

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-11013/29/92-EI, DATED 03.06.83
Environmental Clearance Letter No. 3/29/79//HCT/ENV. DATED 25.08.80


Sir,

Please find enclosed herewith the six monthly compliance report with reference to above Environmental Clearances for our Pyro Plant and Gosunda Dam CLZS location 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

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CIN : L27204RJ1966PLC001208

Sensitivity: Internal (C3)

SIX MONTHLY POINT WISE COMPLIANCE REPORT FOR GOSUNDA DAM
ENVIRONMENTAL CLEARANCE LETTER No. 3/29/79/HTC/ENV DATED 25.08.80

- 1) Majority of labours engaged by the contractor during the construction phase of dam were locals with residential dwellings in nearby villages, hence there was no requirement of fuel wood supply to villages. No trees were felling in the area.
- 2) The excavated mud of the main dam has been utilized in the construction of rock fill dam at the left flank. The soil for the construction of earthen dam has been taken from various borrow area to a maximum depth of uniformly consequently, there are no holes, irregular surface left in the borrow areas. Due to the almost level surface left, no restoration is required.
- 3) General health condition of the persons in the rehabilitation colonies are very good.
- 4) No deforestation or clear felling was resort to for any construction activity associated with the dam construction.
- 5) Environmental plantation of Gosunda dam area has been taken up in right earnest. Plantation of 10,000 numbers of saplings has been done and its subsequent maintenance in all respect. The species chosen are all locally endemic species and are known to register fast growth and good canopy cover.

Note:-The height of Gosunda Dam has been raised from 420 MRL to 422.5 MRL.

- a. Forest clearance for storage of water up to 422.5 MRL
- b. Plantation coming under submergence between 420 to 422.5 MRL shall be replaced by Forest Department.
- c. No village is coming under submergence.

PYRO PLANT

Environment Compliance Report of Chanderiya Lead Zinc Smelter, Chittorgarh with reference to Environmental Clearance letter No. :- J-11013\29\92-EI dated 3.6.83.

