The Singareni Collieries Company Limited
(A Government Company)

Regd. Office:
Kothagudem Collieries - 507 101,
Bhadrachalam Road Rly.Station,
Bhadradri Kothagudem District - Telangana.

Director (P&P) : 08744 - 242328
GM (CP&P) : 08744 - 243108
GM (ENV) : 08744 - 243059
Fax : 08744 - 244115 / 242305
E.Mail : gm_env@scclmines.com

Ref.No. CRP/ENV/A/ 438/221 Date: 10.03.2020

To
The Member Secretary (Violation Projects),
Ministry of Environment, Forest & Climate Change,
Vayu Wing, Indira Paryavaran Bhawan, Jor Bagh Road,
New Delhi – 100003.

Sir,

Sub: Submission of Additional Details Sought (ADS) for Cluster of Godavarikhani No.1&3 Inclines, Godavarikhani No.2&2A Inclines and Godavarikhani No.5 Incline of The Singareni Collieries Company Ltd., Telangana in the 29th EAC meeting held on 30.12.2019 for issue of EC - Reg.

Ref.: 1. Proposal No: IA/TG/CMIN/131588/2017.
2. MoM of 29th EAC meeting, dated 30th Dec, 2019.

***

EAC meeting was conducted for Cluster of Godavarikhani No.1&3 Inclines, Godavarikhani No.2&2A Inclines and Godavarikhani No.5 Incline of The Singareni Collieries Company Ltd., Telangana in the 29th EAC meeting held on 30.12.2019.

Vide reference cited (2), Additional Details (ADS) were sought for which point wise reply is being uploaded in the Parivesh Portal website. A copy is also being sent for your perusal.

It is requested to include the proposal in the ensuing EAC meeting for issuing Environmental Clearance.

Yours Sincerely,

General Manager
Environment

Encl: As above

Reply to Issues Raised by EAC (Violation) Committee in 29th EAC meeting held on 30.12.2019

on

Environmental Impact Assessment / Environmental Management Plan

of

CLUSTER OF GODAVARIKHANI 1&3, 2&2A & 5 INCLINE PROJECTS

JANGAON, SUNDILLA, MUSTYALA & JALLARAM VILLAGES,

RAMAGUNDAM MANDAL,

PEDDAPALLI DISTRICT, TELANAGANA STATE

Project Proponent

THE SINGARENI COLLIERIES COMPANY LIMITED

(A Government Company)

KOTHAGUDEM COLLIERIES – 507 101 (T.S.)

Prepared by

EPTRI

ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE

Sy. No. 91/4, Gachibowli, Hyderabad

March- 2020

Contents

1. In the declaration by Experts contributing in preparation of EIA/EMP, it was observed that two EIA coordinators and FAEs names mentioned without their category of eligibility in preparation of EIA/EMP report. Hence EIA consultant organization has to submit revised declaration with experts with their category. 1
2. Field visit photographs of concerned EIA coordinator involvement during site visit particularly in collection of BLD along with SE&EB functional area experts. 4
3. As per the Annexure-3D of health status collected from District Medical & Health officer the letter dated 16.10.2018, but actual BLD was collected in March 2019 to May ,2019, please clarify in this regard. In this annexure the data furnished is entire Peddapalli district surrounded by SCCL mines and also mentioned that some data will be furnished in due course. Submit 3 years' baseline health status data within 5 km radius of the proposed project with integrated socio economic profile of the study area with QOL comparison between 1993/94 and 2018/19. 5
4. Submission of surface contour plan and water danger plan as approved by DGMS. 8
5. Submission of land use details pre and present and post mining for entire land 1356.85 Ha with LULC comparison as interpreted through Satellite imagery. 15
6. Distance of Sivaram Wildlife Sanctuary from boundary of cluster of mine and the certification if it is around 10 kms from core zone boundary. 18
7. Compliance of earlier ground Water Clearance issued on 18.02.2014. Submit the 3D ground water modelling studies and the impact due to pumping of ground water from these mines based on modelling. 21
8. Revised ground water clearance if obtained from concerned Authority. 34
9. Protective measures taken against inundation as approved by DGMS since the river Godavari is flowing adjacent to the mining lease area. 36

10. Air quality prediction modeling studies based on CMPDI emission factors considering the impact due to handling and transportation of coal for peak production capacity for 1.734 MTPA without control and with control measures and details of air emission year wise of violation period collectively as per the annexure. 38
11. Air quality monitoring locations table showing the distance and direction wrt to predominant wind directions. 38
12. During presentation it was mentioned that air quality locations stations are identified based on annual Wind rose data but this details are not furnished in the EIA/EMP report and same to be submitted. 50
13. Revisit the data of chemical characteristics of coal. 51
14. Certified CFO compliance report to be obtained from concerned regional office of SPCB. 51
15. Proposed STP details like capacity and technology. 51
16. Heavy metals concentrations in the mineralogical composition of RPM is to be rechecked. 53
17. Capital cost of the project with certificate from finance department of the company to be submitted and also EMP capital and recurring cost incurred yearwise if spent to be submitted. 54
18. Flowsheet of water treatment and other water management (ground and surface water) system with detailed quantity shall be submitted.
19. Submit in tabular form the gist of written representations received in the public hearing along with commitment by project proponent with time bound action plan 57
20. Revised CER cost along with the activities based on revised capital cost to be prepared. CER details excluding the activities proposed under CSR with time bound implementation (maximum three years) shall be submitted. 57
21. Presentation to be made as per the specific ToR and standard ToR issued to the project. 61
22. Plantation and Green Belt details with the name of species and photographs 62
23. Declaration about that no Schedule I species in the core and buffer zone of the proposed project with the list of flora and fauna in the required format 66

24. Social Impact Assessment and R&R, if any details to be submitted in the chapter 7 of the EIA/EMP report as per the generic structure 76
25. As suggested by the committee, revised remediation plan, community and natural resource augmentation plan should be submitted. Activities along with the budgetary provision proposed under remediation plan should be revisited. 78
26. Details as per Annexure XI as mentioned in the agenda shall be submitted for the violation period. 96
27. Status of credible action. 101

1. **In the declaration by Experts contributing in preparation of EIA/EMP, it was observed that two EIA coordinators and FAEs names mentioned without their category of eligibility in preparation of EIA/EMP report. Hence EIA consultant organization has to submit revised declaration with experts with their category.**

Declarations by Experts contributing to the EIA/EMP of Cluster of GDK 1&3, GDK 2&2A and GDK 5 Incline Projects

I, hereby, certify that I was a part of the EIA team in the following capacity, developed the EIA/EMP of Cluster of GDK 1&3, GDK 2&2A and GDK 5 Incline Projects of The Singareni Collieries Company Ltd, Kothagudem, T.S.

