - tools and equipments etc.)	10%	78.6	Development of Rescue Centre along with Rescue Facilities and Mobile Rescue Van	15.72	23.58	0.0	39.30
				Support forest department for the maintenance of plantation sites and plantation in gaps and supply of water for water holes.	0.0	14.15	9.43	23.58
				Operation and Maintenance of Rescue centre	3.93	7.86	3.93	15.72

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)	Buffer area (Rs. In Lakhs)	Recurring cost till 2032 (Rs. In Lakhs)	Total cost (Rs. In Lakhs)
4	Contribution towards conservation of wildlife in PAs (to be deposited in RPACS)	10%	78.6	Watch and ward of habitat - plantation area	31.44	47.16	0.0	78.60
5	Administrative cost for processing inspections, etc. (to be deposited in RPACS)	10%	78.6	Deployment of Village Forest Protection and Management Committee (VFPMC) members to track and report (5 members @ Rs. 5000 of incentive per month)	7.86	39.3	31.44	78.60
6	Miscellaneous including Eco-development	10%	78.6	Comprehensive ecological and Biodiversity monitoring by HZL once in every 3 years	31.44	31.44	15.72	78.60
<b>Total</b>			<b>786.00</b>		<b>314.40</b>	<b>395.36</b>	<b>76.24</b>	<b>786.00</b>

Conservation measures need to be implement in the core area and their finances are elaborated in **Table 3**.

**Table 3: Cost of implementation of WCP in the Core area**

S.N.	Heads	Budget allocated for Schedule I species Conservation Plan (Rs. In Lakhs)
1	Habitat Improvement – Plantation of suitable plant species & weed eradication in buffer zone under Silvopastoral Plantation Programme (SPP)	94.32
	Development of Water Holes/ Lake Construction of Water Tank	58.95
	Construction of parapet /boundary wall in abandoned well /Pond to avoid fall of wild animals (Wells, Approx @ Rs. 52,000/- each)	19.65
	Fencing of habitat sites	19.65
2	Increase awareness among local population on the importance and methods of conservation of Schedule - I species by holding group meetings/awareness programs in	31.44

S.N.	Heads	Budget allocated for Schedule I species Conservation Plan (Rs. In Lakhs)
	schools/display of banners/Study through External/posters in different villages to avoid human-wildlife conflict by HZL and Forest Departments	
3	Development of Rescue Centre along with Rescue Facilities and Mobile Rescue Van	15.72
	Operation and Maintenance of Rescue centre	3.93
4	Contribution for watch & Ward, Design, Liasoning with forest department	31.44
5	Administrative cost (Deployment of Village Forest Protection and Management Committee (VFPMC) members to track and report (5 members @ Rs. 5000 of incentive per month)	7.86
6	Miscellaneous cost (Comprehensive ecological and Biodiversity monitoring by HZL once in every 3 years)	31.44
<b>Total</b>		<b>314.40</b>

Conservation measures need to be implement in the buffer area and their finances are presented in **Table 4**.

**Table 4: Cost of implementation of WCP in the Buffer area**

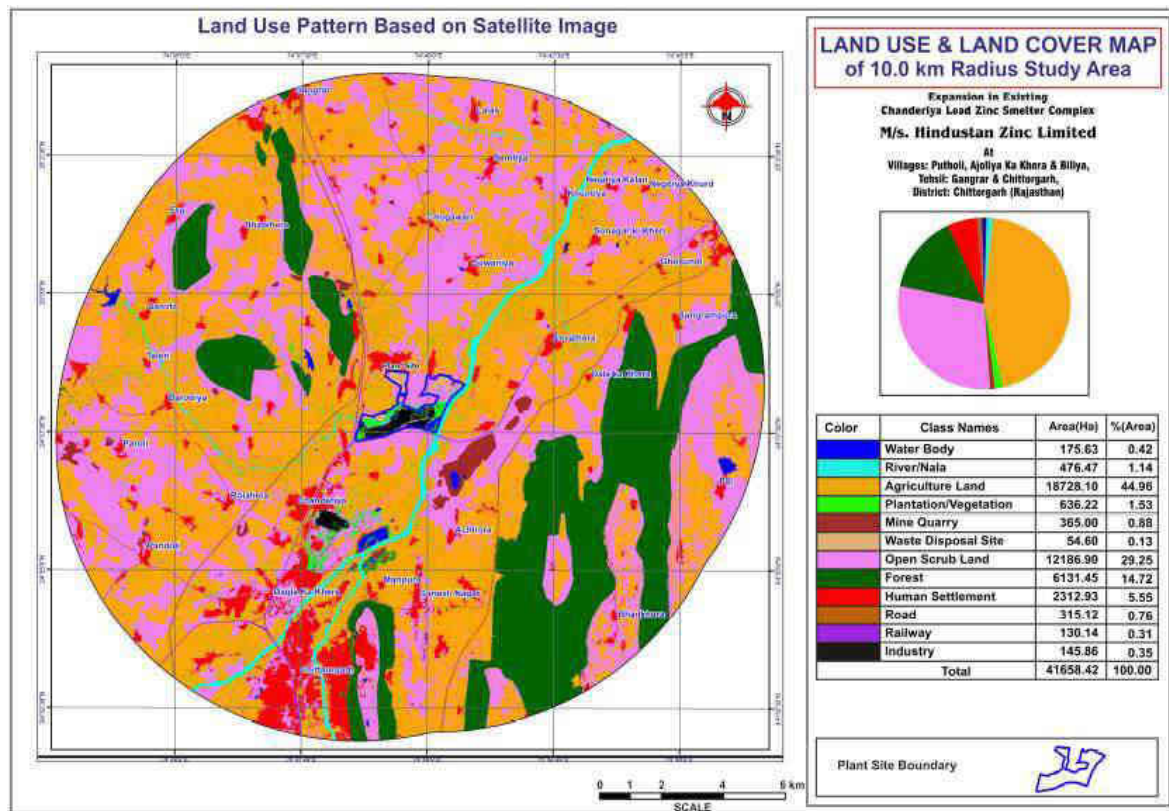
S.N.	Heads	Budget allocated for Schedule I species Conservation Plan (Rs. In Lakhs)
1	Habitat Improvement – Plantation of suitable plant species & weed eradication in buffer zone under Silvopastoral Plantation Programme (SPP)	102.18
	Development of Water Holes/ Lake Construction of Water Tank	58.95
	Construction of parapet /boundary wall in abandoned well /Pond to avoid fall of wild animals (Wells, Approx @ Rs. 52,000/- each)	19.65
	Fencing of habitat sites	19.65
2	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	31.44
3	Development of Rescue Centre along with Rescue Facilities and Mobile Rescue Van	23.58
	Support forest department for the maintenance of plantation sites and plantation in gaps and supply of water for water holes.	14.15
	Operation and Maintenance of Rescue centre	7.86
4	Contribution for watch & Ward, Design, Liasoning with forest department	47.16
5	Administrative cost (Deployment of Village Forest Protection and Management Committee (VFPMC) members to track and report (5 members @ Rs. 5000 of incentive per month)	39.30



S.N.	Heads	Budget allocated for Schedule I species Conservation Plan (Rs. In Lakhs)
6	Miscellaneous cost (Comprehensive ecological and Biodiversity monitoring by HZL once in every 3 years)	31.44
<b>Total</b>		<b>395.36</b>

# Chapter 7

## 7.1. Land use plan – existing and proposed



Source: Satellite Imagery

Figure 7.1: Land use / Land cover map of the study area (Source: bhukosh)

## 7.2. Hydrology map of the WCP area

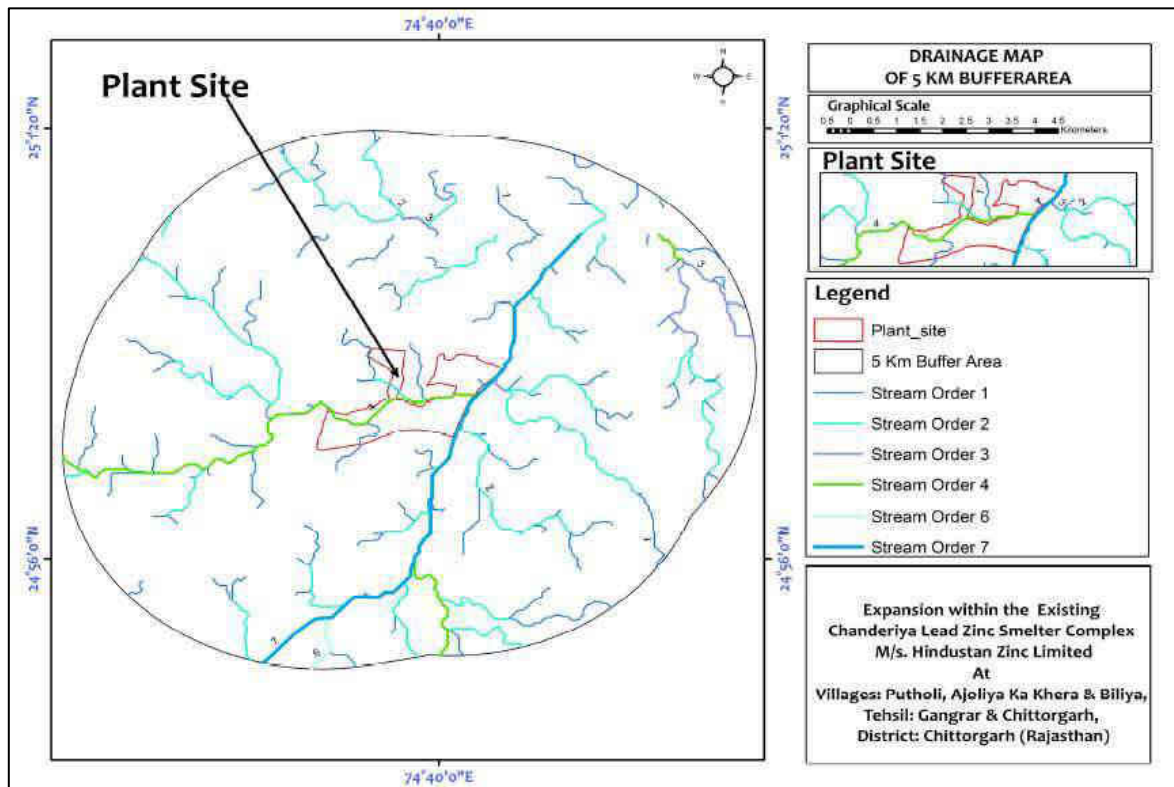


Figure 7.2 - Drainage patterns and surface water scenario of the WCP area

### 7.3. Build-up structure in project area

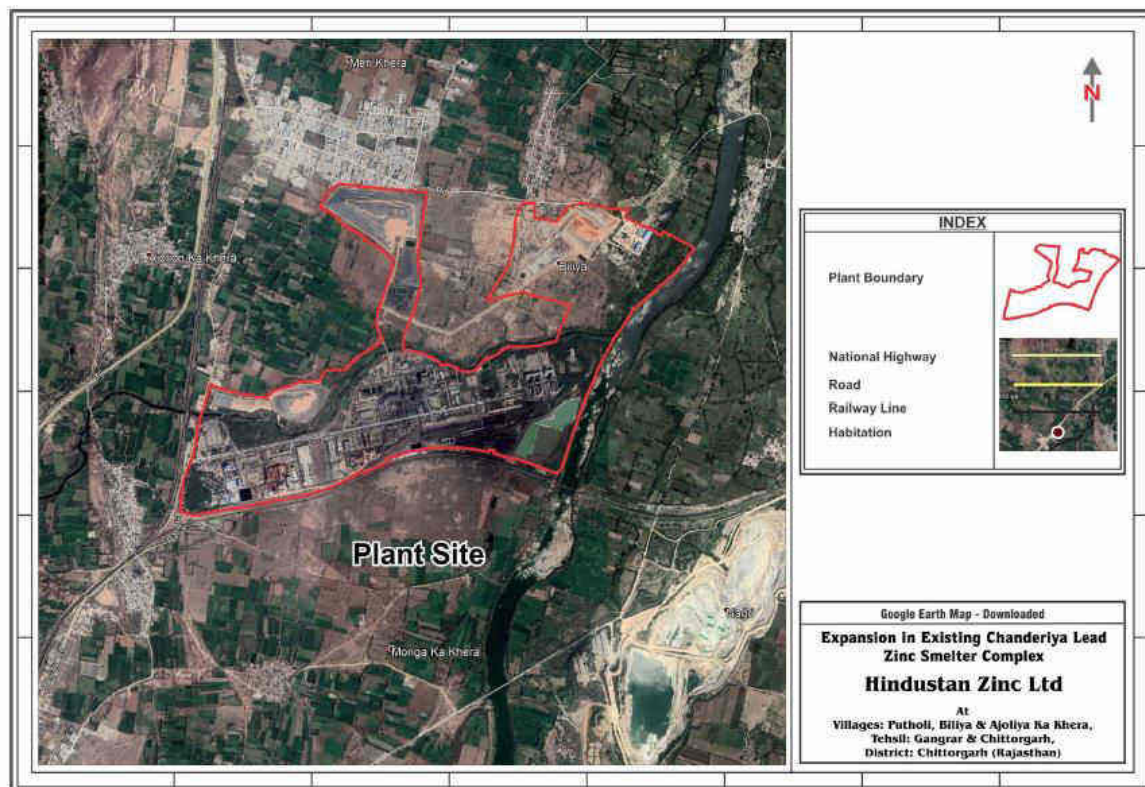


Figure 7.3: Google Earth Downloaded Map of the Plant Site

### 7.4. Location map w.r.t. protected areas, wildlife, and forest

No National Park, Sanctuary, Biosphere Reserve, Wildlife Corridors, Ramsar site, Tiger/Elephant Reserves are present in the 10 km. radius of Chanderiya Lead Zinc Smelter Complex.



