

Registered AD

HZL/CLZS/ENV/33/2020-21/

16.11.2020

To,

Shri V K Singh, IFS
Additional Principal Chief conservator of forest (C)
Ministry of Environment and Forests and climate change
Regional officer(CZ) Kendiya Bhawan,
5 Floor, Sector H – Aliganj,
LUCKNOW – 226024,

Sub : Six monthly Environmental compliance report.

Ref : Environmental Clearance Letter No. J-11011/158/2003-IAII(I) DATED, 31.03.2004

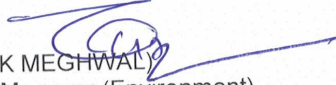
Sir,

Please find enclosed herewith the six monthly compliance report with reference to above Environmental Clearances for Hydro I & 154 MW CPP for Period 01.04.2020 to 30.09.2020.

With all the enclosures.

Thanking you,

Yours faithfully,


(T K MEGHWAL)
Sr.Manager (Environment)

Hindustan Zinc Limited

Sensitivity: Internal (C3)

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HYDRO 1 PLANT & 154 MW CPP

Environment Compliance Report of Chanderiya Lead Zinc Smelter, Chittorgarh with reference to Environmental Clearance letter No. J-11011/158/2003-IAII(I) dtd. 31/03/04) FOR Zn SMELTER & CPP 154 MW

CONDITION		STATUS
A. SPECIFIC CONDITIONS		
i	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.	<ol style="list-style-type: none"> 1) Pollution control systems are interlocked with process; and it is being ensured that emission levels are well below prescribed limit at any time. 2) Process is interlocked with pollution control measure. 3) The respective unit should not be restarted until the control measures was rectified to achieve the desired efficiency.
ii	As reflected in the EIA/EMP, Double Contact Double adsorption (DCDA) plant for sulphuric acid recovery from SO ₂ should be set up. The stack from the sulphuric acid plant should be provided with online stack emission monitoring equipment for continuous monitoring of SO ₂ . As per the recommendations made in charts for corporate responsibility for environment protection, SO ₂ emission limit should be controlled less than 2 kg/tonne of H ₂ SO ₄ produced and acid mist limit of 50 mg/m ³ should be achieved by December 2006. Continuous monitoring of SO ₂ should be carried out.	<ol style="list-style-type: none"> 1) The Double conversion Double absorption Sulphuric Acid Plant has commissioned and meeting Sulphur di-oxide norm of 2 Kg/ T of Product Acid and acid mist 50 mg/m³. 2) Continuous monitoring system for SO₂ monitoring has already been installed and is being operational. 3) Very effective catalyst cesium based V₂O₅ is used for better conversion. 4) More than 100 mts tall stack was installed. <p>Monitoring result of Acid Plant are attached as Annexure I</p>
iii	Fugitive emissions, acid mist vapours, fumes and SO ₂ 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	<ol style="list-style-type: none"> 1) In order to minimize fugitive emissions Zn Concentrate containing 8-10% moisture is being handled. 2) Provision of water sprinkling at Zn concentrate stock yard has been provided and working satisfactorily. 3) Dust control system has been provided at material transfer points.

	movements.	<p>4) 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.</p> <p>5) Regular road washing is being done on industrial roads.</p> <p>6) Truck & truck tyre washing system has been provided and working satisfactorily.</p> <p>7) All roads are pakka and concreted</p> <p>Photographs for Road Vacuum Sweeper is attached as Annexure II</p>
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 50 mg/Nm ³ . The particulate emissions from the captive power plant should be controlled by installation of ESP and controlled within the stipulated limits of 50 mg/Nm ³ .The low NOx burners should be installed to control the NOx emissions.	<p>1) Bag filters have been provided in order to meet out the prescribed norms.</p> <p>2) High efficiency ESP and low NOx burners have been provided at Power Plant to control emissions from plant and meeting the stipulated limits.</p>
v	As reflected in the EIA /Environmental Management plan, discharge of process effluent shall not exceed 139 m ³ /hr. The treated effluent should confirm 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 smelter premises.	<p>1) Process effluents are kept with in prescribed limits both qualitatively and quantitatively.</p> <p>2) Zero discharge is being maintained from the premises of the industry.</p> <p>3) Existing RO plant is being operational in order to maximize recycling of treated effluents.</p> <p>4) New RO 1250 M³/day. Commissioned in Sept.2015.RO reject is being evaporated in solar evaporation pond.</p> <p>5) MEE Installation is in progress at site for better water management at CLZS.</p>
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	<p>1) Jarosite is stabilized with lime and Cement into Jarofix and disposed to lined Jarofix disposal yard in systematic way.</p>

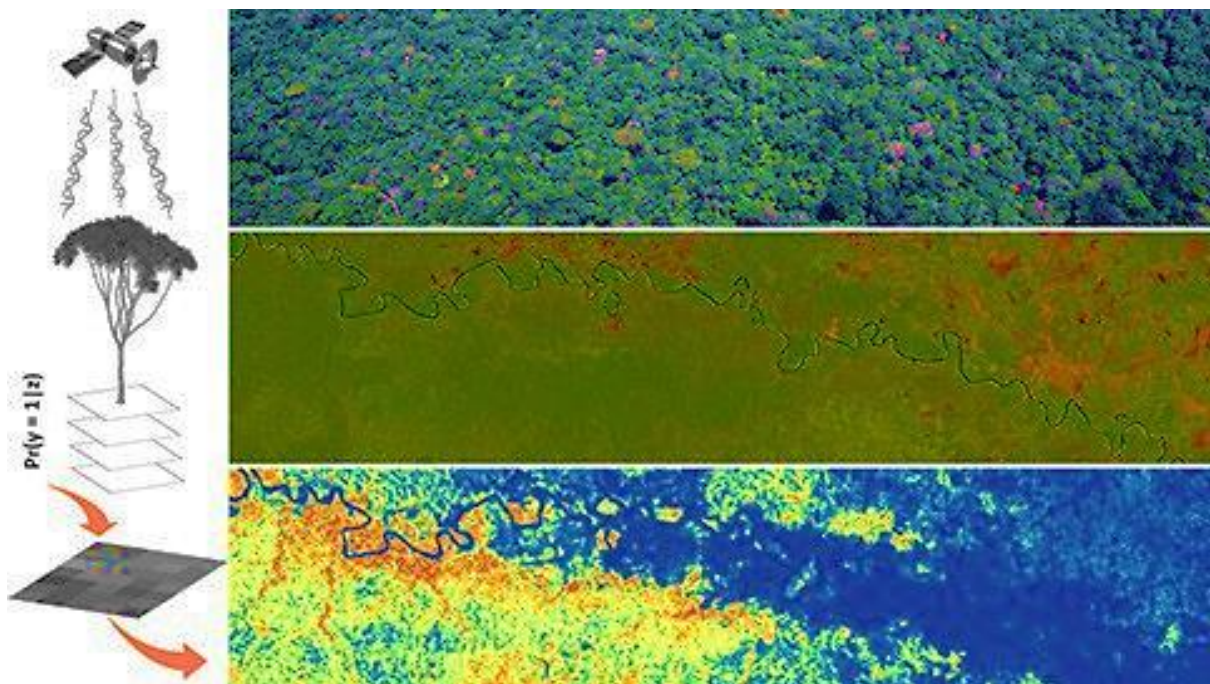
	<p>detection system. As reflected in EIA /EMP report, the Jarosite should be stabilized to jarofix by application of technology obtained from M/s Canadian Electrolyte Zinc Limited. The landfill should be constructed at a safe height from the highest water table; The design of the land should be approved 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 self spent to the authorized reprocesses. 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 unit. 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.</p>	<ol style="list-style-type: none"> 2) Design is approved from RSPCB and CPCB guidelines. 3) Anode mud is being recycled back in to the process. Surplus, if any is being disposed into SLF after stabilization. 4) 1005 flyAsh generated from Power Plant is being given to Cement plants, 5) Bottom ash is also being disposed to brick manufacturers. 6) Piezo wells Have been installed at down/ up stream of Secured land Fill, Jarofix Yard. Monitoring of the Piezometer water is being done regularly. Periodically inspection is being carried out by Statutory authority. <p>Monitoring of Piezometer water analysis enclosed as Annexure III</p>
vii	<p>Green belt of adequate width and density in and around the captive power plant should be developed in consultation with the DFO in 61.12 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.</p>	<ol style="list-style-type: none"> 1) Green belt of adequate width and density in and around the captive power plant is being developed in consultation with the DFO in 61.12 ha. of area in addition to the existing area already brought under green belt. 2) Canopy based greenbelt is already been developed around periphery of plant and township . 3) Presently 121.77 Ha. of green area is been developed inside CLZS Complex which is more than 33% of the Plant area. <p>Details of Green Belt are enclosed - Annexure IV</p>
I	<p>The project authorities must strictly adhere to the stipulation made by the Rajasthan State Pollution Control Board and the State Government.</p>	<p>All the statutory norms prescribed by RSPCB are being met.</p>
li	<p>No expansion or modification in the plant should be carried out without prior approval of the Ministry of Environment and Forests.</p>	<p>No expansion or modification in the plant is being carried out without prior approval of the Ministry of Environment and Forests.</p>
lii	<p>Adequate number of ambient air quality</p>	<p>(1)Adequate number of ambient air</p>