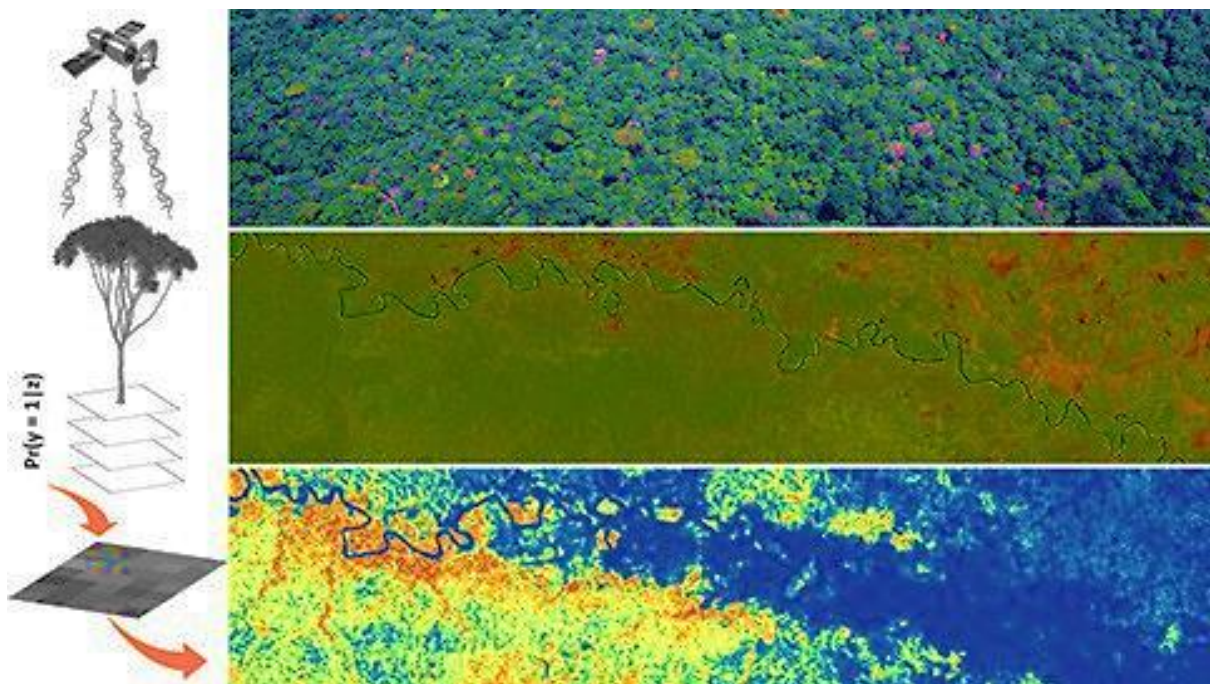
S.N.	CONDITION	COMPLIANCE
1	Transportation of concentrates from mine to the Smelter site should be done in containers or closed trucks to minimize/avoid the entry of metal into environment through spillage, carry over, pilferage etc. trucks used should be washed & cleaned at the centralized place HZL should look in this aspect make proper arrangements. This washing should be properly treated & disposed.	(1) Transportation of concentrate from mine is done in covered dampers to minimize any spillage, carry over pilferage etc. (2) The concentrate contains 8% to 10% moisture (3) After unloading, the trucks are washed at the truck washing facility. (4) The wash water is being treated in ETP followed by RO & solids in slurry form are being recycled to the sinter plant and ETP cake is being disposed in SLF. (5) Proper care is being taken during transportation.
2	Spillage & fugitive dust emission at loading and unloading points should be kept to minimum & for this purpose water spray should be adopted.	(1) Moisture in concentrate received at site is maintained at approximately 8%. (2) This minimizes fugitive emission at unloading point & also at the concentrate handling area in RMH. (3) Water sprinkler and vacuum road sweeper are being used at site to reduce & mitigate fugitive dust emission if any at site. (4) We are complying with all applicable norms of fugitive 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.	(1) Levels of lead and Zinc in the working Environment are within the stipulated limits. (2) Cadmium levels in the working environment have always been found below detection limits. (3) All norms of metal value in the working environment is being followed at site. See Annexure I – Work Environment
4	The local ventilation in all workplaces should be designed in such a way to have a suitable draft circulation.	(1) The stipulated conditions have been taken care of in designing and adequate ventilation system has been provided in work place. (2) Suitable draft circulation is being maintained.
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.	(1) The height & design of the stacks are adequate. (2) Ground level concentration of the gaseous pollutant is 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.	(1) In designing the location & height of stack, CPCB guidelines have been followed. (2) During project and after total meteorological condition is being taken into consideration for this purpose.

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 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.	<p>(1) HZL authorities have arranged 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 consultation with expert in this field to have an idea & base information .</p> <p>(2) Based on these suitable measures is been adopted & reports is being regularly sent to State/Central Board/ Deptt Of Environment.</p> <p>Annexure – II Stack Monitoring</p>
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.	<p>(1)The daily Average water consumption is approx. 5000 M³./day</p> <p>(2)All effluent treated in ETP followed by RO</p> <p>(3)Zero discharge is being effectively maintained at our plant</p> <p>See Annexure – III Treated water quality analysis</p>
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.	<p>(1) Regular reports of the analysis of final treated water are submitted to RPCB, Jaipur on monthly basis.</p> <p>(2) Regular operation is being monitored by Senior or Management officials.</p>
10	The two sludge lagoon should be made imperious to avoid pollution of ground water.	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.	Water quality of upstream & dawn stream of Berach river & the sample of wells water from nearby village area is been regularly monitored.
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.	<p>Treated water is recycled in the process. Every year new plantation work is taken up, as a result well grown up trees comprise the green belt on both side of the plant.</p> <p>Presently 121.77 Ha. of green area is been developed inside CLZS Complex which is more than 33% of the Plant area.</p>
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.	Free plant saplings are distributed in nearby villages every year and also planted sapling under our CSR activity like Punchfal scheme.
14	Rigorous & stringent measure for maintaining the various process & control	Stringent measures are taken to keep all the pollution control equipment in good condition. In