## References

- Arshad, M., A. Hussain Gill. 2010. Population Status of Indian Chinkara in Cholistan Game Reserve, Punjab, Pakistan. *Russian Journal of Ecology*, 41(6): 524-530
- Auffenberg, W. 1994. *The Bengal Monitor*. Gainesville, FL: University Press of Florida
- Babar, M.E. & Mughal, M.s & Hussain, Tanveer & Javed, M.M. & Sherzada, Shahid & Khan, Asadullah & Ali, Ahmad. (2019) Biology, habitat and conservation of Indian rock python-a brief review. *Journal of Animal and Plant Sciences*. 29. 349-352.
- Baskaran, N., et al., Behavioural ecology of four-horned antelope (*Tetracerus quadricornis* de Blainville, 1816 in the tropical forests of southern India". *Mammalian Biology – Zeitschrift für Säugetierkunde*. 76 (6): 741–7.
- Begg CM, Begg KS, Do Linh San E, du Toit JT, Mills MGL. 2016a. Sexual and seasonal variation in the activity patterns and time budget of honey badgers in an arid environment. Pages 161–192.
- Bhatt, Nirav & Dixit, Dhairya & Mori, Devvratish. (2020). Notes on distribution and plumages of Laggar falcon *Falco jugger* in Gujarat.
- Bhupathy, S. & Webb, Robert & Praschag, Peter. (2014). *Lissemys punctata* (Bonnaterre 1789) – Indian Flapshell Turtle. 10.3854/crm.5.076.punctata.v1.2014
- Dharaiya, N., Bargali, H.S. & Sharp, T. 2020. *Melursus ursinus* (amended version of 2016 assessment). The IUCN Red List of Threatened Species 2020.
- Friedman, H., V. Case. 2002. "Davidson" (On-line). *Leopard (Panthera Pardus)*. Accessed March 25, 2009.
- Habibi, K. 2011. "Chinkara"
- [https://animaldiversity.org/accounts/Crocodylus\\_palustris/](https://animaldiversity.org/accounts/Crocodylus_palustris/)
- [https://animaldiversity.org/accounts/Gazella\\_bennettii/](https://animaldiversity.org/accounts/Gazella_bennettii/)
- [https://animaldiversity.org/accounts/Panthera\\_pardus/](https://animaldiversity.org/accounts/Panthera_pardus/)
- [https://animaldiversity.org/accounts/Python\\_molurus/](https://animaldiversity.org/accounts/Python_molurus/)
- [https://animaldiversity.org/accounts/Varanus\\_bengalensis/](https://animaldiversity.org/accounts/Varanus_bengalensis/)
- <https://animalia.bio/indian-flapshell-turtle>
- <https://cw.vncindia.org/crocodylus-palustris/>
- <https://indianbirds.thedynamicnature.com/2015/09/laggar-falcon-falco-jugger.html>
- <https://www.bearconservation.org.uk>
- <https://www.cabi.org/isc/datasheet/89941>
- <https://www.indianforester.co.in/index.php/indianforester/article/view/139582>
- <https://www.wii.gov.in/nmcg/priority-species/mammals/smooth-coatedotter/>
- [https://www.wwfindia.org/about\\_wwf/priority\\_species/threatened\\_species/smooth\\_coated\\_otter/](https://www.wwfindia.org/about_wwf/priority_species/threatened_species/smooth_coated_otter/)
- Hua, L., S. Gong, F. Wang, W. Li, Y. Ge, X. Li, F. Hou. 2015. Captive breeding of pangolins: current status, problems and future prospects. *ZooKeys*, Volume 507: 99-114.
- Hunter, L., G. Hinde. 2005. *Cats of Africa: Behaviour, Ecology, and Conservation*. United Kingdom: New Holland Publisher.
- Laman, T., C. Knott. 1997. An Observation of Leopard (*Panthera pardus* Linnaeus) mating Behaviour in Serengeti National Park, Tanzania. *African Journal of Ecology*, 35/2: 165-167.
- Macdonald, SM. (1990) Surveys. In: Offers; An action plan for their conservation. Turley, P.F., S.M. Macdonald and C.F. Mason ed. International Union for Conservation of Nature and Natural Resources. Gland. Switzerland.
- Mahmood, T., N. Irshad, R. Hussain, F. Akrim, I. Hussain, M. Anwar, M. Rais, M. Nadeem. 2015. Breeding habits of the Indian pangolin (*Manis crassicaudata*) in Potohar Plateau, Pakistan. *De Gruyter*, Volume 80, Issue 2: 231-34.
- Marker, Laurie & Dickman, Amy. (2004). Factors affecting leopard spatial ecology, with particular reference to Namibian farmlands. *South African Journal of Wildlife Research*. 35
- Martins, Q. and Harris, S., 2013. Movement, activity and hunting behaviour of leopards in the Cederberg mountains, South Africa. *African journal of ecology*, 51(4), pp.571-579.
- Mohapatra, R., S. Panda. 2014. Behavioural Description of Indian Pangolins (*Manis crassicaudata*) in Captivity. *International Journal of Zoology*, Volume 2014: 1-7.

- NABIN BARAL, RAMJI GAUTAM and BIJAY TAMANG, 2005, Population status and breeding ecology of White-rumped Vulture *Gyps bengalensis* in Rampur Valley, Nepal, *FORKTAIL* 21 (2005): 87–91.
- Nair, Riju & Jayson, Eluvathingal. (2019). Occurrence of the Indian Crested Porcupine (*Hystrix indica* Kerr.1792) and the Damage on Plantation Crops in the Nilambur Forest Divisions of Southern Western Ghats, Kerala, India. *Agricultural Science Digest - A Research Journal*.
- Nouvellet, P., Rasmussen, G.S.A., Macdonald, D.W. and Courchamp, F., 2012. Noisy clocks and silent sunrises: measurement methods of daily activity pattern. *Journal of Zoology*, 286(3), pp.179-184.
- P.A Movalli, Heavy metal and other residues in feathers of laggar falcon *Falco jugger* from six districts of Pakistan, *Environmental Pollution*, Volume 109, Issue 2, 2000, Pages 267-275.
- Philip, R., Bhatnagar, C. and Koli, V.K., 2021. Feeding ecology of the vulnerable sloth bear (*Melursus ursinus*) in and around Mount Abu wildlife sanctuary, Rajasthan, India. *International Journal of Environmental Studies*, pp.1-11.
- Powell, R. A. (1979). Mustelid spacing patterns: variations on a theme by Mustela. *Z. Tierpsychol.* 50: 153–165.
- Proulx G, Abramov AV, Adams I, Jennings A, Khorozyan I, Rosalino LM, Santos-Reis M, Veron G, Do Linh San E. 2016. World distribution and status of badgers – A review.
- Rosevear, D. R. (1974). *The Carnivores of West Africa*. London: British Museum (Natural History). ISBN 978-0-565-00723-2.
- Sankar, K & Acharya, Bhaskar. (2004). Spotted deer or Chital (*Axis axis* Erxleben, 1777).
- Shenoy, K., Varma, S., Prasad, K. V. D. (2003). Otters in Cauvery Wildlife Sanctuary, southern India; A Study on the Habitat Choice and Diet Composition of the Smooth Coated Otter (*Lutra perspicillata*).
- Sonika Kushwaha, Akhilesh Kumar, Aman Singh, Abhishek Namdev. Ecology of White-rumped vultures (*Gyps bengalensis*) in Northern and Central India. *Species*, 2020, 21(68), 261-269.
- Sunkist, M. & Sunkist, F. (2002) *Wild Cats of the World*. The University of Chicago Press, U.S.A.
- Van Aarde, R.J. (1985). "Reproduction in captive female Cape porcupines (*Hystrix africaeaustralis*)". *Journal of Reproduction and Fertility*. 75 (2): 577–582.
- Varadaraju. 2013. Present Status Of Three Monitor Lizards (*Varanus bengalensis*, *V. flavescens* and *V. salvator* In The Sunderbans. *Rec. zool. Surv. India*: 113(Part-1): 203-210,2013.
- Whitaker, R. and Andrews, H. (2003). Crocodile conservation, Western Asia Region: an update. *J. Bombay Nat. Hist. Soc.* 100(2&3): 432-445.
- Wildlife Institute of India (2016) National Studbook of Indian Pangolin (*Manis crassicaudata*), Wildlife Institute of India, Dehradun and Central Zoo Authority, New Delhi. TR. No. 2016/001.
- Wildlife Institute of India (2018) National Studbook of Indian gazelle (*Gazella bennettii*), Wildlife Institute of India, Dehradun and Central Zoo Authority, New Delhi. TR.No2018/. 03 pages: 103.
- Woods, C. A. (1973). *Erethizon dorsatum*. *Mammalian Species*, (29), 1-6.
- <https://farmech.dac.gov.in/FarmerGuide/RJ/index1.html> & <https://agriculture.rajasthan.gov.in>
- <https://indiawris.gov.in>
- <https://forest.rajasthan.gov.in/content/raj/forest/en/aboutus/departmental-wings/wild-life1/public-information/wildlife-animal-census.html>
- <https://timesofindia.indiatimes.com/city/udaipur/man-killed-girl-hurt-in-sloth-bear-attack-in-udaipur-dist/articleshow/91015979.cms>

## Annexure - I

Forest Department certificate pertaining to having or not having a national park / wildlife sanctuary within 10 kms radius of the project area.

### कार्यालय उप वन संरक्षक, वन्यजीव, चित्तौड़गढ़

पता-प्रताप सर्किल, उदयपुर रोड, चित्तौड़गढ़ पिन कोड-312001

Phone No. 01472-244915,

E-mail ID - dcfwlchittorgarh@gmail.com

क्रमांक : एफ( ) सर्वे/उवसं/वजी/2021-22/ 2709

दिनांक : 26.04.22

निमित्त

मैसर्स हिन्दुस्तान जिंक लिमिटेड  
चंदेरिया

विषय :- आवेदित क्षेत्र के 10 किमी. परिधि में नेशनल पार्क/अभयारण्य होने या ना होने का प्रमाण-पत्र जारी करने के संबंध में।

प्रसंग :- आपका आवेदन दिनांक 15.03.2022 के कम में।

महोदय,

उपरोक्त विषयान्तर्गत लेख हैं कि आवेदित औद्योगिक उत्पादन क्षेत्र हेतु आवेदक- मैसर्स हिन्दुस्तान जिंक लिमिटेड चंदेरिया, औद्योगिक उत्पादन- रिफाईनेड लेड, जिंक व कॉपर मेटल इत्यादि, क्षेत्रफल-335.89 हेक्टेयर, निकट ग्राम-पुठोली, आजोलिया का खेड़ा व बिलिया, तहसील-गंगरार व चित्तौड़गढ़, जिला-चित्तौड़गढ़ में स्थित हैं, जिसमें अभयारण्य से 10 किमी. परिधि में स्थित होने या ना होने के आशय का प्रमाण-पत्र चाहा गया है, उक्त प्रस्तावित क्षेत्र के संबंध में क्षेत्रीय वन अधिकारी वन्यजीव वस्ती के पत्रांक 291 दिनांक 22.04.2022 से प्राप्त रिपोर्ट के आधार पर एवं आवेदन में संलग्न दस्तावेजों में अंकित जीपीएस निर्देशांक को गूगल अर्थ पर मार्क कर देखे जाने पर उक्त आवेदित क्षेत्र के 10 किमी. परिधि में वन्यजीव अभयारण्य/नेशनल पार्क नहीं आता है। आवेदित खनन क्षेत्र के जीपीएस निर्देशांक इस कार्यालय अधिनस्थ स्थित वस्ती वन्यजीव अभयारण्य की सीमा से निम्नानुसार दूरी पर स्थित हैं।

क्र.सं.	प्रस्तावित खनन क्षेत्र के पीलर संख्या	प्रस्तावित खनन क्षेत्र के जीपीएस निर्देशांक		वस्ती वन्यजीव अभयारण्य से हवाई दूरी (किमी. में)
		Latitude	Longitude	
1	A	24°57'21.29"N	74°38'34.39"E	14.44
2	B	24°58'21.03"N	74°40'43.43"E	10.61
3	C	24°57'20.33"N	74°38'37.46"E	13.05
4	D	24°58'35.69"N	74°39'16.22"E	14.34

(डॉ. टी. मोहनराज)  
उप वन संरक्षक  
वन्यजीव, चित्तौड़गढ़

क्रमांक : एफ( ) सर्वे/उवसं/वजी/2021-22/

दिनांक :

प्रतिलिपि : निम्नांकित को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित हैं-

1. उप वन संरक्षक चित्तौड़गढ़।
2. क्षेत्रीय वन अधिकारी वन्यजीव वस्ती।

(डॉ. टी. मोहनराज)  
उप वन संरक्षक  
वन्यजीव, चित्तौड़गढ़





CH 10002163  
**Periodical Medical Examination**  
**SELF DECLARATION FORM**

**Health Status Questionnaire**

Please answer the questions by ticking (✓) the correct box. If you are not sure, leave the question blank and ask your examining physician what it means. Your examining Physician may ask you additional questions during the examination.