	<p>monitoring stations should be established in the downward direction as well as where maximum ground level concentration of SPM, SO₂, 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.</p>	<p>quality monitoring stations was established in the downward direction as well as where maximum ground level concentration of SPM, SO₂, and NO_x are anticipated in consultation with the Rajasthan State Pollution Control Board.</p> <p>(2) Data on ambient air quality and stack emission is being 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.</p> <p>Details of Ambient Air Quality enclosed -Annexure V</p> <p>Details of Stack Monitoring is enclosed as -Annexure VI</p>
iv	<p>Industrial waste water should be properly collected treated so as to conform to the standard prescribed under GSR 422 (E) dated 19th May 1993 and 31st December 1993 or as amended form time to time. The treated waste water should be recycled in the plant as well as utilization for plantation purposes.</p>	<p>Industrial waste water properly treated in ETP/RO to confirm all the prescribed norms and recycled back in to process plants. Continue to maintain Zero discharge.</p>
v	<p>The project authorities must strictly comply with the rules and regulation 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.</p>	<p>(1) All HW activities carried our in accordance with the Hazardous Wastes and other Waste (Management and Handling & Trans boundary) Rules, 2016.</p> <p>(2) Authorization from the State Pollution Control Board already obtained for collection, storage, treatment and disposal of hazardous wastes.</p>
vi	<p>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)</p>	<p>(1)The overall noise levels in and around the plant area is being kept well within the standards (85 dBA) by providing noise control measures including acoustic hoods, silencers , enclosures etc. on all sources of noise generation.</p> <p>(2)The ambient noise levels are observed very below to the standards prescribed under EPA Rules, 1989 viz 75 dBA (daytime) and 70 dBA (nighttime)</p> <p>Details of Ambient Noise Monitoring</p>

		is enclosed as -Annexure VII
vii	Occupational Health Surveillance of the workers should be done on a regular basis and records maintained as per the Factories Act.	Being done and records are maintained.
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.	We are complying all the recommendations of EIA/EMP/Risk/DMP.
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.	Funds are allocated for capital and revenue expenditures and no fund is diverted to other jobs
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.	Last report submitted in the month of June 2020 while quarterly reports being sent to SPCB regularly and statistical interpretation data submitted to SPCB regularly.
xi	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.	Condition already complied with. Accordance of EC advertised in two local widely circulated in leading news paper ,copy was already been submitted to t to your good office.

Greenbelt Estimation using GIS

Chanderiya Lead Zinc Smelter, HZL



November 2020



Terracon Ecotech Private Limited

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Acknowledgement

We are thankful to Mr. Sachin Samar, Head, Environment, Chanderiya Lead Zinc Smelter (CLZS) for assigning us this opportunity to estimate greenbelt using GIS. We express our gratitude to thanks his unrelenting support, coordination, invaluable inputs and active involvement in the Project.

This project also involved various staff members from CLZS, we thank each and every one of them for their active involvement leading to successful and timely completion of the project.

A handwritten signature in blue ink that reads "Ashok Jain".



Ashok Jain
Managing Director
Terracon Ecotech Private Limited

Executive Summary

A systematic mass plantation of pollution tolerant trees in order to mitigate air pollution by filtering, intercepting or absorbing air pollutants is known as ‘Greenbelt’. A greenbelt around industrial areas aims at creating pollution free, sustainable environment.

Greenbelt can be mapped using either remotely sensed data obtained from satellite, drones, or aircraft or digitization of green areas using GIS software like ArcGIS, ERDAS, QGIS, etc. The satellite data in form of multispectral imagery consist of data obtained on different wavelengths in an electromagnetic spectrum. These data can be used to calculate vegetation indices for obtaining the amount of green cover and tree cover.

For the estimation of green cover in Chanderia Lead Zinc Smelter (CLZS), Modified Soil Adjusted Vegetation Index (MSAVI-2), a modified version of the NDVI index was used. For calculation of Modified MSAVI-2, Pléiades 1 satellite imagery (29th February 2020) was procured. Pléiades 1 product has a spatial resolution of 0.5m. ‘Indices’ tool in unsupervised classification tab in ERDAS software was used.

Class	Area in Hectares	Percentage
Green cover	166	37

The total area of CLZS is 437 hectares. The MSAVI-2 analysis revealed that the total green cover area is 166 hectares i.e. 37% of total CLZS area. Out of 166 hectares, 34 hectare area has a new plantation of around 1-2 years old. The balance 132 hectares accounts to trees, shrubs, herbs and lawns.

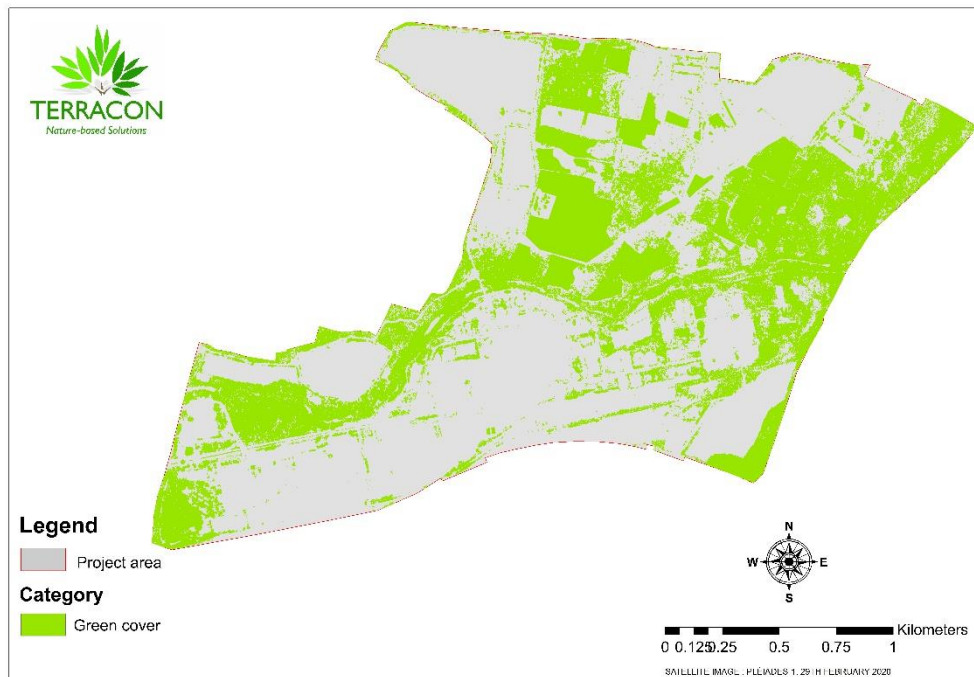


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Introduction

A systematic mass plantation of pollution tolerant trees in order to mitigate air pollution by filtering, intercepting or absorbing air pollutants is known as **'Greenbelt'**. A greenbelt around industrial areas aims at creating pollution free, sustainable environment.