	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.	monthly & annual shutdowns, through checking of pollution control system.
15	An Environmental Management plan stipulating various condition & requirement of operation, maintenance & monitoring should be drawn up. Various levels in the Organisation(s) should be trained to adopt the plans.	EIA study & EMP for CLZS have been prepared. A full fledge Environment Lab exist at site to meet the process and statutory norms. Environmental training is also imparted, and Site Environment Cell is well equipped and trained to adopt the Environment Management Plans at site.
16	Contingency & disaster plans should be drafted for adoption.	Disaster management plan being updated suitably in consultation with Inspector of Factories & Boilers, Jaipur, for the entire location. Site level ERCP is also available at site.
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.	<p>A full fledged Environment deptt. exists at CLZS Sr.(ENV) is the head of Deptt for all functional purpose & is reporting to the Location Head. , Managers (Env.) & Manager (Hort) looks after day to day jobs & technical auditing.</p> <p>EMC is well supported by team of qualified Engineers and Technical staff like Analysts, Horticultural Assistant and Environment Laboratory.</p>
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.	<p>Regular training program are conducted for employees, these program highlight the importance of clean environment and related issues of strict maintaining of process parameters, equipment condition etc.</p> <p>World Environment Day & Van Mahotsav are celebrated every year to create awareness about clean environment & various competitions are also organized.</p> <p>(A) Slogans & poster competition (for both Employees & Contractor workers).</p> <p>(B) Essay& poem competition (for both Employees & Contractor workers).</p>

Greenbelt Estimation using GIS

Chanderiya Lead Zinc Smelter, HZL



November 2020



Terracon Ecotech Private Limited

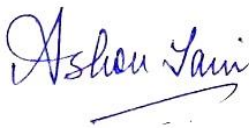
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Acknowledgement

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.



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.

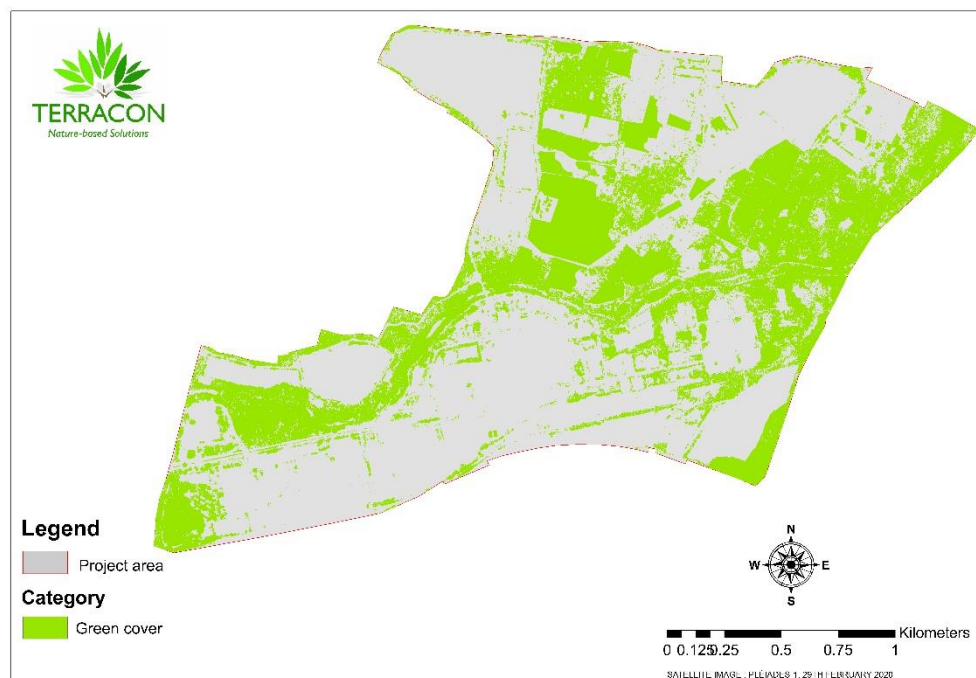


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Introduction

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



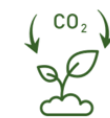
Environment
condition
improvement



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.