Employee Data		Date 10/12/2024	
Last Name Rautra		First Name Jagdish	
I.D No.	Tel #	Occupation	
		No	Yes
1. Are you currently being treated by a doctor for any illness or injury? If yes please briefly describe		✓	
2. Are you receiving any medical treatment or taking any medication (either prescribed or otherwise)? If yes please list		✓	
3. Have you ever had, or been told by a doctor that you had any of the following?		No	Yes
3.1 High blood pressure		✓	
3.2 Heart disease		✓	
3.3 Chest pain, angina		✓	
3.4 Any condition requiring heart surgery		✓	
3.5 Palpitations/irregular heartbeat		✓	
3.6 Abnormal shortness of breath		✓	
3.7 Head injury, spinal injury		✓	
3.8 Seizures, fits, convulsions, epilepsy		✓	
3.9 Blackouts, fainting		✓	
3.10 Stroke		✓	
3.11 Dizziness, vertigo, problems with balance		✓	
3.12 Double vision, difficulty seeing		✓	
3.13 Color blindness		✓	
3.14 Kidney disease		✓	
3.15 Diabetes		✓	
3.16 Neck, back or limb disorders		✓	
3.17 Hearing loss or deafness or had an ear operation or use a hearing aid		✓	
3.18 Do you have difficulty hearing people on the telephone (including use of hearing aid if worn)?		✓	
3.19 Have you ever had, or been told by a doctor that you had a psychiatric illness, or nervous disorder?		✓	
3.20 Have you ever had any other serious injury, illness, operation, or been in hospital for any reason? If Yes, please give details:		✓	



Continued	No	Yes
4.1 Have you ever had, or been told by a doctor that you had a sleep disorder, sleep apnoea, or narcolepsy?	✓	
4.2 Has anyone noticed that your breathing stops or is disrupted by episodes of choking during your sleep?	✓	
5.1 When was the last time you had more than 4 drinks (female) or 5 drinks (male) in 1 day in the past 3 months* last 7 days <input type="checkbox"/> last 4 weeks <input type="checkbox"/> last 3 months <input type="checkbox"/> not in the last 3 months <input type="checkbox"/>		
5.2 Has a relative or friend or a doctor or other health employee been concerned about your drinking or suggested you cut down? No <input type="checkbox"/> Yes, but not in the last year <input type="checkbox"/> Yes, during the last year <input type="checkbox"/>		
	No	Yes
6.1 Do you use illicit drugs?	✓	
6.2 Have you ever been treated for alcohol or substance abuse	✓	
6.3 Whether you smoke? If yes, specify how many cigarettes per day and how long	✓	
7. Do you use any drugs or medications not prescribed for you by a doctor? If yes list here.	✓	
8. Have you been in a vehicle crash since your last license examination? ( Drivers only) If Yes, please give details:		

**Declaration:**

I, certify that to the best of my knowledge the above information supplied by me is true and correct.

Signature :

Date : 10/12/2021

**Office use only**

**Examining Physician's comments**

Fit for duty

Date

10/12/21

Signature

*[Handwritten Signature]*

Print Name

# OCCUPATIONAL HEALTH – PME RECORD

## Medical Examination Record

**\*NB Examining Physician – only complete examinations and investigations required by protocol, or those that are clinically indicated from patient history.**

Name <u>Jagdish</u>		Job Type <u>Helper</u>		Date <u>10/12/2021</u>
Date of birth	<u>3-1-1980</u>	I.D No	<u>CH/0002163</u>	Blood Group
Blood Pressure: (mm Hg) <u>129/75</u>	Pulse: (bpm) <u>88</u>	Height (m): <u>179</u>	Weight (Kg): <u>56kg</u>	BMI:
Systems Revision		Normal / Abnormal		Comment
Head, Eyes, Ears, Mouth, Teeth, Throat				
Spine				
Breasts				
Chest – Respiratory System				
Heart - Cardiovascular				
Extremities				
Musculo-skeletal				
Genito-urinary				
Rectum-Anus				
Abdomen				
Neurological System				
Skin				
Others-incl. Immunization status				
Lab Tests*				
Vision tests*				
Audiogram*				
Spirometry*				
ECG*				
Chest fluorography*				
Other* (CVD risk-Cardio risk%)				

PLEASE ATTACH COPIES OF IMPORTANT SPECIALIST REPORTS AND LAB RESULTS  
(Cardio risk to be calculated for the age group of 35 years and older)

Continued

Examining Physician - additional comments / doctor's recommendations

Fit for duty

Date

10/12/21

Signature



Print Name

### CONSENT FORM

EMPLOYEE'S CONSENT TO RELEASE OF INFORMATION CONTAINED IN THE MEDICAL DOCUMENTS

I (FULL NAME) ✓

DATE OF BIRTH ✓

EMPLOYER ✓

I GIVE MY CONSENT TO THE MEDICAL INSTITUTION

\_\_\_\_\_ TO PROVIDE THE INFORMATION CONTAINED IN MY MEDICAL DOCUMENTS TO THE  
DEPARTMENT OF OCCUPATIONAL HEALTH AND COMPANY CONCERN OFFICIALS.

Signature \_\_\_\_\_

Date

10/12/2021



# Form No. 30 (Prescribed under Rule -100)

डॉ. राकेश घटनागर  
वरिष्ठ विशेषज्ञ (भारत)  
श्री साँवसियाजी सामान्य चिकित्सालय  
चित्तौड़गढ़ (राज.)  
51115

Counter Foil .....

Serial Number .....

## Certificate of Fitness For Dangerous operations

1. Serial Number & Date **51115** **10/12/21**
2. Name of Person examined **जगदीश रचित**
3. Father's Name **लालचंगी रचित**
4. Sex & Age **M** **42**
5. Address **मोहो 14**  
**सुन**
6. Name of the factory in Which employees/in which wished to be employed
7. Process of Department in Which
8. Whether certificate granted ?
9. Where declared unfit & certificate refused
10. Reference number of previous certificate granted or refund

I certify that I have personally  
Examined .....  
S/o.....  
(Father's Name) **लालचंगी रचित**  
residing at .....  
(Address)  
Who is desirous of being employed  
in .....  
(Name of Factory)  
as.....  
(Department) (Process)  
and as nearly as can be ascertained from  
examination us fit/unfit for employment at the  
above noted factory  
2. He is fit to employed and may be  
employed on some other non hazar  
dous operation such as.....  
3. He may be produced for further examination  
after a peroid of .....  
4. He is advised following further  
Examination.....  
5. He is advised following treatment  
.....  
6. The serial number of the previous  
Certificate is .....

डॉ. राकेश घटनागर  
वरिष्ठ विशेषज्ञ (भारत)  
श्री साँवसियाजी सामान्य चिकित्सालय  
चित्तौड़गढ़ (राज.)

**L.T.I. of Person examined**

**Signature of Certifying Surgeon**

**Note :**

1. The counter foil should be retained by the Certifying surgeon and maintained in a file.
2. The Para, which does not apply, may be cancelled

Sunrise Computers 9252730994

डॉ. राकेश घटनागर  
वरिष्ठ विशेषज्ञ (भारत)  
श्री साँवसियाजी सामान्य चिकित्सालय  
चित्तौड़गढ़ (राज.)

**L.T.I. of Person examined**

**Signature of Certifying Surgeon**





# CENTRAL HOSPITAL



Hindustan Zinc Ltd.  
Kapasan Road, Zinc Nagar  
Chittorgarh, Rajasthan  
PHONE: 01472-267532/7533/7535/7537

P Id	: CH10002163	CASE ID	: 96434087
NAME	: MR. JAGDISH RAIKA	LAB NO.	: 21-HAE-90163
AGE/SEX	: 40Y/M	ADVISED DATE & TIME	: 10/12/2021 - 09:41
RELATION	: SELF	REPORT DATE & TIME	: 10/12/2021 - 13:55
DEPENDENT OF	: --	OPD	: M - OPD
REFERRED BY	: Dr. CHETAN TAMBE	SAMPLE DATE & TIME	: 10/12/2021 09:47

Test	Result	Biological Reference Interval
BLOOD SUGAR FASTING	89.70	60 - 120 mg/dL
BLOOD UREA	15.40	10 - 50 mg/dL
SERUM CREATININE	1.06	0.7 - 1.5 mg/dL
LIVER FUNCTION TEST		
SERUM S.G.O.T.	25.50	0 - 40 u/l
SERUM S.G.P.T	30.10	0 - 45 u/l
ALKALINE PHOSPHOTASE	70.00	30 - 300 IU/L
BILLRUBIN TOTAL	0.42	0.1 - 1.1

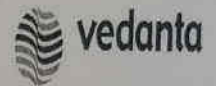
Test	Result	Biological Reference Interval
BLOOD FOR C.B.C		
HAEMOGLOBIN	14.8	12 - 15 gm%
BLOOD TLC	7400	4000 - 11000 cumm
BLOOD D.L.C		
POLYMORPH/NEUTROPHILS	70	55 - 70 %
LYMPHOCYTES	24	22 - 40 %
EOSINOPHILS	04	1 - 4 %
MONOCYTES	02	2 - 8 %
TOTAL PLATELET COUNT	210000	150000 - 450000 cu/mm
TOTAL RBC	4.84	3.8 - 4.8 million/Cu/mm

Test	Result	Biological Reference Interval
URINE ROUTINE EXAMINATION		
PHYSICAL EXAMINATION		
COLOUR	PALE YELLOW	
APPEARANCE	CLEAR	
DEPOSITS	ABSENT	
CHEMICAL EXAMINATION		
REACTION	ACIDIC	
SUGAR	NIL	
ALBUMIN	NIL	
BILE PIGMENTS	ABSENT	
BILE SALTS	ABSENT	
MICROSCOPIC EXAMINATION		



# CENTRAL HOSPITAL

Hindustan Zinc Ltd.  
Kapasan Road, Zinc Nagar  
Chittorgarh, Rajasthan  
PHONE: 01472-267532/7533/7535/7537



P Id	: CH10002163	CASE ID	: 96434087
NAME	: MR. JAGDISH RAIKA	LAB NO.	: 21-HAE-90163
AGE/SEX	: 40Y/M	ADVISED DATE & TIME	: 10/12/2021 - 09:41
RELATION	: SELF	REPORT DATE & TIME	: 10/12/2021 - 13:55
DEPENDENT OF	: --	OPD	: M - OPD
REFERRED BY	: Dr. CHETAN TAMBE	SAMPLE DATE & TIME	: 10/12/2021 09:47

RBC'S	NIL
PUS CELL	NIL
EPITHELIAL CELLS	NIL
CRYSTALS	NIL
BACTERIA	NIL
YEAST	NIL
CASTS	NIL

Test	Result	Biological Reference Interval
DRUG TEST		
COCAINE	Negative	
MARIJUANA	Negative	
AMPHETAMINE	Negative	
MORPHINE	Negative	
BENZODIAZEPINES	Negative	
BARBITURATES	Negative	

Test	Result	Biological Reference Interval
LIPID PROFILE		
SERUM CHOLESTEROL	211.0	150 - 250 mg/dL
SERUM TRIGLYCERIDE	135.7	40 - 150 mg/dL
HDL CHOLESTEROL	38.30	35 - 70 mg/dL
LDL CHOLESTEROL	145.7	50 - 150 mg/dL
VLDL CHOLESTEROL	27.02	12 - 35 mg/dL

\*\*\*End of Report\*\*\*

Report has been generated by computer and does not require signature and not valid for Medico Legal Cases. Kindly correlate with the Clinical Pictures.

RAM AVTAR  
Technologist

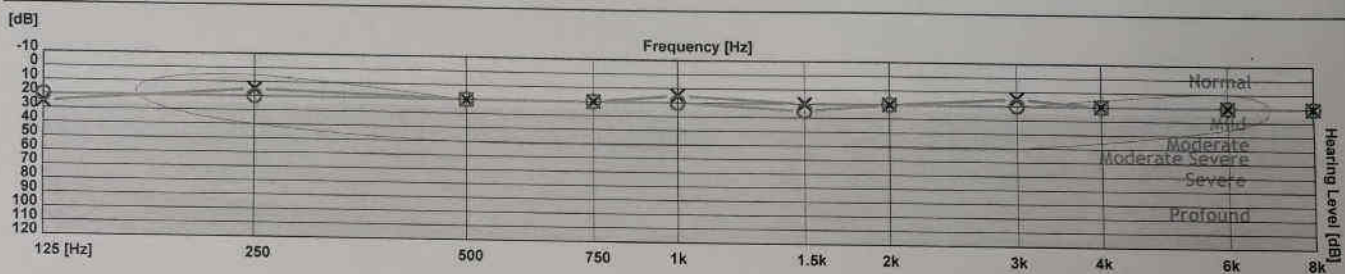
# HINDUSTAN ZINK HOSPITAL

Zink colomny, chittor, Rajasthan



Patient ID : 4066  
Name : JAGDISH RAYKA  
CR Number : 20211210100244  
Registration Date : 10-Dec-2021

Age : 42  
Gender : Male  
Operator : AMARNATH



	125 Hz	250 Hz	500 Hz	750 Hz	1000 Hz	1500 Hz	2000 Hz	3000 Hz	4000 Hz	6000 Hz	8000 Hz
X - Air Left	25	15	20	20	15	20	20	15	20	20	20
O - Air Right	20	20	20	20	20	25	20	20	20	20	20
> - Bone Left											
< - Bone Right											

Clinical Notes :