Green belts are often recommended for Industries as a part of Environment management strategies. Green belt is recognized to provide multifunctional services and aid in sustainable development. Industrialized areas often face air pollution problems and higher atmospheric temperatures due to anthropogenic activities. The ambient air quality of an industrialized area can be restored by creating an effective greenbelt design. Many times, industries are located near settlements. In such scenario, restriction of pollutants near its source by creating vegetation buffer is the most suitable practice. Creation of such buffer zone needs systematic plantation of trees and shrubs.

Green belt is essential; in many ways that eventually lead to conservation of biodiversity. They are often safeguarded in the sense that developmental activities are prohibited in these selected areas and these locations will only be used for growing vegetation. An ideal greenbelt consists of diverse woody plants that aid in pollution mitigation as well as maintain the ecological balance of the surrounding environment, along with lawns, herbs and shrubs. Greenbelt development provides benefits such as –

- Overall improvement of the environmental conditions of a region.
- Mitigation of air pollution as well as enhancement of biodiversity and aesthetic value of a particular area
- Prevention of soil erosion and ultimately, land degradation
- Attenuates noise pollution as plants are efficient absorbers of noise
- Provides regulatory and supporting ecosystem services such as micro-climate regulation, carbon sequestration, etc.

Greenbelt Benefits



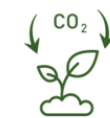
Environment
condition
improvement



Noise control



Soil erosion
control



Carbon
Sequestration



Air pollution
control

Profile for Study area

Chanderiya Lead Zinc Smelter (CLZS) is world's largest integrated smelter located in the Chittorgarh district of Rajasthan. CLZS, hereafter called study area, is situated on an area of 437 hectares. There are various units of hydro and pyro smelting processes. It also has several administrative buildings. A small residential colony, CSF is located near the main entrance.



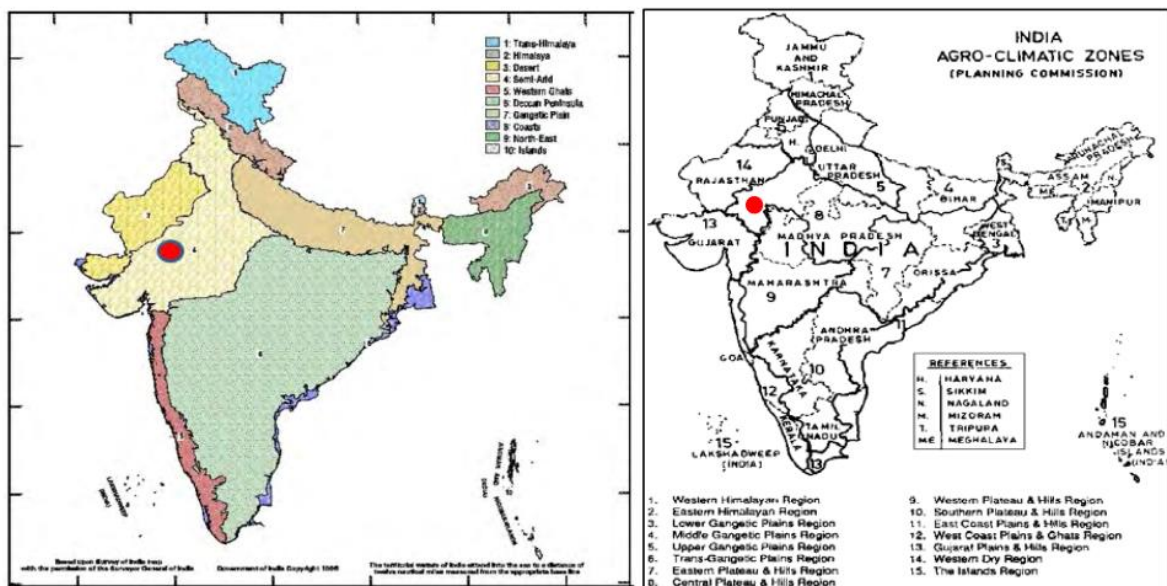
Study area boundary

The study area has an existing greenbelt zone which forms the major green cover of the factory area. It is surrounded by settlements like Billiya Khera, Putholi, agricultural fields, and other small marble industries. Vedanta formally began its commitment to biodiversity protection in 2011 by drafting its Biodiversity Policy. The current study has been carried out to observe the progress of the greenbelt developmental efforts and to monitor the extent of the increase in green cover.

Geographical Details

The study area is located in the south-eastern part of Rajasthan. The major land use in this locality is agricultural fields and is followed by settlements and industries. It lies in the Central Plateau and Hills Agro-climatic zone.

Agro climatic zone	Central plateau and hills
Biogeographic zone	Semi-arid
Biotic province	Gujarat, Rajputana



Bio-geographic map (left) and agro-climatic zone map (right) of India with the factory area location

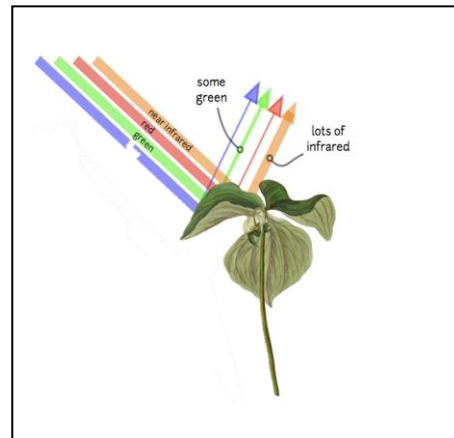
The Land-use map indicates that the study area is highly industrialized with around 58% built-up barren land area and areas covered by industrial operations. There are also some waterbodies present forming to around 3.20% of the total area. The table for landuse areas is given below.

Class	Area in Ha
Built-up/barren land	257
Waterbody	14
Green cover	166

Methodology

Green cover or Greenbelt can be mapped using either remotely sensed data obtained from satellite, drones, or aircraft or digitization of green areas using GIS software like ArcGIS, ERDAS, QGIS, etc. The satellite data in form of multispectral imagery consist of data obtained on different wavelengths in an electromagnetic spectrum. These data can be used to calculate vegetation indices for obtaining the amount of green cover.

Vegetation indices are combinations or transformations of spectral bands in remote sensing to give prominence to spectral properties of plants and other types of vegetation. This makes them stand out from other features allowing us to calculate the cover of vegetation in a particular area. Vegetation indices are capable of providing us information like % green cover, biomass, and leaf area index. The calculations of these indices depend upon the difference between the reflectance and absorption capabilities of plants. Since plants reflect more in the near-infrared region and green region of the electromagnetic spectrum and absorb the rest of wavelengths like red, blue, the difference between NIR and red bands allowing us to extract vegetation features. Temporal analysis of vegetation indices allows us to track changes in the amount of green cover as well as its health. For the estimation of green cover in CLZS, MSAVI, a modified version of the NDVI index was used. MSAVI- 2 minimizes the effects of soil spectral signatures this assist in extraction of only vegetation pixel rather than mixed pixels of soil and vegetation which sometimes happens in case of NDVI.