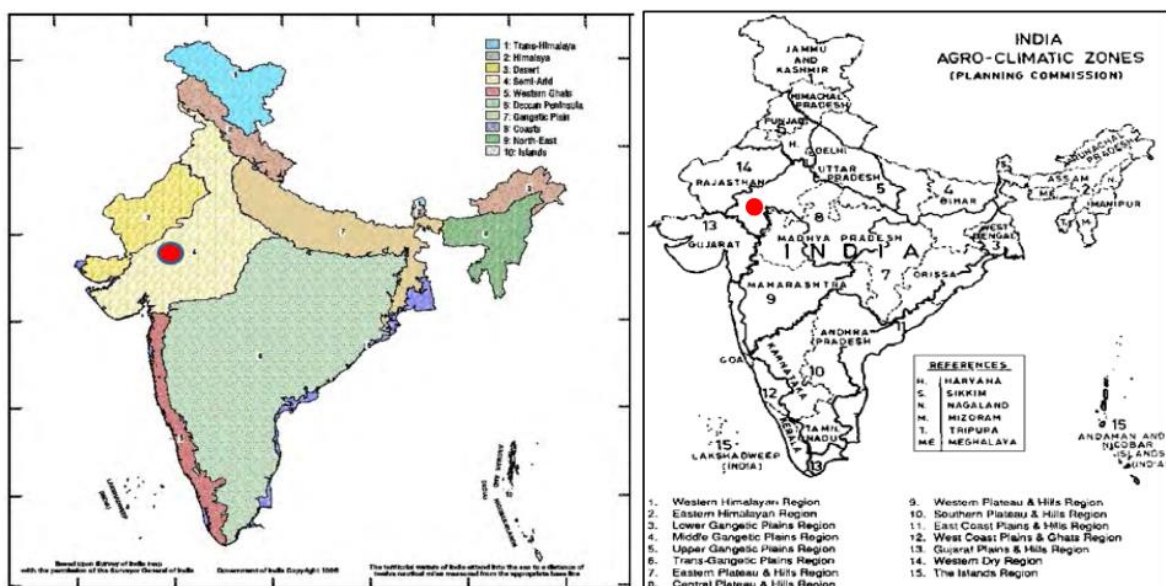
Study area boundary

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

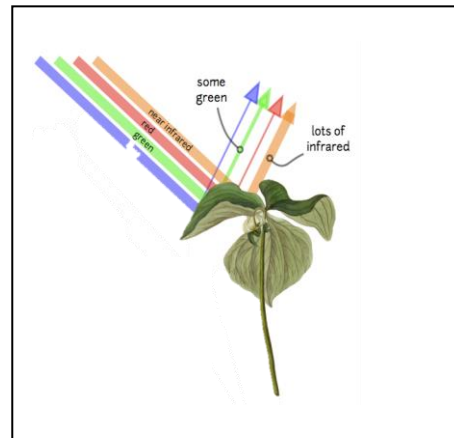
The Land-use map indicates that the study area is highly industrialized with around 58% built-up barren land area and areas covered by industrial operations. There are also some waterbodies present forming to around 3.20% of the total area. The table for landuse areas is given below.

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.

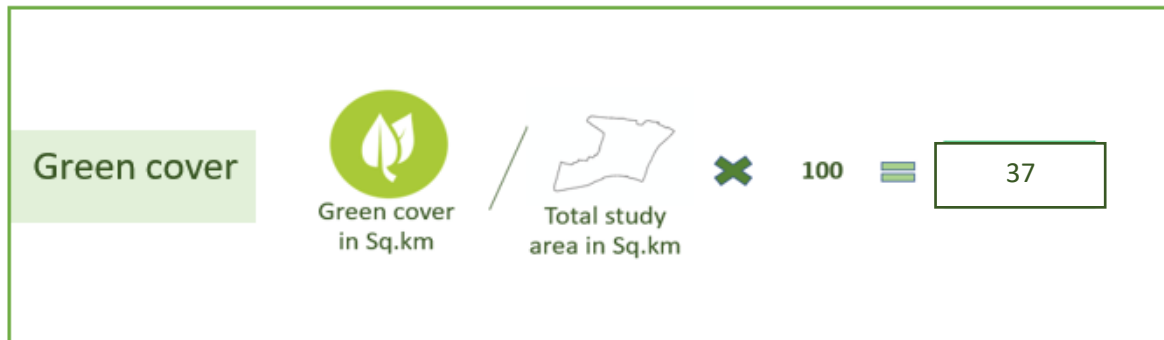
Green Cover of CLZS

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.