Not Found



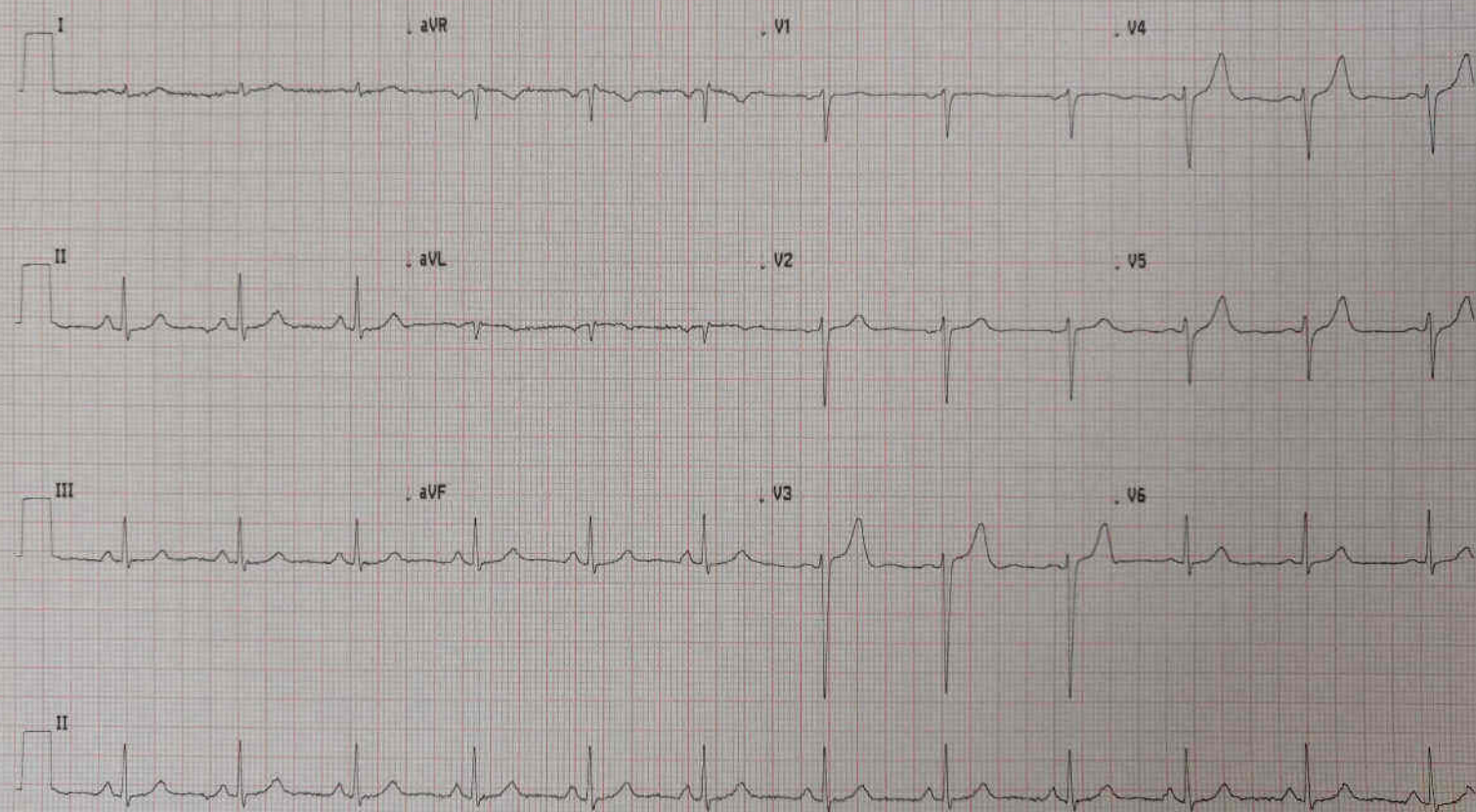
Last: Rayka  
First: Jagdish  
ID: Ch10002163  
DOB:  
Age: 42yr  
Sex: Male

10-Dec-2021 01:13:34

Vent rate: 71 BPM  
PR int: 145 ms  
QRS dur: 91 ms  
QT/QTc: 363/386 ms  
P-R-T axes: 81 83 70  
Avg RR: 837 ms  
QTcB: 396 ms  
QTcF: 385 ms

SINUS RHYTHM  
NORMAL ECG

Reviewed by \_\_\_\_\_

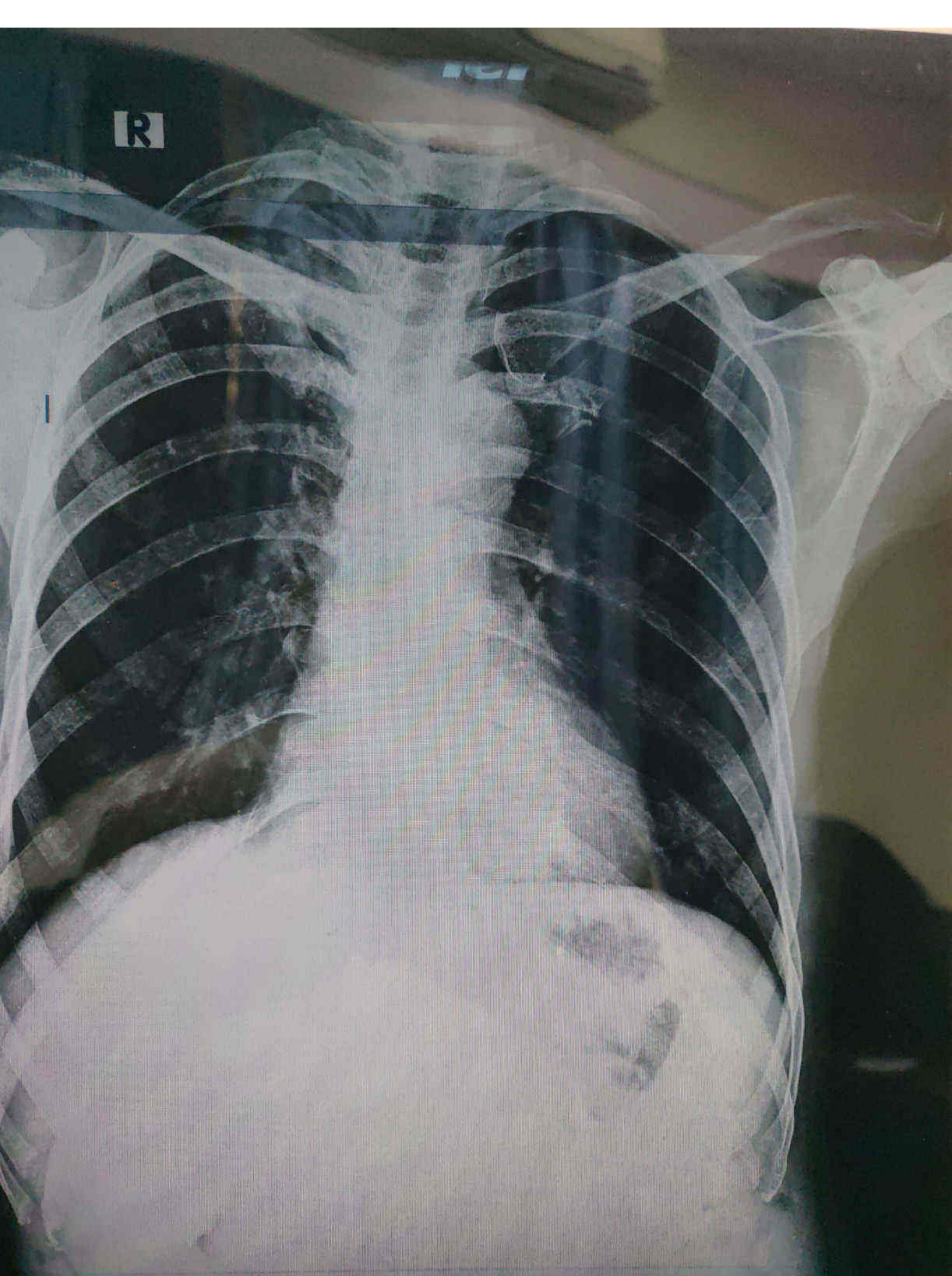


115250259555

vedanta

ECG CARDIOGRAPHY Site # 0 Cart # 0 Version 2.0.35 Sequence #10925 25mm/s 10mm/mV 0.05-40 Hz





**Hindustan Zinc Limited**  
**Chanderiya lead zinc Smelter**  
**Chittorgarh, Rajasthan.**  
**Central Hospital**  
**Phone: 01472-267531/7533/7535**

Sr. No		Emp. No./Gp.no	CH10002163
Name	Jagdish Raika	Department/Company	
Age	41 year	Sex	M
Sample Date	10.12.2021	Report Date	10.12.2021
Ref.by.	CLZS		

**BLOOD LEAD EXAMINATION REPORT**

Test Name	Result	Ref. Range
Blood Lead Level	14	40 ug /dl

*Report has been generated by computer and does not require signature and not valid for medico legal cases. kindly correlate with the clinical pictures*

Chemical analysis of ISF Slag		
Sl. No.	Constituents Determined (%)	Results
1	GOI	5.68
2	SiO <sub>2</sub>	18.08
3	Fe <sub>2</sub> O <sub>3</sub>	34.28
4	Al <sub>2</sub> O <sub>3</sub>	8.17
5	CaO	17.91
6	MgO	1.93
7	Na <sub>2</sub> O	0.68
8	K <sub>2</sub> O	0.71
9	Mn <sub>2</sub> O <sub>3</sub>	1.33
10	ZnO	9.21
11	PbO	1.22
12	Sulphide Sulphur	1.41
13	Insoluble Residue	6.28



## Test Report

ISSUED TO:  
Hindustan Zinc Limited  
Chanderiya Lead Zinc Smelter  
Chittorgarh, Rajasthan  
India

Report Number VLL/VLS/17/05804/018  
Issue Date : 2017-11-06  
Your Ref : TRF  
And Date : 2017-08-22  
Lab Ref No. : 86426

Page 1 of 2

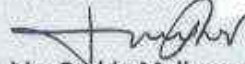
Sample Name:	Cooler Cake, Hydro-I		
Batch Number:	NA	A.R.Number:	NA
Mfg.Date:	NA	Exp.Date:	NA
Sample Received Date:	2017-08-22	Sample Registration Date:	2017-08-22
Analysis Starting Date:	2017-08-22	Analysis completion Date:	2017-09-20
Received Quantity:	500gms sample.		
Test Required:	Physical State of the Waste, Colour & Texture, Specific Gravity, Viscosity in Liquids, Flash Point, Moisture, Organic Content, PFLT, pH, Cyanide, Sulphide, Sulphur, Oil & Grease, Carbon, Nitrogen, Hydrogen, Zinc, Lead, Cadmium, Chromium, Hexavalent Chromium, Antimony, Arsenic, Barium, Beryllium, Copper, Fluorine, Mercury, Selenium, Silver, Iron, Aluminium, Boron, Cobalt, Nickel, Manganese, Mineral Matter & TCLP metals (Al, B, Ba, Cd, Co, Cr, Cu, Fe, Ni, Pb, Zn, Ag, As, Hg, Se).		
Sample Details:	Cooler Cake, Hydro-I		

### TEST RESULTS

S. No	Parameters	Unit	Cooler Cake, Hydro-I
1	Physical State of the Waste	--	Solid
2	Colour & Texture	--	Black
3	Specific Gravity	--	2.2664
4	Calorific Value	Kcal/kg	<200.0
5	Viscosity	CST	NA
6	Flash Point	°C	<40.0
7	Moisture	%	18.46
8	Organic Content	%	4.32
9	PFLT	Pass/Fail	Pass
10	pH	--	2.05
11	Cyanide	mg/kg	<1.0
12	Sulphide	mg/kg	248.4
13	Sulphur	%	<0.1
14	Oil & Grease	mg/kg	<1.0
15	Carbon	%	0.12
16	Nitrogen	%	4.48
17	Hydrogen	%	0.7
18	Zinc as Zn	%	1.15
19	Lead as Pb	%	0.066
20	Cadmium as Cd	mg/kg	27.83
21	Chromium as Cr	mg/kg	51.82
22	Hexavalent Chromium as Cr <sup>6+</sup>	mg/kg	<0.05
23	Antimony	mg/kg	2.85
24	Arsenic as As	mg/kg	0.38

#### Remarks:

Instrument used ICP-MS, ICP-OES.

  
Dr. Subba Reddy Mallampati  
Group Leader-Environment



ISSUED TO:  
Hindustan Zinc Limited  
Chandariya Lead Zinc Smelter  
Chittorgarh, Rajasthan  
India

Report Number VLL/VLS/17/05804/017  
Issue Date : 2017-11-06  
Your Ref : TRF  
And Date : 2017-08-22  
Lab Ref No. : 86426

Page 2 of 2

### TEST RESULTS

S. No	Parameters	Unit	Chandariya Lead Zinc
25	Barium as Ba	mg/kg	<0.1
26	Beryllium as Be	mg/kg	<0.1
27	Copper as Cu	mg/kg	3004.5
28	Fluorine as F	mg/kg	38.8
29	Mercury as Hg	mg/kg	5.768
30	Selenium as Se	mg/kg	<0.1
31	Silver as Ag	mg/kg	0.61
32	Iron as Fe	%	11.41
33	Aluminum as Al	mg/kg	684.03
34	Boron as B	mg/kg	<0.1
35	Cobalt as Co	mg/kg	41.83
36	Nickel as Ni	mg/kg	13.07
37	Manganese as Mn	mg/kg	1465.6
38	Mineral Matter	%	70.85

### TCLP TEST

1	Aluminum as Al	mg/l	0.194
2	Boron as B	mg/l	0.28
3	Barium as Ba	mg/l	0.05
4	Cadmium as Cd	mg/l	1.238
5	Cobalt as Co	mg/l	0.01
6	Chromium as Cr	mg/l	<0.01
7	Copper as Cu	mg/l	0.02
8	Iron as Fe	mg/l	7.91
9	Nickel as Ni	mg/l	0.023
10	Lead as Pb	mg/l	138.45
11	Zinc as Zn	mg/l	180.4
12	Silver as Ag	mg/l	<0.01
13	Arsenic as As	mg/l	<0.01
14	Mercury as Hg	mg/l	<0.001
15	Selenium as Se	mg/l	<0.01

### Remarks:

Instrument used ICP-MS, ICP-OES.