For calculation of MSAVI-2, Pléiades 1 satellite imagery was procured. Pléiades 1 product has a spatial resolution of 0.5m dated 29th February 2020. ERDAS has a tool called as indices in its unsupervised classification tab. It has a collection of different vegetation indices among which MSAVI-2 will be selected. The input in the processing box was .img file of Pléiades 1 with required bands RED and NIR. The formula for the index is already integrated into the tool.

The formula for MSAVI-2 is as follows

$$MSAVI2 = \frac{(2 * NIR + 1 - \sqrt{(2 * NIR + 1)^2 - 8 * (NIR - RED)})}{2}$$

Disclaimer: The green cover was calculated using 0.5m satellite imagery using vegetation indices. Due to travel restriction on account of covid situation the ground truthing has not been carried out to verify the results on the ground.

Green Cover of CLZS

A green cover is natural or planted vegetation covering a certain area of the terrain, functioning as protection against soil erosion, protecting the fauna, and balancing the temperature.

Green cover consists of total tree cover and total green cover. Total tree cover can be calculated by measuring the tree attributes but area occupied by lawns, herbs and shrubs cannot be estimated by the same method. Green cover of a greenbelt is carried out using Vegetation indices. It predicts the percentage of total area of the unit that is under vegetation. According to the CPCB guidelines, there is a prescribed percentage of green cover for a healthy society and determining the green cover allows understanding where the unit stands in developing its greenbelt.

The Green cover of study area is as follows:

Green Cover in Hectares	166
Total study area in Hectares	437



The total area of CLZS is 437 hectares. The MSAVI-2 analysis revealed that the total green cover area is 166 hectares i.e. 37% of total CLZS area. Out of 166 hectares, 34 hectare area has a new plantation of around 1-2 years old (Refer to 2nd map below). The balance 132 hectares accounts to trees, shrubs, herbs and lawns. This 1-2-year-old samplings will gradually grow to an extent which will get converted into thick vegetation.

Green cover map

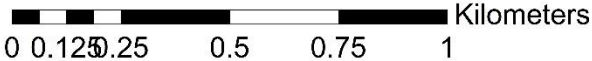
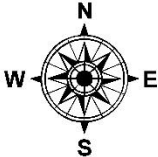


Legend

 Project area

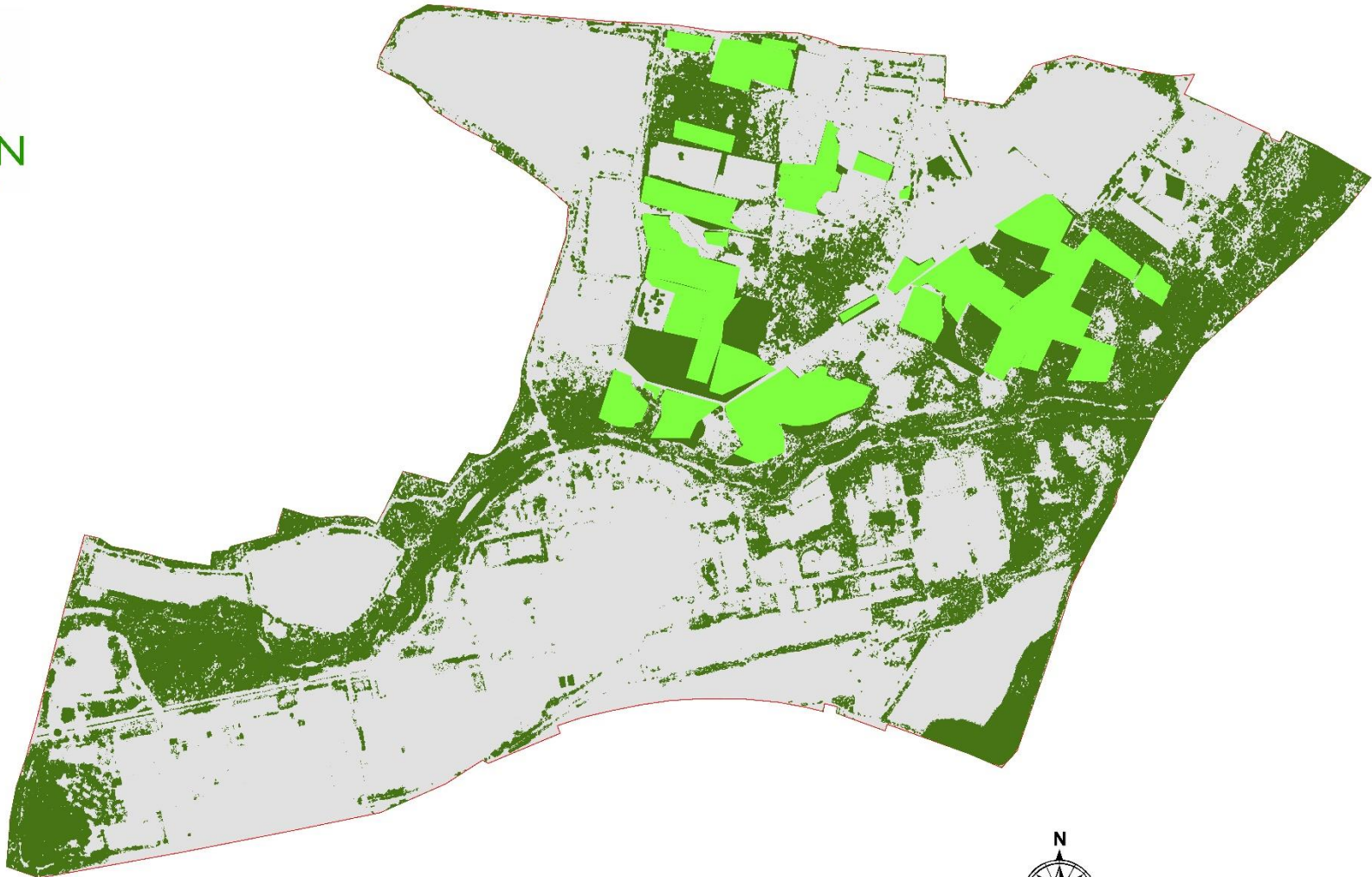
Category

 Green cover



SATELLITE IMAGE : PLÉIADES-1. 29TH FEBRUARY 2020

Green cover and new plantation map



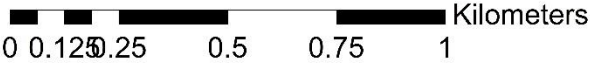
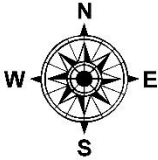
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Project area

Category

Green cover

New Plantation area





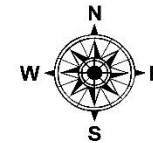
SATELLITE IMAGE : PLÉIADES-1. 29TH FEBRUARY 2020

False colour composite image with 1km buffer



Legend

- FCC- False colour composite image
-  1km Buffer around project area
-  Project area



SATELLITE IMAGE : PLÉIADES-1, 29TH FEBRUARY 2020

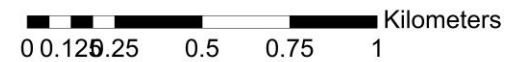
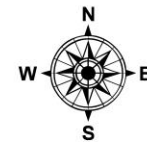
False colour composite image