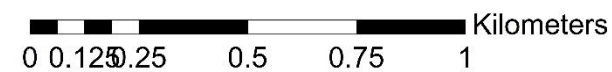
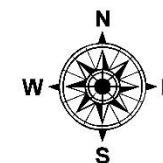
Green cover map



Legend



Category



SATELLITE IMAGE : PLÉIADES-1. 29TH FEBRUARY 2020

Green cover and new plantation map



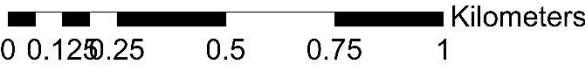
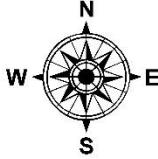
Legend

 Project area

Category

 Green cover

 New Plantation area



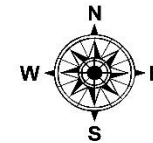
SATELLITE IMAGE : PLÉIADES-1, 29TH FEBRUARY 2020

False colour composite image with 1km buffer



Legend

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



0 0.25 0.5 1 1.5 2 Kilometers

SATELLITE IMAGE : PLÉIADES-1, 29TH FEBRUARY 2020

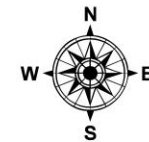
False colour composite image



Legend

FCC- False colour composite image

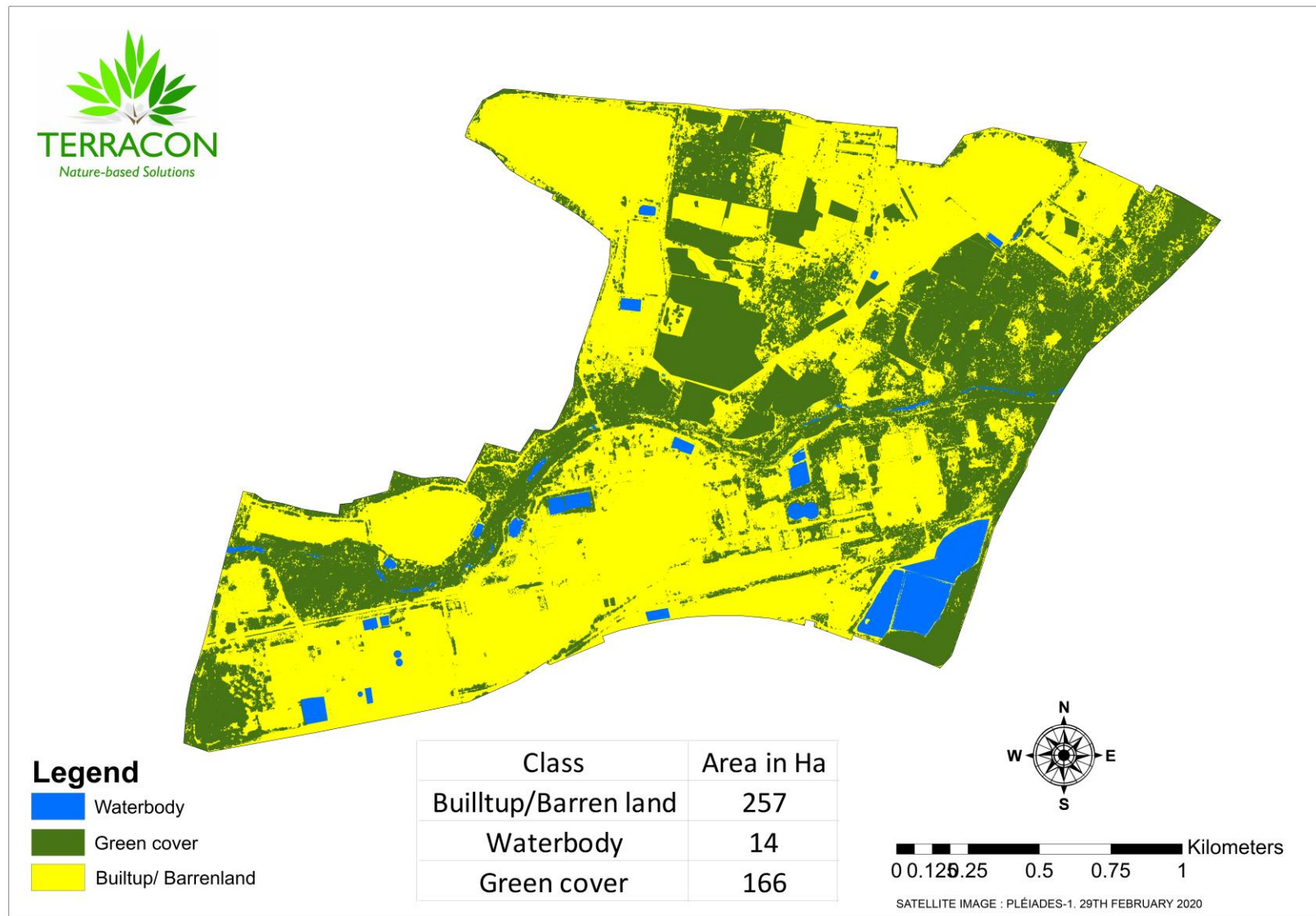
Class	Area in Ha
Builtup/Barren land	257
Waterbody	14
Green cover	166