EIA Coordinators:

Name: Shaheda Begum 

(Category A)

Name: Mrs. V. Bhavani 

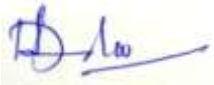
(Category B)

Signature

Period of involvement: March – August, November-December 2019
Contact information: Environment Protection Training & Research Institute
Sy. No. 91/4, Gachibowli, Hyderabad

Functional Area Experts:

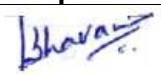
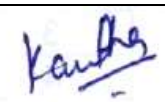
S. No.	Functional areas	Name of the expert/s	Involvement (period and task**)	Signature
1	AP*	Mrs. Shaheda Begum (Category A) Mrs.V.Bhavani (Category B)	Involved in identifying monitoring locations, interpretation of results, identifying impacts and suggesting mitigation measure.	
2	WP*	Mrs. Shaheda Begum (Category A) Mrs.Kavitha (Category B)	Involved in identifying monitoring locations, interpretation of results, identifying impacts and suggesting mitigation measure.	
3	SW*	Mrs.A.Leelavathi (Category A) Mr.Shaik Allavalli (Category B)	Involved in quantification of solid waste, identifying impacts and suggesting mitigation measure.	

S. No.	Functional areas	Name of the expert/s	Involvement (period and task**)	Signature
	HW*	Mr.Shaik Allavalli	Involved in quantification of Hazardous waste, identifying impacts and suggesting mitigation measure.	
4	SE*	Mr.K. Nanaji (Category A) Mr.Gopi Krishna (Category B)	Involved in socio-economic studies, data analysis, identifying impacts and suggesting management plan	
5	EB*	Dr.D.Veeranjaneyulu (Category A) Dr. K.Jyothi (Category A)	Involved in flora & fauna studies by identifying the species. Identifying impacts and suggesting mitigation measure.	 
6	AQ*	Mrs. Shaheda Begum (Category A)	Involved in meteorological studies, identifying air pollution sources, Suggesting mitigation measures.	
7	SC*	Mr.D.Sunder Rao (Category A)	Involved in identifying monitoring locations, interpretation of results, identifying impacts and suggesting mitigation measure.	
8	HG*	Dr.Ramakrishna (Category A) Mr.G.Ramesh (Category A)	Involved in identifying the drainage pattern and its impacts. Suggesting mitigation measure.	 
9	Geo*	Dr.Ramakrishna (Category A) Mr.G.Ramesh (Category B)	Involved in studying the geology of the area and identifying impacts. Suggesting mitigation measure.	 
10	NV*	Sri.B.Bhaskara Rao (Category A) Mrs.A.Leelavathi (Category B)	Involved in identifying monitoring locations, interpretation of results, identifying impacts and suggesting mitigation measure.	 

S. No.	Functional areas	Name of the expert/s	Involvement (period and task**)	Signature
11	LU*	Mr. BA.Patrudu (Category A) Dr.J.Swaraj (Category B)	Involved in processing of satellite imageries for land use classification. Identifying impacts and suggesting mitigation measure.	
12	RH*	Aprup Adwadkar (Category A)	Risk assessment, preparation of risk and disaster management plan.	

*One TM against each FAE may be shown **Please attach additional sheet if required

***Team Members**

S.No	Area of Involvement	Experts	Signature of the experts
1.	Assisted in meteorological studies, identifying air pollution sources, Suggesting mitigation measures.	V.Bhavani	
2	Assisted Air expert in identification and sampling of water samples and report preparation.	Mr. Rahul Jarupula	
3	Assisted Water expert in identification and sampling of water samples and report preparation.	Mr. Rahul Jarupula	
4	Assisted Soil expert in identification of sampling location, interpretation of results and report preparation	V.Bhavani	
5	Mining EIA Coordinator Socio Economic Solid waste	S.Kavitha	

Declaration by the Head of the Accredited Consultant Organization

I, S.D. Mukherji, hereby, confirm that the above mentioned experts prepared the EIA/EMP of Cluster of GDK 1&3, GDK 2&2A and GDK 5 Incline Projects. I also confirm that I shall be fully accountable for any misleading information mentioned in this statement.

Signature & Date
Name: **S.D. MUKHERJI**
Designation: Advisor
Name of the EIA Consultant Organization: Environment Protection Training and Research Institute, Hyderabad, Telangana State.
NABET Certificate No. & Issue Date: Certificate No. NABET/EIA/1922/RA143, Dated 29.05.2022.

2. Field visit photographs of concerned EIA coordinator involvement during site visit particularly in collection of BLD along with SE&EB functional area experts.

Field visit photos of EIA Coordinator with Socio Economic (SE) and Ecology Biodiversity (EB) Functional Area Expert.