COPY

Dr. Subba Reddy Mallampati  
Group Leader-Environment



ISSUED TO:  
Hindustan Zinc Limited  
Chanderiya Lead Zinc Smelter  
Chittorgarh, Rajasthan  
India

Report Number VLL/VLS/17/05804/012  
Issue Date : 2017-11-06  
Your Ref : TRF  
And Date : 2017-08-22  
Lab Ref No. : 86426

Page 1 of 2

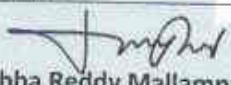
Sample Name:	Unit-II (hydro-II) Cooler Cake		
Batch Number:	NA	A.R.Number:	NA
Mfg.Date:	NA	Exp.Date:	NA
Sample Received Date:	2017-08-22	Sample Registration Date:	2017-08-22
Analysis Starting Date:	2017-08-22	Analysis completion Date:	2017-09-20
Received Quantity:	500gms sample.		
Test Required:	Physical State of the Waste, Colour & Texture, Specific Gravity, Viscosity in Liquids, Flash Point, Moisture, Organic Content, PFLT, pH, Cyanide, Sulphide, Sulphur, Oil & Grease, Carbon, Nitrogen, Hydrogen, Zinc, Lead, Cadmium, Chromium, Hexavalent Chromium, Antimony, Arsenic, Barium, Beryllium, Copper, Fluorine, Mercury, Selenium, Silver, Iron, Aluminium, Boron, Cobalt, Nickel, Manganese, Mineral Matter & TCLP metals (Al, B, Ba, Cd, Co, Cr, Cu, Fe, Ni, Pb, Zn, Ag, As, Hg, Se).		
Sample Details:	Unit-II (hydro-II) Cooler Cake		

### TEST RESULTS

S. No	Parameters	Unit	Unit-II (hydro-II) Cooler Cake
1	Physical State of the Waste	--	Solid
2	Colour & Texture	--	Black
3	Specific Gravity	--	2.2421
4	Calorific Value	Kcal/kg	<200.0
5	Viscosity	CST	NA
6	Flash Point	°C	<40.0
7	Moisture	%	26.84
8	Organic Content	%	4.64
9	PFLT	Pass/Fail	Pass
10	pH	--	2.27
11	Cyanide	mg/kg	<1.0
12	Sulphide	mg/kg	216.2
13	Sulphur	%	<0.1
14	Oil & Grease	mg/kg	<1.0
15	Carbon	%	0.1
16	Nitrogen	%	4.36
17	Hydrogen	%	0.6
18	Zinc as Zn	%	0.83
19	Lead as Pb	%	0.88
20	Cadmium as Cd	mg/kg	228.13
21	Chromium as Cr	mg/kg	38.88
22	Hexavalent Chromium as Cr <sup>VI</sup>	mg/kg	<0.05
23	Antimony	mg/kg	3.32
24	Arsenic as As	mg/kg	0.31

#### Remarks:

Instrument used ICP-MS, ICP-OES.

  
Dr. Subba Reddy Mallampati  
Group Leader-Environment



ISSUED TO:  
Hindustan Zinc Limited  
Chanderiya Lead Zinc Smelter  
Chittorgarh, Rajasthan  
India

Report Number : VLL/VLS/17/05804/012  
Issue Date : 2017-11-06  
Your Ref : TRF  
And Date : 2017-08-22  
Lab Ref No. : 86426

Page 2 of 2

### TEST RESULTS

S. No	Parameters	Unit	Unit-II (hydro-II) Cooler Cake
25	Barium as Ba	mg/kg	388.05
26	Beryllium as Be	mg/kg	0.28
27	Copper as Cu	mg/kg	131.35
28	Fluorine as F	mg/kg	26.4
29	Mercury as Hg	mg/kg	1.389
30	Selenium as Se	mg/kg	<0.1
31	Silver as Ag	mg/kg	1.38
32	Iron as Fe	%	0.64
33	Aluminum as Al	mg/kg	476.15
34	Boron as B	mg/kg	20.74
35	Cobalt as Co	mg/kg	4.32
36	Nickel as Ni	mg/kg	0.86
37	Manganese as Mn	%	4.47
38	Mineral Matter	%	94.41
TCLP TEST			
1	Aluminum as Al	mg/l	0.093
2	Boron as B	mg/l	0.385
3	Barium as Ba	mg/l	0.015
4	Cadmium as Cd	mg/l	2.398
5	Cobalt as Co	mg/l	0.003
6	Chromium as Cr	mg/l	0.017
7	Copper as Cu	mg/l	0.048
8	Iron as Fe	mg/l	0.026
9	Nickel as Ni	mg/l	0.046
10	Lead as Pb	mg/l	0.733
11	Zinc as Zn	mg/l	136.37
12	Silver as Ag	mg/l	<0.01
13	Arsenic as As	mg/l	<0.01
14	Mercury as Hg	mg/l	<0.001
15	Selenium as Se	mg/l	<0.01

### Remarks:

Instrument used ICP-MS, ICP-OES.

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Dr. Subba Reddy Mallampati  
Group Leader-Environment



ISSUED TO:  
Hindustan Zinc Limited  
Chandriya Lead Zinc Smelter  
Chittorgarh, Rajasthan  
India

Report Number VLL/VLS/17/05804/013  
Issue Date : 2017-11-06  
Your Ref : TRF  
And Date : 2017-08-22  
Lab Ref No. : 86426

Page 1 of 2


Sample Name:	Unit-II (Hydro-I) Purification Cake		
Batch Number:	NA	A.R.Number:	NA
Mfg.Date:	NA	Exp.Date:	NA
Sample Received Date:	2017-08-22	Sample Registration Date:	2017-08-22
Analysis Starting Date:	2017-08-22	Analysis completion Date:	2017-09-20
Received Quantity:	500gms sample.		
Test Required:	Physical State of the Waste, Colour & Texture, Specific Gravity, Viscosity in Liquids, Flash Point, Moisture, Organic Content, PFLT, pH, Cyanide, Sulphide, Sulphur, Oil & Grease, Carbon, Nitrogen, Hydrogen, Zinc, Lead, Cadmium, Chromium, Hexavalent Chromium, Antimony, Arsenic, Barium, Beryllium, Copper, Fluorine, Mercury, Selenium, Silver, Iron, Aluminium, Boron, Cobalt, Nickel, Manganese, Mineral Matter & TCLP metals (Al, B, Ba, Cd, Co, Cr, Cu, Fe, Ni, Pb, Zn, Ag, As, Hg, Se).		
Sample Details:	Unit-I (Pyro) Ansmelt Slag		

### TEST RESULTS

S. No	Parameters	Unit	Unit-II (Hydro-I) Purification Cake
1	Physical State of the Waste	--	Solid
2	Colour & Texture	--	Greenish Colour
3	Specific Gravity	--	1.4286
4	Calorific Value	Kcal/kg	<200.0
5	Viscosity	CST	NA
6	Flash Point	°C	<40.0
7	Moisture	%	4.86
8	Organic Content	%	2.84
9	PFLT	Pass/Fail	Pass
10	pH	--	2.11
11	Cyanide	mg/kg	<1.0
12	Sulphide	mg/kg	186.4
13	Sulphur	%	<1.0
14	Oil & Grease	mg/kg	<1.0
15	Carbon	%	0.1
16	Nitrogen	%	3.86
17	Hydrogen	%	0.81
18	Zinc as Zn	%	23.33
19	Lead as Pb	%	1.40
20	Cadmium as Cd	%	24.42
21	Chromium as Cr	mg/kg	<0.1
22	Hexavalent Chromium as Cr <sup>VI</sup>	mg/kg	<0.05
23	Antimony	mg/kg	2892.7
24	Arsenic as As	mg/kg	10.57

#### Remarks:

Instrument used ICP-MS, ICP-OES.

  
Dr. Subba Reddy Mallampati  
Group Leader-Environment



ISSUED TO:  
Hindustan Zinc Limited  
Chanderiya Lead Zinc Smelter  
Chittorgarh, Rajasthan  
India

Report Number : VLL/VLS/17/05804/013  
Issue Date : 2017-11-06  
Your Ref : TRF  
And Date : 2017-08-22  
Lab Ref No. : 86426

Page 2 of 2

### TEST RESULTS

S. No	Parameters	Unit	Unit-II (Hydro-I) Purification Cake
25	Barium as Ba	mg/kg	36.96
26	Beryllium as Be	mg/kg	23.21
27	Copper as Cu	%	11.8
28	Fluorine as F	mg/kg	28.4
29	Mercury as Hg	mg/kg	2.945
30	Selenium as Se	mg/kg	4.96
31	Silver as Ag	mg/kg	3.24
32	Iron as Fe	mg/kg	3208.6
33	Aluminum as Al	mg/kg	770.8
34	Boron as B	mg/kg	45.07
35	Cobalt as Co	mg/kg	3858.6
36	Nickel as Ni	mg/kg	2746.1
37	Manganese as Mn	%	0.68
38	Mineral Matter	%	89.48
TCLP TEST			
1	Aluminum as Al	mg/l	<0.01
2	Boron as B	mg/l	0.76
3	Barium as Ba	mg/l	0.044
4	Cadmium as Cd	mg/l	1365
5	Cobalt as Co	mg/l	17.45
6	Chromium as Cr	mg/l	<0.01
7	Copper as Cu	mg/l	0.02
8	Iron as Fe	mg/l	<0.01
9	Nickel as Ni	mg/l	11.11
10	Lead as Pb	mg/l	9.32
11	Zinc as Zn	mg/l	68.92
12	Silver as Ag	mg/l	<0.01
13	Arsenic as As	mg/l	<0.01
14	Mercury as Hg	mg/l	<0.001
15	Selenium as Se	mg/l	<0.01

### Remarks:

Instrument used ICP-MS, ICP-OES.

COPY

Dr. Subba Reddy Mallampati  
Group Leader-Environment



## Test Report

ISSUED TO:  
Hindustan Zinc Limited  
Chanderiya Lead Zinc Smelter  
Chittorgarh, Rajasthan  
India

Report Number VLL/VLS/17/05804/019  
Issue Date : 2017-11-06  
Your Ref : TRF  
And Date : 2017-08-22  
Lab Ref No. : 86426

Page 1 of 2

Sample Name:	CPP Unit-1,2&3 Fly ash		
Batch Number:	NA	A.R.Number:	NA
Mfg.Date:	NA	Exp.Date:	NA
Sample Received Date:	2017-08-22	Sample Registration Date:	2017-08-22
Analysis Starting Date:	2017-08-22	Analysis completion Date:	2017-09-20
Received Quantity:	500gms sample.		
Test Required:	Physical State of the Waste, Colour & Texture, Specific Gravity, Viscosity in Liquids, Flash Point, Moisture, Organic Content, PFLT, pH, Cyanide, Sulphide, Sulphur, Oil & Grease, Carbon, Nitrogen, Hydrogen, Zinc, Lead, Cadmium, Chromium, Hexavalent Chromium, Antimony, Arsenic, Barium, Beryllium, Copper, Fluorine, Mercury, Selenium, Silver, Iron, Aluminium, Boron, Cobalt, Nickel, Manganese, Mineral Matter & TCLP metals (Al, B, Ba, Cd, Co, Cr, Cu, Fe, Ni, Pb, Zn, Ag, As, Hg, Se).		
Sample Details:	CPP Unit-1,2&3 Fly ash		

### TEST RESULTS

S. No	Parameters	Unit	CPP Unit-1,2&3 Fly ash
1	Physical State of the Waste	--	Solid
2	Colour & Texture	--	Dark Gray
3	Specific Gravity	--	2.1086
4	Calorific Value	Kcal/kg	1108
5	Viscosity	CST	NA
6	Flash Point	°C	<40.0
7	Moisture	%	8.47
8	Organic Content	%	3.11
9	PFLT	Pass/Fail	Pass
10	pH	--	1.80
11	Cyanide	mg/kg	<1.0
12	Sulphide	mg/kg	136.8
13	Sulphur	%	<0.10
14	Oil & Grease	mg/kg	<1.0
15	Carbon	%	13.24
16	Nitrogen	%	<0.10
17	Hydrogen	%	0.32
18	Zinc as Zn	mg/kg	1.15
19	Lead as Pb	mg/kg	279.7
20	Cadmium as Cd	mg/kg	258.8
21	Chromium as Cr	mg/kg	45.78
22	Hexavalent Chromium as Cr <sup>VI</sup>	mg/kg	<0.05
23	Antimony	mg/kg	6.57
24	Arsenic as As	mg/kg	6.27

#### Remarks:

Instrument used ICP-MS, ICP-OES.