Legend

FCC- False colour composite image

Class	Area in Ha
Builtup/Barren land	257
Waterbody	14
Green cover	166






SATELLITE IMAGE : PLÉIADES-1, 29TH FEBRUARY 2020

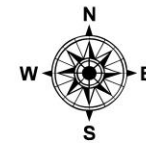
Land use map



Legend

-  Waterbody
-  Green cover
-  Builtup/ Barrenland

Class	Area in Ha
Builtup/Barren land	257
Waterbody	14
Green cover	166

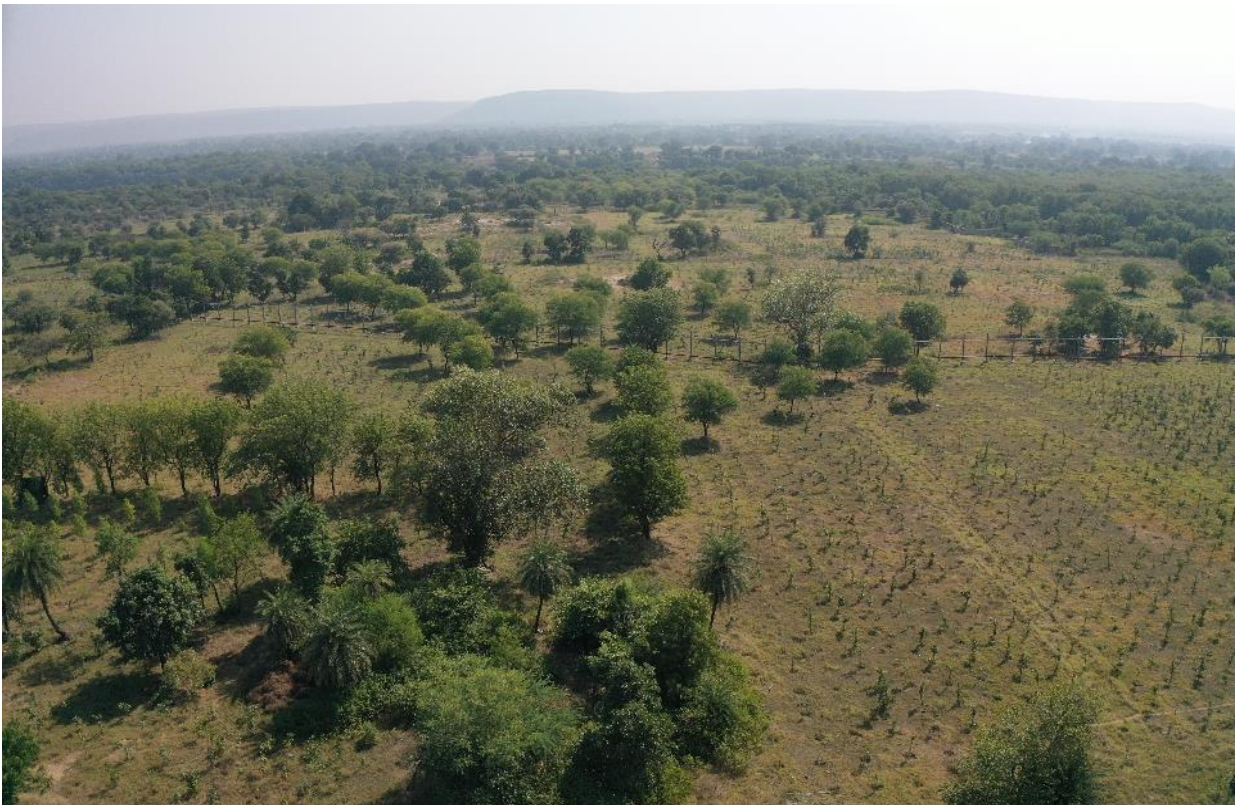


0 0.125 0.25 0.5 0.75 1 Kilometers


SATELLITE IMAGE : PLÉIADES-1, 29TH FEBRUARY 2020

Plantation efforts by CZLS







Project Name	Greenbelt Estimation Using GIS
Client	CHNADERIYA LEAD ZINC SMETLER, HINDUSTAN ZINC LIMITED
Contact Person	MR. SACHIN SAMAR
Consultant	Terracon Ecotech Private Limited 202, Kingston, Tejpal Road, Vile Parle (East), Mumbai 400057 www.terraconindia.com
Consultant Team	Dr. Ninad Raut, Lead, Ecology and Biodiversity Mr. Akshay Nachane, Co-Lead, Ecology and Biodiversity Ms. Pratiksha Chalke, Analyst, Biodiversity (GIS)
Project Co-ordinator	 Mr. Akshay Nachane Co-Lead, Ecology and Biodiversity Terracon Ecotech Private Limited



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Annexure -
HINDUSTAN ZINC LIMITED
CHANDERIA LEAD ZINC SMELTER
Work Zone (8 - Hours) Environment Monitoring Results
(Apr'20 - Sept'20)

Month Location	Parameters/Unit	Prescribed Standards*	Apr'20	May'20	Jun'20	Jul'20	Aug'20	Sep'20
Pyro, CPP, H-1 & H-2 Plant								
Pyro RMH	SPM mg/m3	10	0.728	0.410	0.666	0.577	0.600	0.666
	SO ₂ mg/m3	5	BDL	BDL	BDL	BDL	BDL	BDL
	Zn mg/m3	5	0.134	0.124	0.131	0.125	0.189	0.196
Pyro Sinter Area	SPM mg/m3	10	0.575	0.501	0.600	0.615	0.615	0.662
	SO ₂ mg/m3	5	BDL	BDL	BDL	BDL	BDL	BDL
	Zn mg/m3	5	0.123	0.109	0.199	0.163	0.166	0.162
H -1 Purification Section	SPM mg/m3	10	0.625	0.666	0.487	0.443	0.509	0.531
	SO ₂ mg/m3	5	BDL	BDL	BDL	BDL	BDL	BDL
	Zn mg/m3	5	0.112	0.117	0.081	0.178	0.087	0.083
H - 1 Cell House	SPM mg/m3	10	0.152	0.176	0.221	0.153	0.136	0.150
	SO ₂ mg/m3	5	0.349	0.537	0.354	0.288	0.298	0.266
	Zn mg/m3	5	BDL	BDL	BDL	BDL	BDL	BDL
LRP Casting Area	SPM mg/m3	10	0.602	0.556	0.659	0.552	0.527	0.491
	SO ₂ mg/m3	5	BDL	BDL	BDL	BDL	BDL	BDL
	Pb mg/m3	0.15	BDL	BDL	BDL	BDL	BDL	BDL
LRP K-5 Dross Area	SPM mg/m3	10	0.583	0.618	0.549	0.637	0.637	0.615
	SO ₂ mg/m3	5	BDL	BDL	BDL	BDL	BDL	BDL
	Pb mg/m3	0.15	BDL	BDL	BDL	BDL	BDL	BDL
H-2 Cell House	SPM mg/m3	10	0.164	0.155	0.120	0.111	0.116	0.110
	SO ₂ mg/m3	5	0.452	0.590	0.341	0.232	0.264	0.288
	Zn mg/m3	5	BDL	BDL	BDL	BDL	BDL	BDL
CPP Coal Yard	SPM mg/m3	10	0.444	0.424	0.396	0.466	0.531	0.400
	SO ₂ mg/m3	5	BDL	BDL	BDL	BDL	BDL	BDL
	Zn mg/m3	5	BDL	BDL	BDL	BDL	BDL	BDL


Tarun Kumar Meghwal

Environment Head
Chanderia Lead Zinc Smelter

Annexure -
HINDUSTAN ZINC LIMITED
CHANDERIA LEAD ZINC SMELTER
Work Zone (15 – Minute) Environment Monitoring Results
(Apr'20 - Sept'20)