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>GDK No. 5 Incline</td><td>GDK No.2 incline</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td colspan="2">Jangoan PHC</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Indaram Forest</td><td>Musthalya cross road plantation</td></tr>
</table>

3. As per the Annexure-3D of health status collected from District Medical & Health officer the letter dated 16.10.2018, but actual BLD was collected in March 2019 to May ,2019, please clarify in this regard. In this annexure the data furnished is entire Peddapalli district surrounded by SCCL mines and also mentioned that some data will be furnished in due course. Submit 3 years' baseline health status data within 5 km radius of the proposed project with integrated socio economic profile of the study area with QOL comparison between 1993/94 and 2018/19.

BLD for the project was collected in summer season i.e. March 2019 to May 2019. During the study period the District Medical & health officer was requested to provide the health data, but the data not received till complection of the Final EIA/EMP. Considering this, the data that was collected during October 2018 was utilized for summer season.

The baseline health status of 3 years data is collected from Peddapalli district, DM&HO office and the details are furnished below.

Table No.1 Public Health profile data sheet

S.No.	Name of the Village	Malaria	Cholera	Dengue	Chikungunya	Acute Diarrhoea	Typhoid	Hepatitis	Tuberculosis	HIV Cases	Cancer	Heart attack & Cardiac arrest	Kidney diseases	Accidents	Infant Mortality Rate	Others
	Year 2017															
1	Jangaon	0	0	0	0	80	20	0	3	0	0	0	0	0	0	0
2	Sundilla	0	0	3	0	0	0	0	3	0	1	0	0	0	0	0
3	Singareddipalli	0	0	0	0	0	6	0	2	2	1	3	1	0	0	0
4	Dubbapalli	0	0	0	0	4	6	0	2	0	0	0	0	0	0	0
5	Venkatraopalli	0	0	0	1	0	1	0	2	1	0	1	1	0	0	0
6	Malkapur	0	0	0	0	0	18	0	1	0	0	0	2	0	0	0
7	Jangalapalle	0	0	0	0	0	10	0	1	0	0	0	1	0	0	0
8	Addaguntapalli	2	0	1	0	0	2	0	2	1	1	1	2	1	0	0
9	Kundanapalli	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0
10	Elkallpalli	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
11	Kamanpur	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
12	Gunturupalli	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
13	Ranapuram	0	0	0	0	0	5	0	3	0	0	2	1	0	0	0
14	NTPC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total		2	0	4	1	91	68	0	20	5	3	7	8	1	0	0

	Year 2018															
S.No.	Name of the Village	Malaria	Cholera	Dengue	Chikungunya	Acute Diarrhoea	Typhoid	Hepatitis	Tuberculosis	HIV Cases	Cancer	Heart attack & Cardiac arrest	Kidney diseases	Accidents	Infant Mortality Rate	Others
1	Jangaon	0	0	0	0	40	25	0	3	0	0	0	0	0	0	0
2	Sundilla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	Singareddipalli	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0
4	Dubbapalli	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	Venkatraopalli	0	0	0	0	0	0	0	6	1	0	0	0	1	1	0
6	Malkapur	0	0	0	0	0	18	0	2	0	0	0	1	0	0	0
7	Jangalapalle	0	0	0	0	0	13	0	3	0	0	0	1	0	0	0
8	Addaguntapalli	0	0	1	0	0	2	0	2	0	1	2	2	0	0	0
9	Kundanapalli	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0
10	Elkallpalli	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0
11	Kamanpur	0	0	0	0	0	0	0	2	0	1	1	1	0	0	0
12	Gunturupalli	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0
13	Ranapuram	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0
14	NTPC	0	0	0	0	80	55	0	0	0	0	0	0	0	0	0
	Total	**0**	**0**	**1**	**0**	**13**	**12**	**0**	**18**	**1**	**2**	**3**	**5**	**1**	**1**	**0**

Note: Total number of cases recorded in a year

S.No.	Name of the Village	Malaria	Cholera	Dengue	Chikungunya	Acute Diarrhoea	Typhoid	Hepatitis	Tuberculosis	HIV Cases	Cancer	Heart attack	Diabetes	Kidney diseases	Blood pressure	Respiratory /Lung problems	Accidents	Infant Mortality Rate	Women deaths during & after pregnancy	Malnutrition cases
	Year -2019																			
1	Dubbapalli	0	0	0	0	0	6	0	1	0	3	2	2	6	79	4	2	0	0	0
2	Bestapalli	0	0	0	0	0	3	0	3	0	3	2	3	6	52	6	0	0	0	0
3	Siripuram	0	0	0	0	0	3	0	1	0	1	2	1	4	38	8	0	1	0	0
4	Elkallpalli	0	0	0	0	0	1	0	2	0	1	0	1	1	33	3	0	0	0	0
5	Basanthnaga	0	0	2	3	0	3	0	5	2	2	2	1	2	12	4	2	2	0	0
6	Lingapur	0	0	2	0	0	8	0	2	0	0	0	1	0	65	5	0	0	0	0
	Total	0	0	4	3	0	2	0	1	2	10	8	8	1	27	30	4	3	0	0

Note: Total number of cases recorded in a year

Based on the above details it shows that *Acute Diarrhoea, Typhoid,* Blood pressure and Diabetes are recorded high in number and followed by *Tuberculosis, Kidney diseases, Heart attack & Cardiac arrest and Accidents*. In Jangaon, Malkapur, Jangalapalle, Bestaplli, Dubbapalli and NTPC areas recorded with more number then compared to other villages in the study area.

The increase in number of cases could be due to rise in population, increase in vehicular traffic and due to the nearby industries. The area is basically developed which is part of Ramagundam Municipality and very close to NTPC Super Critical Thermal power plant and 4 to 5 km away from TS Genco Thermal plant, Fertilizer Corporation of India (Under construction) and the Singareni Collieries Company limited underground and opencast coal mines.

For studying the integrated socio economic profile and Quality of Life 2001 and 2011 census data is compared. The table showing the study area amenities in 2001 and 2011 are given in Table No.2.