Dr. Subba Reddy Mallampati  
Group Leader-Environment



ISSUED TO:  
Hindustan Zinc Limited  
Chanderiya Lead Zinc Smelter  
Chittorgarh, Rajasthan  
India

Report Number : VLL/VLS/17/05804/018  
Issue Date : 2017-11-06  
Your Ref : TRF  
And Date : 2017-08-22  
Lab Ref No. : 86426

Page 2 of 2

### TEST RESULTS

S. No	Parameters	Unit	Cooler Cake, Hydro-I
25	Barium as Ba	mg/kg	495.2
26	Beryllium as Be	mg/kg	<0.1
27	Copper as Cu	mg/kg	48.04
28	Fluorine as F	mg/kg	16.8
29	Mercury as Hg	mg/kg	0.531
30	Selenium as Se	mg/kg	<0.1
31	Silver as Ag	mg/kg	<0.01
32	Iron as Fe	%	1.07
33	Aluminum as Al	%	0.62
34	Boron as B	mg/kg	22.07
35	Cobalt as Co	mg/kg	11.51
36	Nickel as Ni	mg/kg	37.42
37	Manganese as Mn	%	1.82
38	Mineral Matter	%	93.46
TCLP TEST			
1	Aluminum as Al	mg/l	0.442
2	Boron as B	mg/l	0.42
3	Barium as Ba	mg/l	0.01
4	Cadmium as Cd	mg/l	0.69
5	Cobalt as Co	mg/l	<0.01
6	Chromium as Cr	mg/l	0.03
7	Copper as Cu	mg/l	0.05
8	Iron as Fe	mg/l	0.03
9	Nickel as Ni	mg/l	0.02
10	Lead as Pb	mg/l	0.52
11	Zinc as Zn	mg/l	183.06
12	Silver as Ag	mg/l	<0.01
13	Arsenic as As	mg/l	<0.01
14	Mercury as Hg	mg/l	<0.001
15	Selenium as Se	mg/l	<0.01

#### Remarks:

Instrument used ICP-MS, ICP-OES.

COPY

Dr. Subba Reddy Mallampati  
Group Leader-Environment



Table 2.5: Chemical analysis of composite jarosite, jarofix, jaroash and other materials

Oxide constituents	Jarosite JS-D	Jarofix JFX-D	Jarosite JS-CH	Flyash FA-CH	Jaroash JSA	Gypsum GYP	Clinker CL-1	Clinker CL-2	Clinker CL-3
LOI	33.88	27.15	30.38	2.29	15.27	-	0.40	0.35	0.18
CaO	7.24	12.78	5.38	2.38	3.19	26.28	64.92	63.19	65.85
SiO <sub>2</sub>	12.02	11.16	9.10	57.93	34.07	-	19.97	20.30	21.50
Al <sub>2</sub> O <sub>3</sub>	7.37	6.72	7.29	26.03	17.58	1.93	5.90	5.31	4.79
Fe <sub>2</sub> O <sub>3</sub>	27.13	25.18	33.83	5.83	17.92	0.94	4.57	4.10	4.40
MgO	0.33	0.45	0.28	0.96	0.43	0.66	1.79	4.63	1.11
SO <sub>3</sub>	28.14	20.80	23.09	0.39	11.58	32.77	1.08	0.92	0.83
Na <sub>2</sub> O	1.84	1.89	1.82	0.35	1.28	0.07	0.20	0.17	0.15
K <sub>2</sub> O	0.47	0.49	0.39	0.89	0.66	0.05	0.54	0.57	0.55
TiO <sub>2</sub>	0.61	0.69	0.55	1.62	0.84	0.13	0.32	0.44	0.50
Mn <sub>2</sub> O <sub>3</sub>	0.11	0.08	0.32	0.006	0.08	0.006	0.08	0.02	0.07
P <sub>2</sub> O <sub>5</sub>	-	-	0.032	0.009	0.04	0.006	0.008	0.02	0.008
Chloride	0.019	0.022	0.03	0.009	0.011	0.006	0.10	0.029	0.007
IR	7.60	16.10	14.24	90.47	49.24	-	0.13	0.12	0.27



## DEMOGRAPHIC PROFILE OF THE STUDY AREA

S. No.	Name of Village	No. Of House Hold	Total Population	T. Male	T. Female	T. Population (0-6 years)	T. Male (0-6 years)	T. Female (0-6 years)	Sex ratio	SC population	ST Population	P_LIT	M_LIT	F_LIT	Total Pop (-06)	M_Pop (-06)	F_Pop (-06)	Lit. Rate	Male LR	Female LR	Working Population	Main worker	Margin al Worker	Non Working
<b>0 - 3 km</b>																								
1	Biliya	331	1496	755	741	258	134	124	981	342	175	708	460	248	1238	621	617	57.2	74.1	40.2	759	639	120	737
2	Ajollon ka khera	485	2207	1104	1103	267	117	150	999	294	120	1193	792	401	1940	987	953	61.5	80.2	42.1	1334	1067	267	873
3	Salera	5	26	15	11	7	5	2	733	0	25	8	7	1	19	10	9	42.1	70.0	11.1	14	14	0	12
4	Bhawanipura	106	607	322	285	92	52	40	885	8	49	253	186	67	515	270	245	49.1	68.9	27.3	409	258	151	198
5	Suwaniya	370	1720	884	836	194	98	96	946	219	92	960	631	329	1526	786	740	62.9	80.3	44.5	978	606	372	742
6	Nagri	364	1741	891	850	232	124	108	954	708	0	997	632	365	1509	767	742	66.1	82.4	49.2	905	902	3	896
7	Monga ka khera	182	762	378	384	94	42	52	1016	11	62	364	227	137	668	336	332	54.5	67.6	41.3	416	401	15	346
8	Chogawari	196	911	441	470	141	70	71	1066	101	38	421	262	159	770	371	399	54.7	70.6	39.8	563	255	308	348
9	Amoliya	141	628	330	298	120	65	55	903	96	128	208	153	55	508	265	243	40.9	57.7	22.6	406	377	29	222
<b>Sub-Total</b>		<b>2180</b>	<b>10098</b>	<b>5120</b>	<b>4978</b>	<b>1405</b>	<b>707</b>	<b>698</b>	<b>972</b>	<b>1779</b>	<b>689</b>	<b>5112</b>	<b>3350</b>	<b>1762</b>	<b>8693</b>	<b>4413</b>	<b>4280</b>	<b>54.3</b>	<b>72.4</b>	<b>35.3</b>	<b>5784</b>	<b>4519</b>	<b>1265</b>	<b>4314</b>
<b>3-7 km</b>																								
10	Shivpura	98	488	250	238	61	31	30	952	111	0	205	137	68	427	219	208	48.0	62.6	32.7	314	276	38	174
11	Modsingh ki chawki	7	30	15	15	2	1	1	1000	0	0	24	13	11	28	14	14	85.7	92.9	78.6	7	6	1	23
12	Mansingh ji ka khera	74	340	172	168	57	30	27	977	17	11	131	88	43	283	142	141	46.3	62.0	30.5	175	173	2	165
13	Jodhsingh ka khera	60	245	124	121	42	17	25	976	44	9	107	71	36	203	107	96	52.7	66.4	37.5	112	85	27	133
14	Baldarkha	389	1661	828	833	237	116	121	1006	314	727	842	529	313	1424	712	712	59.1	74.3	44.0	942	911	31	719
15	Songaron ki kheri	117	563	286	277	74	38	36	969	156	124	264	165	99	489	248	241	54.0	66.5	41.1	303	281	22	260
16	Bheeliya khera	102	499	266	233	98	59	39	876	170	226	191	123	68	401	207	194	47.6	59.4	35.1	280	279	1	219
17	Ekling Pura	29	136	64	72	30	11	19	1125	0	74	24	17	7	106	53	53	22.6	32.1	13.2	85	83	2	51
18	Sangrampur	81	396	206	190	41	25	16	922	16	275	174	126	48	355	181	174	49.0	69.6	27.6	364	235	29	132
19	Surjana	160	766	394	372	129	79	50	944	158	182	289	199	90	637	315	322	45.4	63.2	28.0	440	425	15	326
20	Mango Dara	63	290	144	146	46	27	19	1014	37	98	138	85	53	244	117	127	56.6	72.6	41.7	172	154	18	118
21	Jal	17	90	47	43	13	7	6	915	0	0	68	37	31	77	40	37	88.3	92.5	83.8	49	49	0	41
22	Achhora	249	1160	592	568	160	95	65	959	581	61	481	298	183	1000	497	503	48.1	60.0	36.4	665	544	121	495
23	Bherda	26	126	64	62	22	13	9	969	0	45	46	25	21	104	51	53	44.2	49.0	39.6	60	59	1	66
24	Damdama	53	270	143	127	37	20	17	888	0	52	148	98	50	233	123	110	63.5	79.7	45.5	176	165	11	94
25	Seerdi	299	1205	634	571	165	89	76	901	1051	5	492	345	147	1040	545	495	47.3	63.3	29.7	615	591	24	590
26	Semalpura	342	1726	877	849	257	135	122	968	167	212	895	583	312	1469	742	727	60.9	78.6	42.9	977	962	15	749
27	Manpura	518	2766	1383	1383	443	231	212	1000	977	221	1390	869	521	2323	1152	1171	59.8	75.4	44.5	1327	1179	148	1439
28	Kasara Kheri	86	358	179	179	50	26	24	1000	8	37	184	117	67	308	153	155	59.7	76.5	43.2	178	154	24	180
29	Barodliya	47	210	109	101	43	20	23	927	7	134	47	33	14	167	89	78	28.1	37.1	17.9	116	114	2	94
30	Taleri	114	523	269	254	74	40	34	944	50	46	283	178	105	449	229	220	63.0	77.7	47.7	225	114	11	298
31	Bolo ka sanwata	389	1769	883	886	239	127	112	1003	649	67	836	574	262	1530	756	774	54.6	75.9	33.9	1053	861	192	716
32	Geniya	227	1062	552	510	138	72	66	924	616	87	452	304	148	924	480	444	48.9	63.3	33.3	607	604	3	455
33	Det	137	644	327	317	81	43	38	969	91	9	353	221	132	563	284	279	62.7	77.8	47.3	229	200	29	29
34	Laxmansingh ji ka khera	11	55	26	29	7	2	5	1115	0	0	33	18	15	48	24	24	68.8	75.0	62.5	28	28	0	27
35	Bodiyana	331	1644	861	783	271	144	127	909	273	160	1020	608	412	1373	717	656	74.3	84.8	62.8	604	577	27	1040
36	Daulatpura	111	471	236	235	60	28	32	996	99	84	228	159	69	411	208	203	55.5	76.4	34.0	24	239	8	224
37	Rolahera	567	2502	1312	1190	372	223	149	907	112	225	1145	776	369	2130	1089	1041	53.8	71.3	35.4	1443	1399	44	1059
38	Amragadri khera	48	260	128	132	45	23	22	1031	0	0	110	79	31	215	105	110	51.2	75.2	28.2	155	152	3	105
39	Laxmipura	58	251	133	118	34	19	15	887	14	0	112	77	35	217	114	103	51.6	67.5	34.0	156	148	8	95
<b>Sub-Total</b>		<b>4810</b>	<b>22506</b>	<b>11504</b>	<b>11002</b>	<b>3528</b>	<b>1791</b>	<b>1537</b>	<b>956</b>	<b>5718</b>	<b>3171</b>	<b>10712</b>	<b>6952</b>	<b>3760</b>	<b>19178</b>	<b>9713</b>	<b>9465</b>	<b>55.1</b>	<b>69.3</b>	<b>40.4</b>	<b>11881</b>	<b>11047</b>	<b>857</b>	<b>10087</b>
<b>7 - 10 km</b>																								
40	Nolagadri ka khera	68	281	138	143	42	20	22	1036	3	22	138	86	52	239	118	121	57.7	72.9	43.0	139	130	9	142
41	Sadapura	76	358	179	179	61	33	28	1000	24	14	137	90	47	297	146	151	46.1	61.6	31.1	124	16	8	234
42	Dhuwalya	73	337	165	172	63	29	34	1042	3	53	127	87	40	274	136	138	46.4	64.0	29.0	210	208	2	127
43	Moorliya	83	362	176	186	55	30	25	1057	177	72	156	90	66	307	146	161	50.8	61.6	41.0	191	37	54	171
44	Gowaliya	134	590	306	284	89	51	38	928	51	0	284	191	93	501	255	246	56.7	74.9	37.8	317	304	13	273
45	Lalas	282	1224	618	606	180	99	81	981	138	52	444	306	138	1044	519	525	42.5	59.0	26.3	661	588	73	563
46	Semliya	232	1039	533	506	133	74	59	949	263	0	564	330	234	906	459	447	62.3	71.9	52.3	687	682	5	352
47	Khuntiya	185	829	423	406	94	48	46	960	48	190	508	311	197	735	375	360	69.1	82.9	54.7	545	519	26	284