Month Location	Parameters/Unit	Prescribed Standards*	Apr'20	May'20	Jun'20	Jul'20	Aug'20	Sep'20
Pyro, CPP, H-1 & H-2 Plant								
Pyro RMH	SPM mg/m3	-	3.00	5.33	4.66	6.33	5.00	3.66
	SO ₂ mg/m3	10	BDL	BDL	BDL	BDL	BDL	BDL
	Zn mg/m3	10	0.051	0.063	0.07	0.03	0.07	0.05
Pyro Sinter Area	SPM mg/m3	-	4.33	4.66	5.33	4.66	4.00	3.66
	SO ₂ mg/m3	10	BDL	BDL	BDL	BDL	BDL	BDL
	Zn mg/m3	10	0.092	0.058	0.08	0.07	0.05	0.04
H -1 Purification Section	SPM mg/m3	-	3.66	2.66	4.00	5.00	2.00	3.00
	SO ₂ mg/m3	10	BDL	BDL	BDL	BDL	BDL	BDL
	Zn mg/m3	10	0.05	0.02	0.05	0.05	0.02	0.02
H – 1 Roster Area	SPM mg/m3	-	4.33	3.33	3.66	4.00	3.66	4.66
	SO ₂ mg/m3	10	BDL	BDL	BDL	BDL	BDL	BDL
	Zn mg/m3	10	0.03	0.05	0.05	0.05	0.04	0.06
LRP Casting Area	SPM mg/m3	-	4.66	5.00	4.66	3.66	4.00	5.33
	SO ₂ mg/m3	10	BDL	BDL	BDL	BDL	BDL	BDL
	Pb mg/m3	-	BDL	BDL	BDL	BDL	BDL	BDL
LRP K-5 Dross Area	SPM mg/m3	-	3.66	3.33	4.33	5.33	3.66	5.00
	SO ₂ mg/m3	10	BDL	BDL	BDL	BDL	BDL	BDL
	Pb mg/m3	-	BDL	BDL	BDL	BDL	BDL	BDL
H-2 Roaster Area	SPM mg/m3	-	4.33	3.66	3.00	4.33	3.00	4.66
	SO ₂ mg/m3	10	BDL	BDL	BDL	BDL	BDL	BDL
	Zn mg/m3	10	0.16	0.06	0.04	0.06	0.03	0.05
CPP Coal Yard	SPM mg/m3	-	2.66	4.33	3.66	3.33	4.33	4.00
	SO ₂ mg/m3	10	BDL	BDL	BDL	BDL	BDL	BDL
	Zn mg/m3	10	BDL	BDL	BDL	BDL	BDL	BDL




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Chandera Lead Zinc Smelter

Annexure -
HINDUSTAN ZINC LIMITED
Chandera Lead Zinc Smelter
STACK HEIGHT – PYRO PLANT


S. No.	Stack Attached to	Height(m)
Ausmelt		
1	Dust extraction system of feed handling	35
2	Hygeine and ventilation system	30
3	Ausmelt furnace	52
4	SO2 absorption tower	55
Hydro 1		
1	Zinc dross milling bag filter	30
2	Zinc atomizing bag filter	30
3	Zinc melting furnace bag filter (1st stack)	30
4	Zinc melting furnace bag filter (2nd stack)	30
5	Acid plant	100
Pyro		
1	Sinter venturi	45
2	Sinter main	75
3	Crusher venturi	75
4	Crusher bag filter	75
5	ISF slagging floor	75
6	ZRP fume extraction	35
7	ZRP ventilation stack	75
8	LRP	75
9	Copper recovery plant	30
10	Copper drossing	34
11	TGT (Acid plant)	75
Hydro 2		
1	Zinc melting furnace bag filter	30
2	Zinc dross milling bag filter	30
3	Zinc atomizing bag filter	30
4	Acid plant	100
CPP		
1	Captive power plant	165
2	Captive power plant-Phase-II	165
3	16 MW DG SET	30


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Chandera Lead Zinc Smelter

Annexure -
HINDUSTAN ZINC LIMITED
Chandaria Lead Zinc Smelter
Stack Monitoring Results (PM & LEAD)
(APR'20 - SEPT'20)

Location	Parameters	Limit	Unit	Result Apr-Jun'20	Result Jul-Sept'20
Sinter Main	PM	150	Mg/nm ³	15.76	47.58
	Lead	10	Mg/nm ³	BLQ(LOQ 0.005)	4.12
Sinter Venturi	PM	150	Mg/nm ³	11.40	37.74
	Lead	10	Mg/nm ³	BLQ(LOQ 0.005)	3.58
Crusher Main	PM	150	Mg/nm ³	28.70	32.48
	Lead	10	Mg/nm ³	BLQ(LOQ 0.005)	3.22
Crusher Venturi	PM	150	Mg/nm ³	11.16	27.45
	Lead	10	Mg/nm ³	BLQ(LOQ 0.005)	2.89
LRP Main	PM	150	Mg/nm ³	6.16	15.25
	Lead	10	Mg/nm ³	BLQ(LOQ 0.005)	0.80
ZRP Main	PSD				
ZRP Fume	PSD				


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 Chandaria Lead Zinc Smelter

Annexure -
HINDUSTAN ZINC LIMITED
Chandera Lead Zinc Smelter
Stack Monitoring Results (PM & LEAD)
(APR'20 - SEPT'20)


Location	Parameters	Limit	Unit	Result Apr-Jun'20	Result Jul-Sept'20
LRP Copper Drossing	PM	150	Mg/nm3	35.0	23.65
	Lead	10	Mg/nm3	BLQ(LOQ 0.005)	2.74
ISF Slagging Floor	PM	150	Mg/nm3	35.57	42.63
	Lead	10	Mg/nm3	BLQ(LOQ 0.005)	3.01
CRP Milling	PM	150	Mg/nm3	26.85	29.95
	Lead	10	Mg/nm3	BLQ(LOQ 0.005)	1.44
Ausmelt RMH	PM	50	Mg/nm3	15.09	35.56
	Lead	10	Mg/nm3	BLQ(LOQ 0.005)	1.01
Ausmelt Hygiene	PM	50	Mg/nm3	11.73	29.65
	Lead	10	Mg/nm3	BLQ(LOQ 0.005)	1.38

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Chandera Lead Zinc Smelter

Annexure -
HINDUSTAN ZINC LIMITED
Chandera Lead Zinc Smelter
Stack Monitoring Results (PM)
(APR'20 - SEPT'20)

Location	Parameters	Limit	Unit	Result Apr-Jun'20	Result Jul-Sept'20
H-1 ZMC – 1st	PM	50	Mg/nm3	26.80	21.48
H-1 ZMC - 2nd	PM	50	Mg/nm3	13.07	23.69
H-1 Zinc Dust	PM	50	Mg/nm3	14.04	28.85
H-2 ZMC in side	PM	50	Mg/nm3	20.19	22.39
H-2 Zinc Dross	PM	50	Mg/nm3	20.92	37.78
H-2 Zinc Dust	PM	50	Mg/nm3	30.28	31.84
CPP Unit - 1 & 2	PM	50	Mg/nm3	30.75	29.85
CPP Unit - 3	PM	50	Mg/nm3	34.19	42.56


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Environment Head
Chandera Lead Zinc Smelter

Annexure -
HINDUSTAN ZINC LIMITED
Chandaria Lead Zinc Smelter
Treated Water Monitoring Results
(Apr'20 - Sept'20)

ETP Out Let - (Hydro - 2)

Parameter	Unit	Limit	Result (Apr-Jun'20)	Result (Jul-Sept'20)
pH	-	5.5 - 9.0	7.21	7.28
Chloride	Mg/l	1000	144	479.85
Oil & Grease	Mg/l	10.0	BDL	3.0
Total Residual Chlorine	Mg/l	1.0	BDL	BDL
Ammonical Nitrogen	Mg/l	50.0	9.09	2.80
Nitrate Nitrogen	Mg/l	10.0	BDL	1.20
BOD	Mg/l	30	5.00	5.2
COD	Mg/l	250	16.1	36
TSS	Mg/l	100	BDL	12
Fluoride	Mg/l	2.0	0.9	0.85