Table No.2 Study area amenities as per census

Education	**2001**	**2011**
Primary School	89	140
Middle School	45	153
Secondary School	14	101
Arts and Science Degree College	3	7
Engineering college	0	1
Health		
Hospitals Allopathic	2	2
Community Health Centre	2	2
Primary Health Sub Centre	14	15
Non Government Medical facilities	27	40
Non Government Medical facilities	3	134
Facility	**Coverage in %**	
Post Office	55	18
Mobile Phone Coverage	11	100
Public Bus Service	75	84
Black Topped (pucca) Road	83	100
Commercial Banks	11	11
Cooperative Banks	0	8
Agricultural Credit Societies	13	8
Self - Help Group	50	100

From the above table it is evident that QOL is better in 2011 than 2001. The basic amenities that showed vast improvement in 2011 from 2001 are given below:

- Transport facility
- Mobile communication
- Self-Help groups and postal services
- Primary and Secondary education
- Education infrastructure due to development activities in the nearby areas
- Private hospitals and medicine shops are increased in large number

The amenities that need to be improved are:

- College and professional education facilities
- Improvement in government hospitals

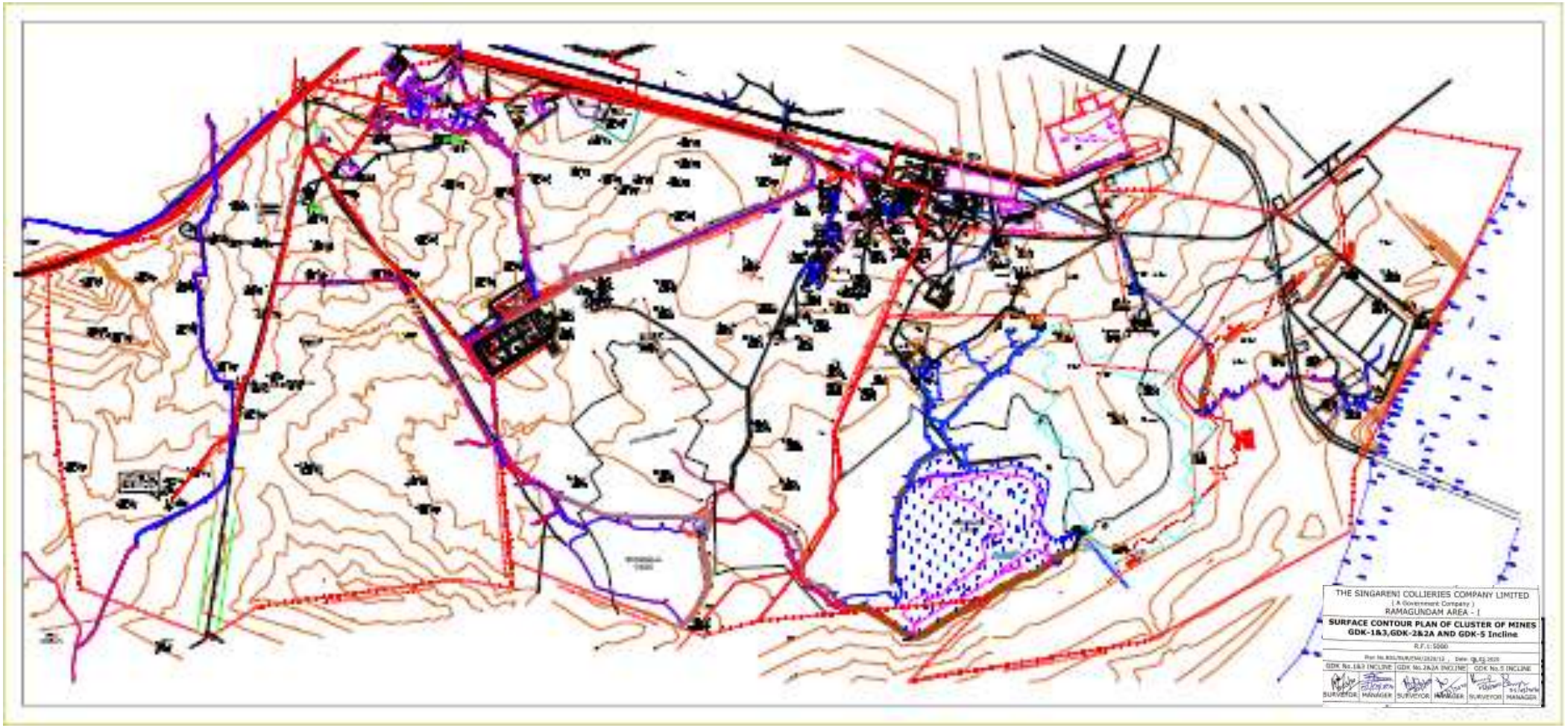
Apart from this Health and medical amenities were adequate as most of the villages were covered by the Rural Medical Practitioners (RMPs) and within the study area 2 PHC, 4 Urban PHC, One Area Hospital and more than 20 private hospitals are available.

While the average QOL for all the sample households in village wise found to be 5.7, which is fair. It is highest in GDK Vittalnagar (6.8) which is having basic amenities like RWS, Road with RTC bus, autos and Post office.

4. Submission of surface contour plan and water danger plan as approved by DGMS.

Surface contour plan and water danger plan was submitted to the DGMS as per the Regulation No.149/126 (Dangers from surface water) of The Coal Mines Regulation 2017 / 1957 at the time of obtaining permissions for working of the mine. All the precautions against the danger from surface water are being taken and the same is being monitored by the DGMS during the pre monsoon inspections. Surface contour plan, water management plan and water danger plan which were submitted to DGMS are enclosed here under.