0 0.125 0.25 0.5 0.75 1 Kilometers

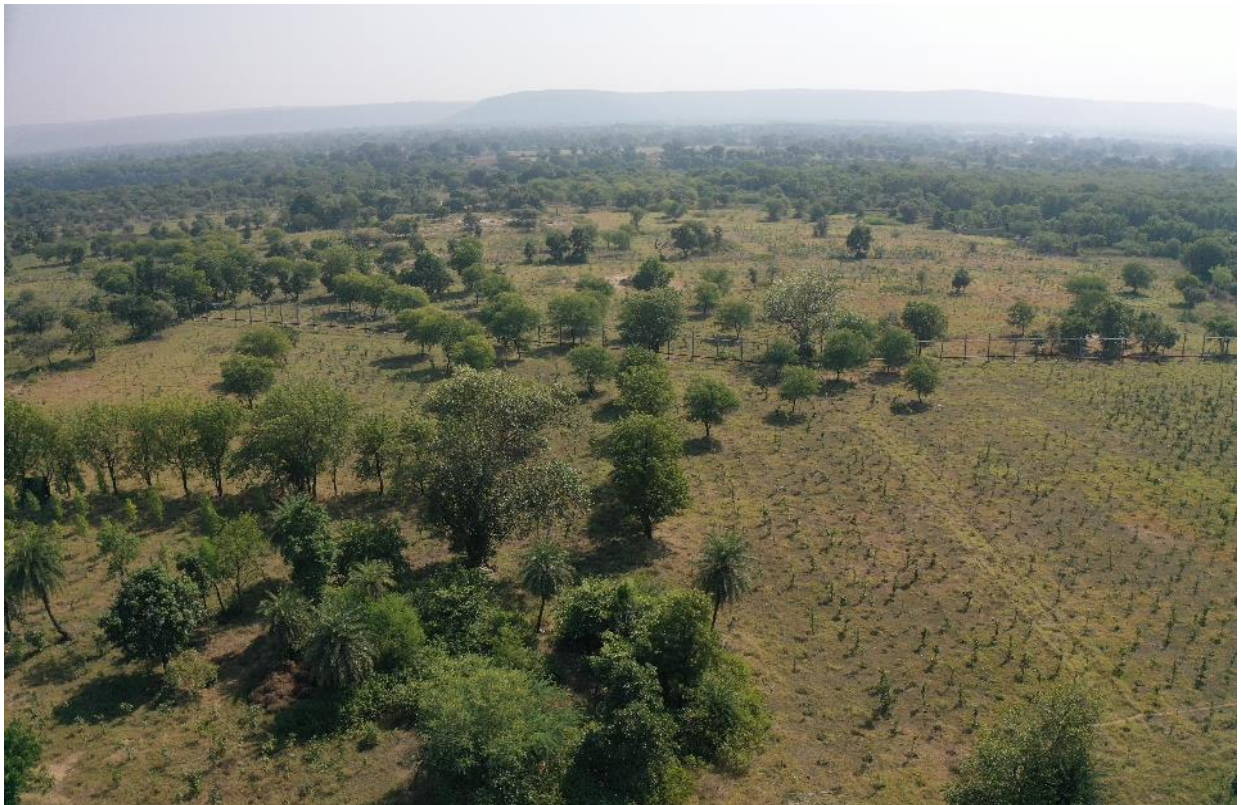
SATELLITE IMAGE : PLÉIADES-1, 29TH FEBRUARY 2020