S. No.	Name of Village	No. Of House Hold	Total Population	T. Male	T. Female	T. Population (0-6 years)	T. Male (0-6 years)	T. Female (0-6 years)	Sex ratio	SC population	ST Population	P_LIT	M_LIT	F_LIT	Total Pop (-06)	M_Pop (-06)	F_Pop (-06)	Lit. Rate	Male LR	Female LR	Working Population	Main worker	Margin al Worker	Non Working
48	Peepalya Kalan	178	802	400	402	155	74	81	1005	509	0	288	218	70	647	326	321	44.5	66.9	21.8	548	504	44	254
49	Ghosondi	260	1052	523	529	160	74	86	1011	352	404	477	304	173	892	449	443	53.5	67.7	39.1	579	198	381	473
50	Negadiya Khurd	116	489	228	261	90	36	54	1145	54	0	195	130	65	399	192	207	48.9	67.7	31.4	328	300	28	161
51	Negadiya Kalan	122	535	266	269	78	43	35	1011	85	130	306	184	122	457	223	234	67.0	82.5	52.1	373	365	8	162
52	Pal	247	1096	554	542	185	93	92	978	61	42	413	313	100	911	461	450	45.3	67.9	22.2	618	615	3	478
53	Pal ka khera	140	727	361	366	114	52	62	1014	49	113	286	221	65	613	309	304	46.7	71.5	21.4	385	384	1	342
54	Kanwarji ka khera	86	337	170	167	37	19	18	982	105	40	158	106	52	300	151	149	52.7	70.2	34.9	234	234	0	103
55	Mayra	86	375	196	179	64	33	31	913	53	127	156	103	53	311	163	148	50.2	63.2	35.8	212	207	5	163
56	Galiyamal	42	205	98	107	40	17	23	1092	0	103	52	37	15	165	81	84	31.5	45.7	17.9	134	58	76	71
57	Arjunpura	39	145	78	67	21	10	11	859	0	74	61	46	15	124	68	56	49.2	67.6	26.8	95	94	1	50
58	Ambaberi	41	166	78	88	35	14	21	1128	0	127	44	29	15	131	64	67	33.6	45.3	22.4	106	27	79	60
59	Bari ka khera	76	367	183	184	70	39	31	1005	5	146	170	107	63	297	144	153	57.2	74.3	41.2	202	96	106	165
60	Bhairaosin gh ka khera	283	1273	640	633	177	86	91	989	122	369	535	378	157	1096	554	542	48.8	68.2	29.0	687	647	40	586
61	Dhadhan	100	477	240	237	88	41	47	988	16	33	207	142	65	389	199	190	53.2	71.4	34.2	295	262	33	182
62	Narpat ki kheri	150	668	336	332	76	41	35	988	60	3	435	267	168	592	295	297	73.5	90.5	56.6	384	379	5	284
63	Dhanet khurd	80	381	188	193	60	29	31	1027	12	78	171	113	58	321	159	162	53.3	71.1	35.8	192	188	4	179
64	Dhanet Kalan	460	2565	1304	1261	299	166	133	967	399	9	1744	1058	686	2266	1138	1128	77.0	93.0	60.8	1319	1201	118	1246
65	Pandoli	554	2330	1159	1171	280	153	127	1010	415	144	1120	752	368	2050	1006	1044	54.6	74.8	35.2	1453	701	752	877
66	Shivsingh ka khera	77	389	207	182	62	38	24	879	20	0	181	131	50	327	169	158	55.4	77.5	31.6	178	177	1	211
67	Seerodi	176	833	431	402	96	47	49	933	136	49	390	264	126	737	384	353	52.9	68.8	35.7	416	245	171	417
68	Borda	444	2137	1079	1058	310	153	157	981	300	216	915	581	334	1827	926	901	50.1	62.7	37.1	1246	874	372	891
69	Sokriya	73	287	143	144	48	27	21	1007	10	70	121	76	45	239	116	123	50.6	65.5	36.6	174	173	1	113
70	Gurjaniya	95	482	240	242	81	35	46	1008	41	29	181	130	51	401	205	196	45.1	63.4	26.0	293	293	0	189
71	Era	262	1246	610	636	177	97	80	1043	117	516	563	368	195	1069	513	556	52.7	71.7	35.1	690	688	2	556
72	Lambiya	95	451	224	227	72	35	37	1013	50	259	140	102	38	379	189	190	36.9	54.0	20.0	254	254	0	197
73	Jalki ka khera	29	100	42	58	27	11	16	1381	0	97	22	14	8	73	31	42	30.1	45.2	19.0	55	55	0	45
74	Dhoda	8	40	23	17	4	2	2	739	0	15	25	15	10	36	21	15	69.4	71.4	66.7	19	19	0	21
75	Ganeshpur a	96	413	202	211	61	30	31	1045	45	59	112	86	26	352	172	180	31.8	50.0	14.4	261	144	117	152
76	Chittaurga rh	59787	285264	146756	138508	35292	18649	16643	943.798	37836	8794	206846	116339	90507	249972	128107	121865	82.7	90.8	74.3	102519	90003	12516	182745
Sub-Total		65335	310652	159497	151155	38976	20528	18448	947.698	41559	12449	218672	124105	94567	271676	138969	132707	80.5	89.3	71.3	117123	101869	15054	193519
Grand-Total		72325	343256	176121	167135	43709	23026	20683	949	49056	16309	234496	134407	100089	299547	153095	146452	63.3	77.0	49.0	134788	117435	17176	207920

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## **Energy Carbon Management Plan**

### **Chanderiya Smelting Complex**

***Document published on: 11th July 2022.***

CHANDERIYA SMELTING COMPLEX

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  - 8.2 Initiatives and opportunities



## Foreword to 2021 CSC Energy Carbon Management Plan

Chanderiya Smelting Complex is the largest Zinc producing plant in India where zinc can be produced using pyro metallurgical or hydrometallurgical processes, depending on the type of concentrate used as charge. Coke and power are main inputs which are responsible for GHG emissions. A lot of amounts of heat and flue gases are generated in different process 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 in last few years for reduction in consumption of FO, Energy saving projects, utilization of heat of gases. Still there is lot of scope in utilizing the heat and reduction in energy consumption. In 2020-21 the total emissions were 2282540 tCO<sub>2</sub>e and specific emissions 3.92 tCO<sub>2</sub>e per ton of metal. In 2021-22 the total emissions were decrease to 2226962 tCO<sub>2</sub>e and specific emissions decrease 3.77 tCO<sub>2</sub>e per ton of metal. In the financial year FY'22 total emission and specific emission decreases due to energy saving projects, fuel replacement from propane to PNG and other emission reduction projects.

CSC has taken target of reduction in scope 1 and 2 emissions against its 2016-17 baseline by 14% by 2026-27 in terms of absolute emission. This is a reduction of tCO<sub>2</sub>e against that baseline 2078464 tCO<sub>2</sub>e. CSC 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 CSC PLANT

HZL manufactures zinc as main product at its Chanderiya smelting unit in Rajasthan. Zinc smelting is the process of converting zinc concentrates into pure zinc. Zinc can be produced using pyro metallurgical or hydrometallurgical processes, depending on the type of concentrate used as a charge. HZL had only a pyro process-based manufacturing unit (commissioned in 1991) till 2005 - when a unit based on the hydrometallurgical process was commissioned.

The facility went through another capacity addition with the commissioning of another unit in 2007, a zinc smelter (based on hydro process). The total installed capacity at Chanderiya smelting unit is 5, 85,000 tons per annum (TPA) of refined zinc. The refined Lead capacity is 90,000 tons per annum.

The total 254 MW capacity coal base thermal power plant, 13.7 MW WHRB and 0.91 MW solar plants installed to fulfill the requirement of the in-house demand.

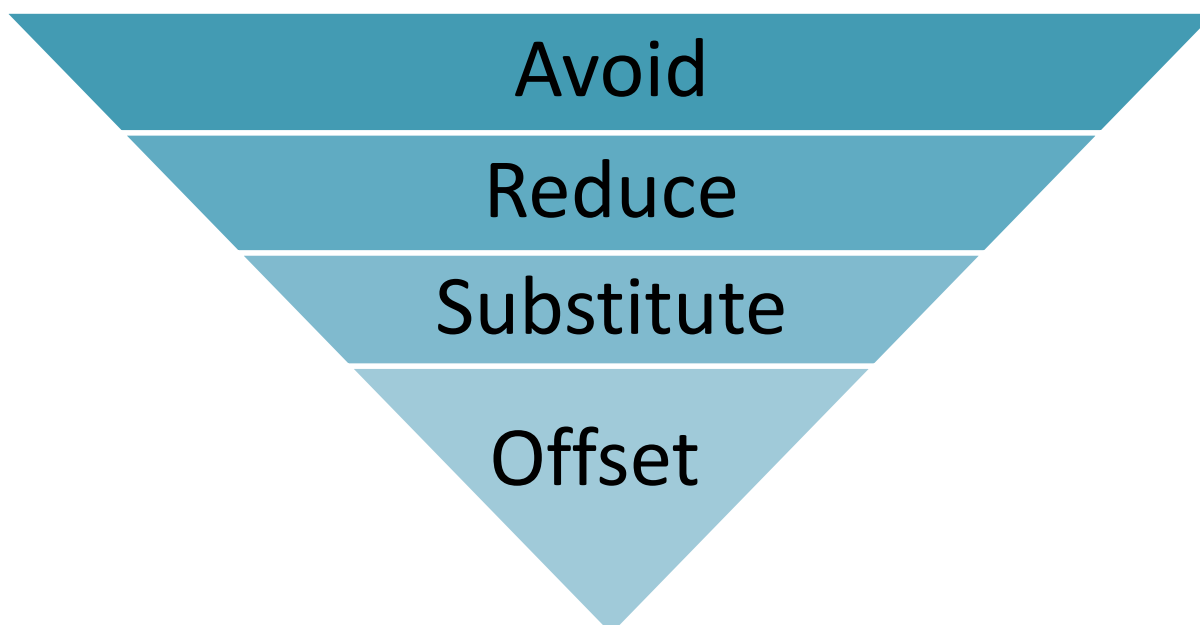
## 2. Greenhouse Gas Management

### 2.1 Context and drivers

We are focussed on accelerating actions to lower carbon emissions generated during our operations. Our environment conservation efforts are driven by a strategic thrust on minimising 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.

- This would also help reduce CLZS'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 CSC 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 Scope 1 and 2 total emissions by 14 % by 2026-27 against a 2016-17 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 CLZS's operating costs. Thus, it is important to analyze opportunities for increased efficiency in the use of energy.
- CSC should discharge its corporate responsibility, in part by contributing to HZL targets to reduce Green House Gas emissions.



# 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 innovative 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.

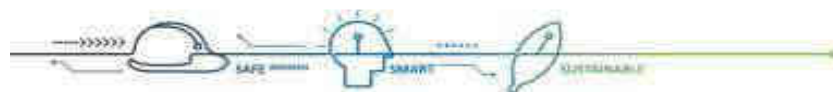
### Adapting to Climate Change

- ❖ 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: 05<sup>th</sup> July, 2022**

*Arun Misra*  
**Arun Misra**  
CEO & Whole Time Director, HZL



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## 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.
  - Maximising the benefits of process improvements and technology 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 recognised protocols.
- Invest in clean energy and energy recovery projects.
- Engage with stakeholder and provide for adaption 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 CSC. The CMP is also made in line with 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.

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- 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 optimisation.
- 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 Utilisation capacity etc.
- Climate Change risk assessment based on TCFD guidelines.
- Turbine Revamping in FY22-23 will lead to increase in energy efficiency and contribute to reduction on 87000 tco2e.
- The introduction of 5% of biomass with coal, this has led to saving of approx. 12290 tCO2e GHG emission. Going ahead this will be increased to 7-8%. This will further contribute to emission reduction in the future.
- Increasing current efficiency of cell house lead to GHG emission saving of 12150 tCO2e per year.
- Plantation activities undertaken at CLZS plant will also contribute to carbon sequestration over a long run.
- Installed 582.24 kW capacity Solar Roof Top Project at different locations of CLZS plant, 319.59 KW capacity solar roof top project at different locations of Zinc Nagar Chittorgarh and 1000 LPD solar water Heater at Guest House have also contributed towards emission reduction.
- Electric Forklifts introduced in Business partner operations in Pyro, going ahead by FY23-24 more electric vehicles to be introduced this will lead to scope 3 emission reduction.
- As a part of long-term Net zero strategy additional 200 MW Renewable energy to be procured which will replace Chanderiya CPP by FY29.

## CSC Scope 1 , 2 and 3 emissions contributing factors are as follows:

<b>Scope 1 – Direct emissions</b>
Fuels burnt (coal) at CPP – for generation of electricity
Fuels burnt (Coke) at PYRO – for Process
Propane at Pyro, H1&H2
PNG at Pyro, Hydro-1 and Hydro-2
Diesel at DG sets (production of electricity), pyro, H1, H2 and CPP
<b>Scope 2 – Emissions associated with the use of electricity</b>
Electricity used at PYRO and H1&H2
Electricity purchased from AVVNL
<b>Scope 3 – Indirect emissions</b>
Transport of material – cathodes, finished, goods, coal, concentrate
Bus travel of employees
LPG consumption in colony

## Scope 1 & 2 Emissions Baseline and Projections

### 3.1 Scope

CSC'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 CSC complex.

### 3.2 Baseline

We have calculated that our Scope 1 and 2 emissions in 2016-17 as

Scope	2016-17	
Scope 1 (tCO <sub>2</sub> e)	2056034	98.92%
Scope 2 (tCO <sub>2</sub> e)	22430	1.08%
Total emission (tCO <sub>2</sub> e)	2078464	
Production (MT)	403980	

**CSC's carbon emissions in FY 2016-17 had reported 2056034 tones CO<sub>2</sub>e in scope1 and 22430 tones CO<sub>2</sub>e in Scope 2. This had taken as base line.**



### 3.3 Emissions since FY 2016-17

The table below indicates the Scope 1 and 2 emissions being produced across the entire CSC. The emissions have been calculated on power and fuel consumption basis.