Contour plan of Cluster of Godavarikhani No.1&3 , No2&2A and No.5 Incline



WATER MANAGEMENT PLAN

DANGER FROM SURFACE WATER:

1) HFL OF GODAVARI RIVER :

S. No.	Source of Danger	Anticipated Danger	Existing Controls	Monitoring
1	Workings below HFL of Godavari River	Entry of water in to the underground workings through entrances of Main Incline, Manway Dip of 1 Incline, 1A Incline, 3 Incline section, 3A incline and Air shaft	a) **Reduced Levels of *River Godavari (HFL)* : 837.167m** i. Gdk 1 Main Incline : 852.885m (+15) ii. Gdk 1 Manway Incline : 852.525m (+15) iii. Gdk 3 Main Incline : 852.413m (+15) iv. Gdk 3 Manway Incline : 850.008m (+12) v. Gdk 2 Main Incline : 858.217m (+21) vi. Gdk 2 Manway Incline : 857.110m (+20) vii. Gdk 2A Main Incline : 851.210m (+14) viii. Gdk 2AManway Incline : 850.520m (+13) ix. Gdk 5 Main Incline : 854.000m (+16) x. Gdk 5 Manway Incline : 854.830m (+17) xi. Bore holes surface at No.1 Stowing bunker : 840.197m (+3) xii. No.2 Stowing bunker : 845.000m (+7) xiii. Air Shaft(1 & 3 Incline : 845.674m (+7) xiv. Air Shaft(2 & 2A Incline : 844.270m (+7) xv. Air Shaft(5 Incline) : 856.690m (+7) * All the entries are more than 3m above the HFL of Godavari river ie.837.167m as observed on 20/10/1995. **b)** Float alarm is fixed at Godavari River bank and constantly maintained. **Warning level : 830m RL** **Danger level : 832m RL** **Withdrawal level : 834m RL**	a) Shift under manager will monitor the water level of Godavari River. b) To monitor the water levels, persons are posted on the river bank in all the 3 shifts and provided with Cell Phone (No. 9491144250) with a directive to monitor the levels and inform MWC, Safety Officer, Manager of Gdk.1&3 Incline and Agent at frequent intervals as per letter No. RG.I/GDK1&3/G-19/18/1904, Dt:31.05.2018 c) A continuous liaison is being maintained by safety officer with the authorities of Kaddam, Sriram Sagar, Yellampalli Reservoirs in case of releasing of water from the above Reservoirs.

2) JANAGAON TANK

S. No	Source of Danger	Anticipated Danger	Existing Controls	Monitoring
1	Janagaon Tank East dip side	Entry of water to underground workings through cracks	a) Depth of cover varies from 130m to 380m b) Panels are being worked by hydraulic Stowing method under Janagaon tank. c) Continuous monitoring of water level at 1D/52L sump in No.4Seam. The normal water level is being monitored at 473m RL. If the water level exceeds abnormally above 473m RL, water leakage from surface may be suspected. If water from the surface enters into mine through cracks it enters to 1 seam. From 1seam through interseam boreholes water will go to 2 seam and then to 3 seam through interseam bore holes at 15D/53L/3S. From there, the water will come to 4 seam 1D/52L sump through interseam boreholes. Two 190HP & two 125 HP pumps are installed at 1D/52L, BD/52L & 2D/52L in 4seam. Pumping capacity is 1600 GPM. One 350 HP & One 240 HP pump is installed at 48LN/1D/4seam sump. Pumping capacity is 600 GPM. 4nos 240 HP pumps are installed at 37LN/1D/4seam sump. (**Make of water** : 900 GPM Water for drinking + compressors : 100 GPM Stowing water: : 300 GPM Total water : : 1300 GPM Total pumping capacity to surface is 1800GPM).	1) Shift Overmen and Shift Under Manager will monitor for abnormal seepage of water if any. 2) Pump Operators posted in three shifts at 1D/52L sump will inform the concerned Shift Overmen/Shift incharge/ Engineer / Manager if any abnormal increase of water is noticed. 3) Pumping Engineer and Pit Engineer shall monitor water level in sumps and pumps working status.

3) SUBSIDENCE AREAS:

S. No	Source of Danger	Anticipated Danger	Existing Controls	Monitoring
1	Subsidence Areas	Water may enter through subsidence areas, due to accumulation of water at Panel No. 3S/5, 3S/6, 3S/3B, 3S/6F, 4S/5, 4S/6, 4S/3B, 4S/6F, 2S-22	a) Some of the areas were effectively dozed and compacted. In part of the area sand stocking arrangements to a height of 1m were made. b) To monitor the flow of water, underground galleries were provided with V-notches and are being monitored regularly. If any water enters to underground through these subsidence areas, the water from 1A section will go into 37LN/1D/4seam sump, where pump operators are constantly posted in three shifts. Water which may enter in 4S/9 & 4S/13 panels will enter 4S/18 panel through water seals of 4S/13 panel. It is collected at 54L and drained to 1D/53L sump. i) About 80,000m^3 of ash was dumped over these subsidence areas. ii) 5.81 lakh m^3 of OB was dumped over the above areas.	1) Manager will inspect once in 15days during rainy season. Manager and Sr. Officers will inspect immediately after heavy rains. 2) The surface areas in and around the Panels have to be inspected by Sr.Survey Officer & Safety Officer during rainy season and immediately after heavy rain, if any. 3) In the absence of SO, Sri Sudir kumar Jha, Asst. Manager will inspect the above areas. 4) The stoppings from 7LN/NCD/1A to 35LN/ NCD/1A will be inspected by Sri P. Sharath, MS/SF(Acting Overman) once in a week, who will monitor the water coming out of the V-notches. 5) Water flowing from the water seals provided at 15LN/NCD/1A, 24LN/ NCD/1A at any time shall not exceed 50GPM of water through the V-Notches provided at the seals. 6) V-notches in No.3seam shall be monitored by Sri P.Kamalakar Rao, HOM and in No.4seam by Sri P.Sharath, SF/MS(Acting Overman). 7) The Pump operators are apprised to that effect that they shall inform the man way clerk and concerned over man to take further precautions in case of increase of water level.