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Environment Head
Chandaria Lead Zinc Smelter

Annexure -
HINDUSTAN ZINC LIMITED
Chandera Lead Zinc Smelter
Treated Water Monitoring Results
(Apr'20-Sept'20)

ETP Out Let – (Hydro – 2)

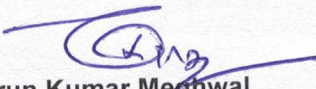
Parameter	Unit	Limit	Result (Apr-Jun'20)	Result (Jul-Sept'20)
Phosphate	Mg/l	5.0	0.03	BDL
Cyanide	Mg/l	0.2	BDL	BDL
Cadmium	Mg/l	2.0	BDL	BDL
Chromium	Mg/l	2.0	BDL	BDL
Copper	Mg/l	3.0	BDL	BDL
Iron as Fe	Mg/l	Not Specified	0.14	BDL
Lead as Pb	Mg/l	0.1	BDL	0.02
Nickel	Mg/l	3.0	BDL	BDL
Zinc	Mg/l	5.00	BDL	0.37


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Environment Head
Chandera Lead Zinc Smelter

Annexure -
HINDUSTAN ZINC LIMITED
Chanderia Lead Zinc Smelter
Treated Water Monitoring Results
(Apr'20-Sept'20)

ETP Out Let – (PYRO)

Parameter	Unit	Limit	Result (Apr-Jun'20)	Result (Jul-Sept'20)
pH	-	5.5 - 9.0	7.26	8.12
Chloride	Mg/l	1000	141.00	541.75
Oil & Grease	Mg/l	10.0	BDL	5
Total Residual Chlorine	Mg/l	1.0	BDL	BDL
Ammonical Nitrogen	Mg/l	50.0	8.81	3.40
Nitrate Nitrogen	Mg/l	10.0	BDL	2.25
BOD	Mg/l	30	7.40	10.7
COD	Mg/l	250	28.20	62.47
TSS	Mg/l	100	BDL	15
Fluoride	Mg/l	2.0	0.9	1.08


Tarun Kumar Meghwal
 Environment Head
 Chanderia Lead Zinc Smelter

Annexure -
HINDUSTAN ZINC LIMITED
Chandaria Lead Zinc Smelter
Treated Water Monitoring Results
(Apr'20-Sept'20)

ETP Out Let – (PYRO)

Parameter	Unit	Limit	Result (Apr-Jun'20)	Result (Jul-Sept'20)
Phosphate	Mg/l	5.0	0.04	0.15
Cyanide	Mg/l	0.2	BDL	BDL
Cadmium	Mg/l	2.0	BDL	BDL
Chromium	Mg/l	2.0	BDL	BDL
Copper	Mg/l	3.0	BDL	BDL
Iron as Fe	Mg/l	Not Specified	0.11	BDL
Lead as Pb	Mg/l	0.1	BDL	0.03
Nickel	Mg/l	3.0	BDL	BDL
Zinc	Mg/l	5.00	BDL	0.35



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Environment Head
Chandaria Lead Zinc Smelter

Annexure -
HINDUSTAN ZINC LIMITED
Chandaria Lead Zinc Smelter
Water Monitoring Results
(Apr'20-Sept'20)

Bearach River Up Stream Report


Parameter	Unit	Limit	Result (Apr-Jun'20)	Result (Jul-Sept'20)
pH	-	6.5 – 8.5	8.32	7.66
Zinc	Mg/l	15.0	0.353	1.96
Lead	Mg/l	0.1	BDL	BDL
Cadmium	Mg/l	0.01	0.05	0.038
Copper	Mg/l	1.5	BDL	BDL
Iron	Mg/l	5.0	BDL	BDL
Hardness	Mg/l	600	604	652
Chloride	Mg/l	600	277.95	218.37
Sulphate	Mg/l	1000	102.80	115.23


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Chandaria Lead Zinc Smelter

Annexure -
HINDUSTAN ZINC LIMITED
Chandaria Lead Zinc Smelter
Water Monitoring Results
(Apr'20-Sept'20)

Bearach River Down Stream Report

Parameter	Unit	Limit	Result (Apr-Jun'20)	Result (Jul-Sept'20)
pH	-	6.5 – 8.5	8.37	7.58
Zinc	Mg/l	15.0	0.067	1.58
Lead	Mg/l	0.1	BDL	0.27
Cadmium	Mg/l	0.01	BDL	.073
Copper	Mg/l	1.5	BDL	BDL
Iron	Mg/l	5.0	BDL	BDL
Hardness	Mg/l	600	456	636
Chloride	Mg/l	600	207.02	241.06
Sulphate	Mg/l	1000	106.60	105.32


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Environment Head
Chandaria Lead Zinc Smelter

Annexure -
Hindustan Zinc Limited
Chandera Lead Zinc Smelter Complex
Putholi, Chandera , Dist. Chittorgarh, Rajasthan.

ACID PLANT MONITORING
Quarterly Monitoring (Apr'20-Sept'20)

Month Location	Parameters	Prescribed Limits	Apr-June'20	July-Sept'20
Acid Plant* (Hydro-1)	SO ₂ (2 Kg/T of H ₂ SO ₄ Production)=224 PPM	224 ppm	106.00 ppm 0.97 kg/T	77.49 ppm 0.97 kg/T
	ACID MIST	50 (mg/nm ³)	35.80	26.38
Acid Plant* (Hydro-2)	SO ₂ (2 Kg/T of H ₂ SO ₄ Production)=224 PPM	224 ppm	110.00 ppm 1.10 kg/T	92.35 ppm 1.10 kg/T
	ACID MIST	50 (mg/nm ³)	23.00	34.28
TGT Stack (Pyro Plant)	SO ₂ (2 Kg/T of H ₂ SO ₄ Production)=224 PPM	224 ppm	86.00 ppm 1.10 kg/T	54.50 ppm 1.10 kg/T
	ACID MIST	50 (mg/nm ³)	29.10	29.95
Cansolve (Ausmelt Plant)	SO ₂ (2 Kg/T of H ₂ SO ₄ Production)=224 PPM	224 ppm	96.00 ppm 0.99 kg/T	91.05 ppm 0.99 kg/T
	ACID MIST	50 (mg/nm ³)	33.03	35.52


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Chandera Lead Zinc Smelter

Annexure –

HINDUSTAN ZINC LIMITED

Chandera Lead Zinc Smelter

Ambient Air Quality Monitoring Results

Quarterly Monitoring (Apr-June'20)

Name of Monitoring Station	Parameters (Values are in $\mu\text{g}/\text{m}^3$)				
	PM (2.5)	PM (10)	CO	NO _x	SO ₂
Limit	60 $\mu\text{g}/\text{m}^3$	100 $\mu\text{g}/\text{m}^3$	4000 $\mu\text{g}/\text{m}^3$	80 $\mu\text{g}/\text{m}^3$	80 $\mu\text{g}/\text{m}^3$
Near CISF Colony C1	48.65	88.16	0.50	27.47	7.95
Near LOCO Shed C2	49.21	92.45	0.63	23.92	7.50
Near Slag Gate	47.85	86.58	0.75	30.55	8.30
Near DM Plant	36.52	73.01	0.50	25.32	8.75

Ambient Air Quality Monitoring Results

Quarterly Monitoring (Jul-Sept'20)