Scope	2016-17		2017-18		2018-19		2019-20		2020-21		2021-22	
Scope 1 (tCO <sub>2</sub> e)	2056034	98.92%	2372170	98.63%	2217235	98.56%	2206921	98.13%	2217395	97.15%	2040810	91.64%
Scope 2 (tCO <sub>2</sub> e)	22430	1.08%	32885	1.37%	32292	1.44%	42054	1.87%	65145	2.85%	186152	8.36%
Total emission (tCO <sub>2</sub> e)	2078464		2405055		2249527		2248975		2282540		2226962	
Production (MT)	403980		584758		543713		552049		581814		590635	
Per ton product emission (tCO <sub>2</sub> e/ton)	5.14		4.11		4.14		4.07		3.92		3.77	

#### GHG emission Plant wise: -

Plant	2016-17		2017-18		2018-19		2019-20		2020-21		2021-22	
CPP (tCO <sub>2</sub> e)	153387	7%	166575	7%	161040	7.16%	160463	7.13%	162555	7.12%	144285	6.48%
Hydro 1 (tCO <sub>2</sub> e)	740568	36%	857623	36%	834159	37.08%	843749	37.52%	928337	40.67%	880423	39.53%
Hydro 2 (tCO <sub>2</sub> e)	764556	37%	909301	38%	877494	39.01%	870731	38.72%	921012	40.35%	892316	40.07%
Pyro (tCO <sub>2</sub> e)	113626	5%	457844	19%	343487	15.27%	333464	14.83%	283820	12.43%	343633	15.43%
Total (tCO <sub>2</sub> e)	2078464		2405055		2249527		2248975		2282540		2226962	

#### GHG Emission as per Fuel Consumption: -

Fuel	2016-17		2017-18		2018-19		2019-20		2020-21		2021-22	
Coal (tCO <sub>2</sub> e)	1752027	84.29%	2054214	85.41%	1995777	88.72%	1993426	88.64%	2047435	89.70%	1810693	79.33%
HSD (tCO <sub>2</sub> e)	10466	0.50%	20299	0.84%	47296	2.10%	40934	1.82%	23326	1.02%	39886	1.75%
Propane/LPG (tCO <sub>2</sub> e)	16157	0.78%	16691	0.69%	9922	0.44%	5213	0.23%	422	0.02%	0	0.00%
Coke (tCO <sub>2</sub> e)	250641	12.06%	258136	10.73%	164239	7.30%	165886	7.38%	136710	5.99%	171718	7.52%
FO (tCO <sub>2</sub> e)	26744	1.29%	22831	0.95%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
PNG(tCO <sub>2</sub> e)	-	-	-	-	-	-	1462	0.07%	9502	0.42%	18513	0.81%
Purchased Electricity (tCO <sub>2</sub> e)	22430	1.08%	32885	1.37%	32292	1.44%	42054	1.87%	65145	2.85%	186152	8.16%
Total (tCO <sub>2</sub> e)	2078464		2405055		2249527		2248975		2282540		2226962	

### 3.4 Targets

A target is set for the HZL to reduce scope 1 and 2 absolute emissions by 14 % by 2026-27 against 2016-17 baseline. In line with the same the target of CSC is set to reduce the Scope 1 and 2 absolute emissions by 14 % by 2026-27 against 2016-17 baseline

Scope	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
Scope 1 (tCO <sub>2</sub> e)	2056034	2027249	1998465	1969680	1940896	1912111	1883327	1854542	1825758	1796973	1768189
Scope 2 (tCO <sub>2</sub> e)	22430	22116	21802	21488	21174	20860	20546	20232	19918	19604	19290
Total emission (tCO <sub>2</sub> e)	2078464	2049365	2020267	1991168	1962070	1932971	1903873	1874774	1845676	1816577	1787479

Now we have taken revise emission targets for coming year but aggregate emission target by FY 2026-27 is same as per previous.

Scope	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
Scope 1 (tCO <sub>2</sub> e)	2056034	2372170	2217235	2206921	2144245	2081569	2018893	1956217	1893541	1830865	1768189
Scope 2 (tCO <sub>2</sub> e)	22430	32885	32292	42054	38802	35550	32298	29046	25794	22542	19290
Total emission (tCO <sub>2</sub> e)	2078464	2405055	2249527	2248975	2183047	2117119	2051191	1985263	1919335	1853407	1787479

#### Achievement till 2021-22: -

During the FY 21-22 the total emissions have reduced by 2.43% and we have reduced specific emission from 3.92 tCO<sub>2</sub>e/MT to 3.77 tCO<sub>2</sub>e/MT. Now we need to put more focus on reduction of emission to achieve set target. We will also seek to further assess and reduce our scope 3 emissions.

In calculating progress towards this target on an annual basis, benchmarking will need to consider the following statistics for each year: Emissions from the following sections:

CPP

Hydro 1

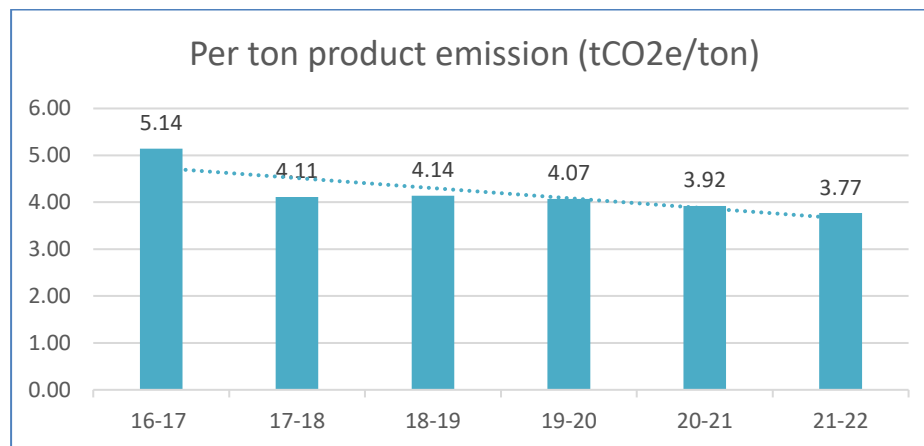
Hydro 2

PYRO

Logistic

Administration

Changes in these statistics will need to be taken into account in the calculation of percentage change in CO<sub>2</sub> emissions. It is considered that growth in these areas is likely to result in an increase in energy consumption and carbon emissions.



An overall reduction of 26.71% in specific GHG emission (tCO<sub>2</sub>e) per MT of production has been observed since base year FY17.

## 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 on 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 CSC.

### 4.2 Energy and fuel saving projects past and ongoing

CSC 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

S. No	Projects	GHG emission reduction(tCO <sub>2</sub> e)
1	Power Rating improvement from 7.16(FY 20-21 YTD actual) to 7.32 (FY 21-22 YTD in BP) in Hydro1	6367.8
2	Power Rating improvement from 7.34 (FY 20-21 YTD actual) to 7.38 (FY 21-22 YTD in BP) in Hydro2	8114.8
3	Optimization of water flow in PGCT 1	116.2
4	Replacement of existing compressor with new energy efficient compressor	122.5
5	2 shift operation of RMH plant to be made for unloading the material	80.2
6	Reduction in Zn dust power consumption from 470 Unit 450 Unit/MT of Zinc Dust	74.6
7	Stopping Belt Conveyor (2.2 KW) and Bucket trolley (5.5 KW) in DTP Plant through manual charging.	50.8
8	NL1 and 2 pumps flow to be maintained with one pump@ May'21	61.5
9	Utilization of Dynamic classifier VFD in ETP	67.8

### Carbon Sequestration through Greenbelt development

1. Several initiatives like, Greenbelt development on Jarofix 2.
2. Miyawaki Plantation.
3. Regular plantation activities by 3rd party.

These projects will lead to carbon sequestration which will be quantified by the plant in the near future. The above initiatives will contribute to a plantation of more than 70,000 trees, which will contribute towards carbon sequestration and the organisation shall identify the amount of carbon being sequestered.

According to some reports a fully grown tree can sequester about 25 kg of carbon per-year, which would result in the sequestration of 175000 tco<sub>2</sub>e over the years. The plantation shall be further increased in CLZS.

## 5. GHG Reduction measures

Few of the things which could be done to reduce GHG emissions at CSC are categorized under the following heads i.e., Behavioral Measure, Efficiency Measures, Fuel Replacement Measures and Long-Term 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, SO<sub>2</sub>, NO<sub>x</sub> etc emitted by our operational activities

### ➤ Lighting Management

- Replace dated air conditioners and fans.
- Replacing existing lights with CFL and LED.
- Installation of auto transformers and operate all lighting feeders at 210 V.
- Use of voltage controllers on lighting feeders.
- 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
  - IV. Wound rotor AC motor drives (slip ring induction motors)

### ➤ 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 from the analysis of data analysis, we can reduce emissions by substituting PNG from propane gas in Pyro, Hydro1 and Hydro 2 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<sub>2</sub>e 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 FY22-23.
- Improving the efficiency of combustion in boilers and CPPs.

## 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 582.24 kW capacity Solar Roof Top Project at different locations of CLZS plant, 319.59 KW capacity solar roof top project at different locations of Zinc Nagar Chittorgarh and 1000 LPD solar water Heater at Guest House.

## 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 CSC.
- A series on short training sessions for existing staff to start the program.
- The inclusion of a climate change session within the CSC.
- Inclusion of low carbon driving within the driver training program.

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- 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,

- Awareness session on Climate Change & roadmap to net zero.
- GHG accounting, current status of GHG emissions
- GHG reporting at different standard (CDP, SBTi etc.)

## Communication: -

### Communication to Stakeholder

CSC 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.

CSC 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

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- To embed the principles of carbon management into the culture of CSC 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 \(hzlindia.com\)](https://www.hzlindia.com/hzl-sustainability-vedanta-sustainability-framework)

Integrated Annual report (HZL) [HZL | Digital Integrated Report 2021-22 \(hzlindia.com\)](https://www.hzlindia.com/hzl-digital-integrated-report-2021-22)

Environment management (HZL) [HZL Sustainability - Annual Report 2021-22 \(hzlindia.com\)](https://www.hzlindia.com/hzl-sustainability-annual-report-2021-22)

Energy and climate change management policy (HZL) [Policy - 2022.cdr \(hzlindia.com\)](https://www.hzlindia.com/policy-2022.cdr)

Energy and climate change strategy (HZL) [HZL Energy and Climate Strategy 2022.pdf \(hzlindia.com\)](https://www.hzlindia.com/hzl-energy-and-climate-strategy-2022.pdf)

Air emission Management (HZL) [HZL AIR EMISSIONS MANAGEMENT 2022.pdf \(hzlindia.com\)](https://www.hzlindia.com/hzl-air-emissions-management-2022.pdf)

**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.

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.

## Biomass substitution in Coal Fuel



Biomass is being blended with coal and used in CPP as fuel. Currently 5% biomass is being substituted with coal. On successful implementation this will be increased to 7-8%.  
This has led to saving of approx. 12290 tCO<sub>2</sub>e GHG emission.

## Increasing Current Efficiency of Cell House



The Increasing Current Efficiency 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 12150 tCO<sub>2</sub>e per year.

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## 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 CSC 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. Installation of VFD in PA and FD Fans in Unit-1&2.
2. HMT Conventional Lights to be replaced with LED Lights.
3. Reduce Power Consumption by 2% in Centac 1 and 2.
4. CSM Brushing Unit to be kept in Off Mode during Ideal Condition- CH1.
5. Additional 200 MW Renewable energy to be procured (Chanderiya CPP) by FY29.

### 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.

### Heat Stress Analysis

HZL management has taken step to conduct quantitative exposure assessment to know the exposure of zinc, lead, carbon black, silica, calcium hydroxide as calcium, sulphuric acid, asbestos, personal Noise and 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.

Heat Stress Analysis is conducted by HZL for the worker working in areas ETP, Leaching, Smelting and Casting and Zinc Dust Plant. Heat stress occurs when the body's means of controlling its internal temperature starts to fail. As well as air temperature, factors such as work rate, humidity and clothing worn while working may lead to heat stress.

#### Sample Collection Methodology:

- Sample collection was done based on job selection for monitoring. Pre-calibrated Extech make 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.
- Threshold Limit Values [TLVs] as prescribed by ACGIH was referred for the comparison with actual.

#### Analytical Procedure:

Sampling was conducted as per below mentioned flow rates and methods:

Sr. No.	Analyte	Flow Rate (L/m)	Method of Analysis
1.	Zinc, Lead & Calcium hydroxide as calcium	2 LPM	NIOSH 7303
2.	Carbon Black	2 LPM	NIOSH 5000
3.	Silica	2.5 LPM	NIOSH 7500
4.	Sulphuric Acid	0.2 LPM	NIOSH 165SG
5.	Asbestos	2 LPM	NIOSH 7400A

Note: Sample collection was done for the duration for which the respective activities were carried out.

#### Area of Heat Stress

Sample ID	Department	Area / Location	Total run Duration (Min)	Wet bulb temperature °C	Dry bulb temperature °C	Globe temperature °C	WBGT °C	R H	Work cycle	Category of work	TLV as per ACGIH °C
HZLD/30818/HT 1	ETP	Filter press	20	26	27.3	27.3	26.5	85.1	0 to 25 %	Moderate	31.5
HZLD/5918/HT 2	Leaching	Purification-Filer press	20	26.8	33.2	36.4	31.3	83.7	25 to 50 %	Moderate	30
HZLD/5918/HT 3	Smelting and casting	Casting-skimming	20	28.3	31.6	35.7	29.4	52.2	25 to 50 %	Moderate	30
HZLD/5918/HT 4	Zinc Dust plant	Quenching	20	27.6	36.2	38.5	30.8	50.5	25 to 50 %	Moderate	30

Source: Industrial Hygiene Quantitative Exposure Assessment Report Page no. 30

**Observation:**

- From total thirty-five personal noise samples, result of twenty-eight samples were higher than TLV- TWA of ACGIH.
- From three area heat stress samples, results of two samples were higher than TLV-TWA of ACGIH.

**Mitigation Measures:**

- Schedule hot jobs for the cooler part of the day.
- Increase number of the person for the task to cut half the heat exposure to the one person in one shift.
- Give training to the supervisor and employees about the "Effects of Heat exposure" and "Health effect of Heat stress"
- Provide adequate amounts of cool, portable drinking water near the work area and encourage workers to drink frequently.
- Give sufficient time to the employees to acclimatize in this area where heat stress is high.

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