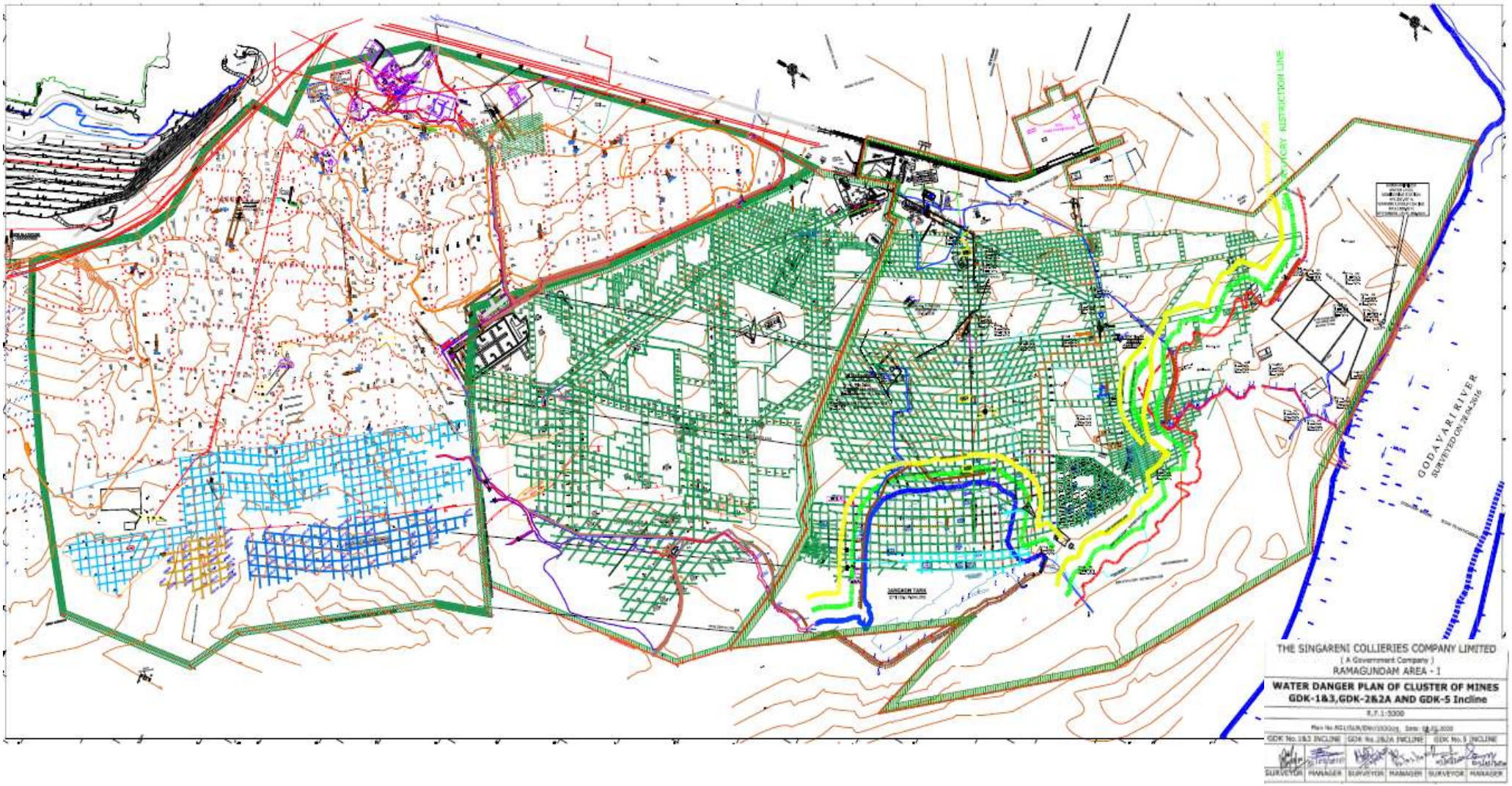
4) BOREHOLES :

S. No	Source of Danger	Anticipated Danger	Existing Controls	Monitoring
1	Boreholes drilled from surface to underground	Entry of surface water into the underground workings.	All the unused boreholes were plugged.	All the plugged bore holes are being monitored by Sri Y.Hanumandlu Surveyor once at least in 15 days and or after heavy rain during the rainy season for their effective sealing.

5) NALLAHS :

S. No	Source of Danger	Anticipated Danger	Existing Controls	Monitoring
1	i) Surface drainage leading from Gdk.No.2A incline filter bed to Janagaon Tank ii) Surface drainage from Gdk.No.1 incline filter bed towards stowing plant No1. iii) Surface drainage from water storage tank of stowing plant No.2.	No danger is anticipated.	I) Underground workings are at a depth of 143Mtr beneath. The nallah was diverted flowing over the depillared Panels of 1Seam to prevent water seepage. ii) Small drain, hence no danger is anticipated. However diversion and construction with cement has been done. iii) It is diverted along the barrier of depillared panels at GDK 3 section.	The drainage system, surface water bodies, subsidence areas and surface areas over goaved out panels shall be inspected by Sri P.Kamalakar Rao, HOM as per Regulation No.149(9) of the CMR-2017. Sr.Survey Officer Sri Y.Hanmandlu, Safety Officer Sri P.Srinvasa Rao, and VO, K.Rajeswara Rao, will inspect during the rainy season and immediately after heavy rain for any blockages in the drains.

Water Danger plan of Cluster of Godavarikhani No.1&3 , No2&2A and No.5 Incline



5. Submission of land use details pre and present and post mining for entire land 1356.85 Ha with LULC comparison as interpreted through Satellite imagery.

The total project area of cluster of Godavarikhani 1&3, 2&2A & 5 Incline mines is 1356.85 ha. The Land use land cover of 1993 and 2019 is compared with satellite imagery procured for Kharif and Rabi seasons from National Remote Sensing Data Center (NDC),NRSC. The satellite imagery for kharif and rabi season is shown in Figure No.1, 2 and Map showing LULC classification is shown in Figure No.3.