Name of Monitoring Station	Parameters (Values are in $\mu\text{g}/\text{m}^3$)				
	PM (2.5)	PM (10)	CO	NO _x	SO ₂
Limit	60 $\mu\text{g}/\text{m}^3$	100 $\mu\text{g}/\text{m}^3$	4000 $\mu\text{g}/\text{m}^3$	80 $\mu\text{g}/\text{m}^3$	80 $\mu\text{g}/\text{m}^3$
Near CISF Colony C1	36.62	65.48	320	27.71	28.87
Near LOCO Shed C2	36.52	70.84	370	32.39	31.26
Near Slag Gate	37.49	71.27	410	33.50	35.14
Near DM Plant	37.74	72.10	380	29.38	33.20


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Environment Head
 Chandera Lead Zinc Smelter

Annexure
HINDUSTAN ZINC LIMITED
CHANDERIA LEAD ZINC SMELTER
Ambient Air Quality Monitoring Report (Outside Plant)
Quarterly Monitoring (Apr'20 - Sept'20)

Month	Parameters	Limit	(Apr-Jun'20)	(Jul-Sept'20)
Village		Unit		
Putholi	PM-10	100 $\mu\text{g}/\text{m}^3$	84.32	69.95
	PM-2.5	60 $\mu\text{g}/\text{m}^3$	42.13	28.74
	SO ₂	80 $\mu\text{g}/\text{m}^3$	6.56	15.56
	NO _x	80 $\mu\text{g}/\text{m}^3$	31.11	26.35
	Pb	1.0 $\mu\text{g}/\text{m}^3$	0.01	0.19
Munga ka khera	PM-10	100 $\mu\text{g}/\text{m}^3$	94.78	64.78
	PM-2.5	60 $\mu\text{g}/\text{m}^3$	35.25	27.79
	SO ₂	80 $\mu\text{g}/\text{m}^3$	8.61	22.14
	NO _x	80 $\mu\text{g}/\text{m}^3$	36.01	15.54
	Pb	1.0 $\mu\text{g}/\text{m}^3$	0.01	0.16
Nagari	PM-10	100 $\mu\text{g}/\text{m}^3$	92.24	66.58
	PM-2.5	60 $\mu\text{g}/\text{m}^3$	40.70	32.85
	SO ₂	80 $\mu\text{g}/\text{m}^3$	6.77	14.68
	NO _x	80 $\mu\text{g}/\text{m}^3$	26.26	18.57
	Pb	1.0 $\mu\text{g}/\text{m}^3$	0.002	0.18
Biliya	PM-10	100 $\mu\text{g}/\text{m}^3$	78.24	62.57
	PM-2.5	60 $\mu\text{g}/\text{m}^3$	50.12	30.28
	SO ₂	80 $\mu\text{g}/\text{m}^3$	6.96	24.40
	NO _x	80 $\mu\text{g}/\text{m}^3$	29.65	16.89
	Pb	1.0 $\mu\text{g}/\text{m}^3$	0.002	0.14


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 Environment Head
 Chanderia Lead Zinc Smelter

Ajoliya Ka Khera	PM-10	100 $\mu\text{g}/\text{m}^3$	72.41	63.48
	PM-2.5	60 $\mu\text{g}/\text{m}^3$	37.55	27.74
	SO2	80 $\mu\text{g}/\text{m}^3$	8.61	15.14
	NOx	80 $\mu\text{g}/\text{m}^3$	30.65	16.59
	Pb	1.0 $\mu\text{g}/\text{m}^3$	0.01	0.09
Anwalhera	PM-10	100 $\mu\text{g}/\text{m}^3$	62.78	62.11
	PM-2.5	60 $\mu\text{g}/\text{m}^3$	33.45	28.87
	SO2	80 $\mu\text{g}/\text{m}^3$	7.15	14.58
	NOx	80 $\mu\text{g}/\text{m}^3$	29.91	17.76
	Pb	1.0 $\mu\text{g}/\text{m}^3$	0.005	0.18
Zinc Nagar	PM-10	100 $\mu\text{g}/\text{m}^3$	86.33	58.60
	PM-2.5	60 $\mu\text{g}/\text{m}^3$	39.65	28.57
	SO2	80 $\mu\text{g}/\text{m}^3$	9.43	10.33
	NOx	80 $\mu\text{g}/\text{m}^3$	26.08	14.41
	Pb	1.0 $\mu\text{g}/\text{m}^3$	0.008	0.12


Tarun Kumar Meghwal

Environment Head

Chandaria Lead Zinc Smelter


Annexure -
HINDUSTAN ZINC LIMITED
Chandera Lead Zinc Smelter
Ambient NOISE Monitoring Results
(Apr'20 - Sept'20)

April to June - 2020

S.No.	Testing Protocol	Parameters	Point of Collection	Observed Value	Observed Value
			Noise Standard(dB)	DAY - 75	Night - 70
1	IS 9989	Noise Level (dB)	Near Loco shade C2	53.2	48.9
2	IS 9989	Noise Level (dB)	Near Slag gate	58.2	53.6
3	IS 9989	Noise Level (dB)	Near DM Plant	58.3	53.7
4	IS 9989	Noise Level (dB)	Near CISF Colony C1	52.2	47.6


July to Sept - 2020

S.No.	Testing Protocol	Parameters	Point of Collection	Observed Value	Observed Value
			Noise Standard(dB)	DAY - 75	Night - 70
1	IS 9989	Noise Level (dB)	Near Loco shade C2	67.2	57.6
2	IS 9989	Noise Level (dB)	Near Slag gate	64.8	55.0
3	IS 9989	Noise Level (dB)	Near DM Plant	72.4	64.5
4	IS 9989	Noise Level (dB)	Near CISF Colony C1	66.7	56.5


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 Environment Head
 Chandera Lead Zinc Smelter

Annexure -
HINDUSTAN ZINC LIMITED
Chandera Lead Zinc Smelter
Ambient Air Quality (CAAQM) Report

AMBIENT AIR QUALITY STATUS OF CLZS								
Direction	CAAQMS NO.1 Near C1 Office							
West	LOCATION							
	Parameter	Standard of AAQ	APRIL	MAY	JUNE	JULY	AUGUST	SEPT
	PM 10	100	84	87	74	50	34	68
	SOX	80	19.66	21.13	20.09	20.32	22.60	23.90
	NOX	80	16.6	16.8	14.3	12.3	14.5	16.4
Direction	CAAQMS NO.2 DM Plant – CPP							
East	LOCATION							
	Parameter	Standard of AAQ	APRIL	MAY	JUNE	JULY	AUGUST	SEPT
	PM 10	100	76	83	75	45	29	59
	SOX	80	36.3	47.3	41.1	36.5	29.8	27.9
	NOX	80	17.8	25.1	23.8	19.5	15.5	18.5
Direction	CAAQMS NO.3 Chittorgarh Fort							
South	LOCATION							
	Parameter	Standard of AAQ	APRIL	MAY	JUNE	JULY	AUGUST	SEPT
	PM 10	100	66	62	55	48	44	51
	SOX	80	8.3	7.6	10.1	10.6	10.4	10.7
	NOX	80	22.5	17.9	23.8	23.5	21.7	22.4
Direction	CAAQMS NO.4 Pond No 1 (New Station)							
North	LOCATION							
	Parameter	Standard of AAQ	APRIL	MAY	JUNE	JULY	AUGUST	SEPT
	PM 2.5	60	37	27	40	35	24	34
	PM 10	100	77	71	84	80	55	71
	SOX	80	29.5	25.2	22.3	23.4	23.2	22.1
	NOX	80	7.6	7.4	4.4	4.5	4.7	3.7


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 Chandera Lead Zinc Smelter

ROAD SWEEPING BY VACCUM ROAD SWEEPER