Land use map



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



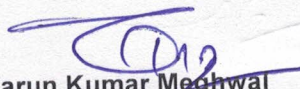
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Environment Head

Chandaria Lead Zinc Smelter

Annexure -
HINDUSTAN ZINC LIMITED
Chandaria 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 absorpton 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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Chandaria Lead Zinc Smelter

Annexure -
HINDUSTAN ZINC LIMITED
Chanderia 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/nm3	15.76	47.58
	Lead	10	Mg/nm3	BLQ(LOQ 0.005)	4.12
Sinter Venturi	PM	150	Mg/nm3	11.40	37.74
	Lead	10	Mg/nm3	BLQ(LOQ 0.005)	3.58
Crusher Main	PM	150	Mg/nm3	28.70	32.48
	Lead	10	Mg/nm3	BLQ(LOQ 0.005)	3.22
Crusher Venturi	PM	150	Mg/nm3	11.16	27.45
	Lead	10	Mg/nm3	BLQ(LOQ 0.005)	2.89
LRP Main	PM	150	Mg/nm3	6.16	15.25
	Lead	10	Mg/nm3	BLQ(LOQ 0.005)	0.80
ZRP Main	PSD				
ZRP Fume	PSD				


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 Chanderia 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
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



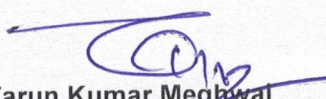
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Chandaria Lead Zinc Smelter

Annexure -
HINDUSTAN ZINC LIMITED
Chandaria 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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Chandaria 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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Chandaria Lead Zinc Smelter

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

ETP Out Let – (Hydro – 2)

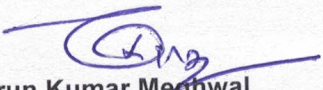
Parameter	Unit	Limit	Result (Apr-Jun'20)	Result (Jul-Sept'20)
Phosphate	Mg/l	5.0	0.03	BDL
Cyanide	Mg/l	0.2	BDL	BDL
Cadmium	Mg/l	2.0	BDL	BDL
Chromium	Mg/l	2.0	BDL	BDL
Copper	Mg/l	3.0	BDL	BDL
Iron as Fe	Mg/l	Not Specified	0.14	BDL
Lead as Pb	Mg/l	0.1	BDL	0.02
Nickel	Mg/l	3.0	BDL	BDL
Zinc	Mg/l	5.00	BDL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


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Chandaria 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)
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


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Chandaria 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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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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Chandaria Lead Zinc Smelter

Annexure -
Hindustan Zinc Limited
Chandaria Lead Zinc Smelter Complex
Putholi, Chandaria , 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/nm3)	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/nm3)	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/nm3)	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/nm3)	33.03	35.52


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Chandaria Lead Zinc Smelter

Annexure –

HINDUSTAN ZINC LIMITED

Chandaria 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)

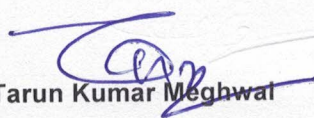
Name of Monitoring Station	Parameters (Values are in $\mu\text{g}/\text{m}^3$)				
	PM (2.5)	PM (10)	CO	NO _x	SO ₂
Limit	60 $\mu\text{g}/\text{m}^3$	100 $\mu\text{g}/\text{m}^3$	4000 $\mu\text{g}/\text{m}^3$	80 $\mu\text{g}/\text{m}^3$	80 $\mu\text{g}/\text{m}^3$
Near CISF Colony C1	36.62	65.48	320	27.71	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
Chandaria 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


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Environment Head

Chandaria Lead Zinc Smelter


Annexure -
HINDUSTAN ZINC LIMITED
Chandaria 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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Chandaria Lead Zinc Smelter

Annexure -
HINDUSTAN ZINC LIMITED
Chandaria 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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 Chandaria Lead Zinc Smelter

ROAD SWEEPING BY VACCUM ROAD SWEEPER