Figure No.1 Satellite Imagery of Kharif Season

Pre-Mining – 1993 **Present Mining – 2009**

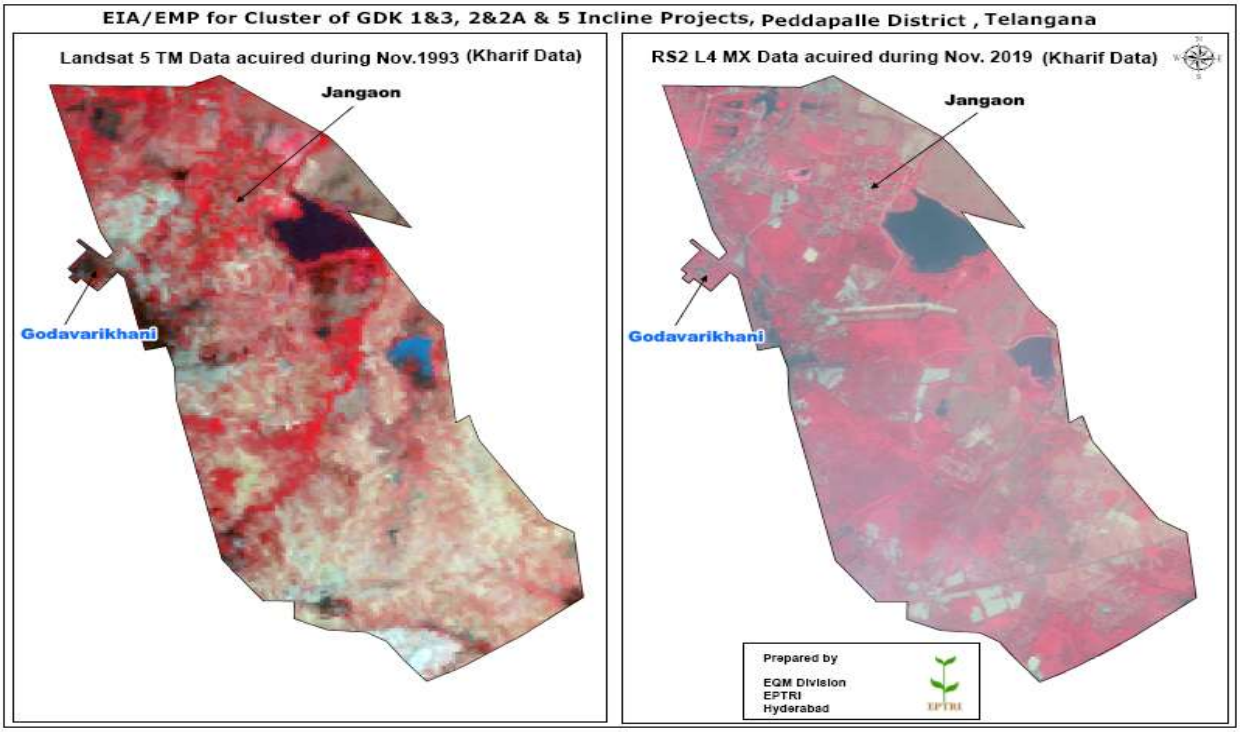


Figure No.2 Satellite Imagery of Rabi Season

Pre-Mining – 1993 **Present Mining – 2009**

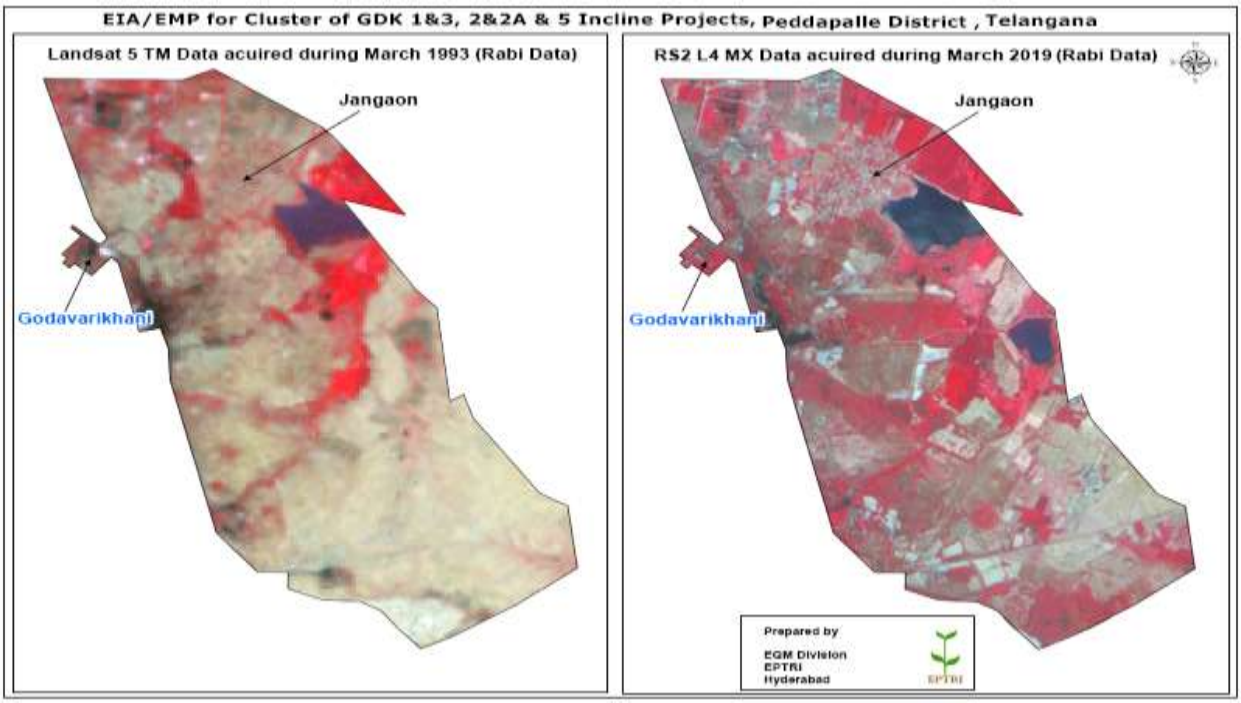
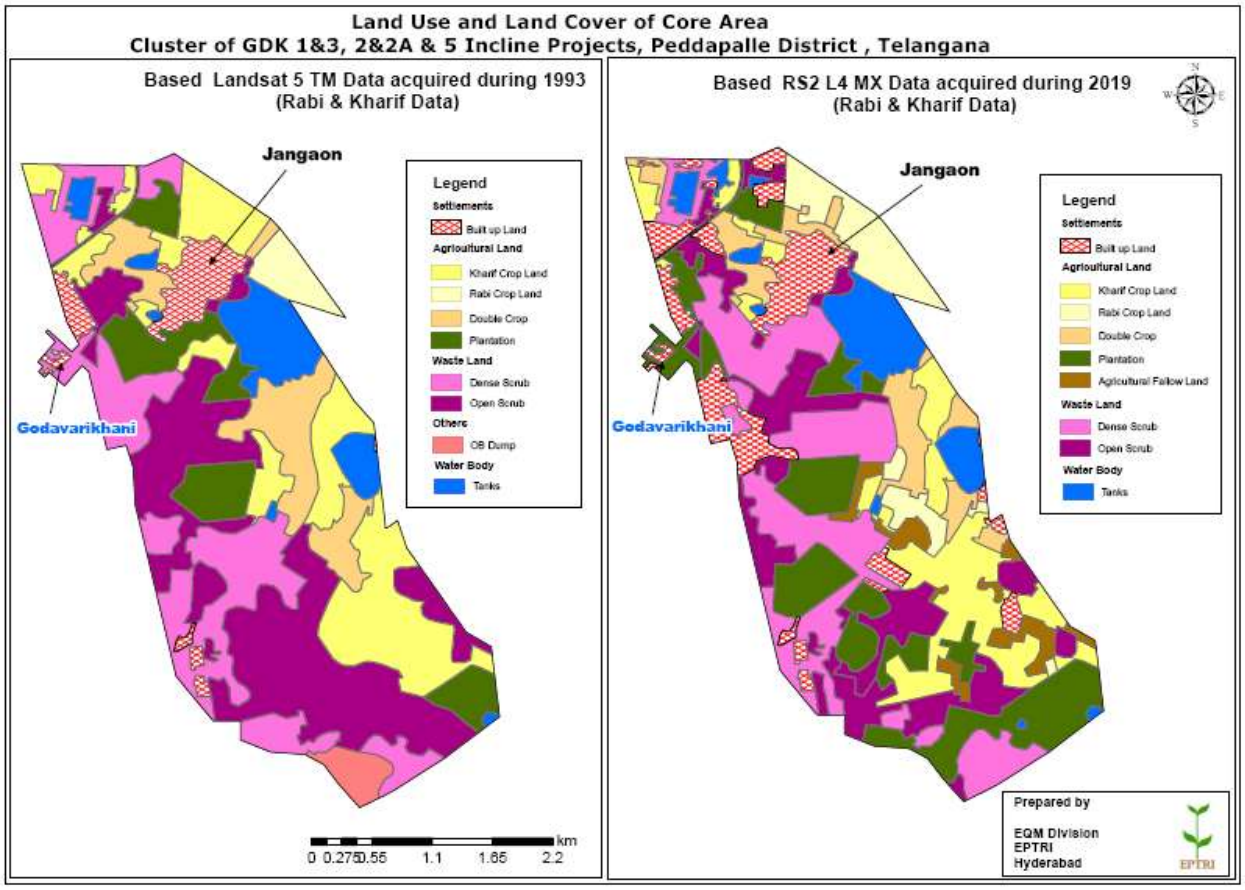


Figure No.3 Map showing LULC classification

Pre-Mining – 1993 **Present Mining – 2009**



Interpretation of Land use land cover map

The landuse land cover classification of 1993 and 2019 during kharif and rabi seasons is given in Table No.1 and 2. The comparison of LULC classification with interpretation is given in Table No.3. The map showing the LULC classification for Rabi and Kharif season is shown in Figure No.3.

Table No.1 Landuse classification of 1993

S.No	LULC Class Name	Area in ha	% of area
1	Built up land	62.56	4.61
2	Kharif crop	294.16	21.68
3	Rabi crop	29.94	2.21
4	Double crop	122.55	9.03
5	Agricultural plantation	120.02	8.85
6	Dense scrub	243.77	17.97
7	Open scrub	369.90	27.26
8	OB dump	22.86	1.68
9	Water body	91.09	6.71

Table No.2 Landuse classification of 2019

S.No	LULC Class Name	Area in ha	% of area
1	Built up land	134.49	9.91
2	Kharif crop	212.03	15.63
3	Rabi crop	87.63	6.46
4	Double crop	90.09	6.64
5	Plantation	237.05	17.47
6	Agricultural Fallow land	42.03	3.10
7	Dense scrub	255.56	18.83
8	Open scrub	201.35	14.84
9	Water body	96.62	7.12

Table No.3 Comparison of 1993 and 2019 landuse classification

S.No	LULC Class Name	% of area during 1993	% of area during 2019	Difference in Area in % (1993-2019)
1	Built up Land	4.61	9.91	**5.30**
2	Kharif Crop Land	21.68	15.63	**-6.05**
3	Rabi Crop Land	2.21	6.46	**4.25**
4	Double Crop	9.03	6.64	**-2.39**
5	Agricultural Plantation	8.85	17.47	**8.62**
6	Agricultural Fallow Land	0	3.10	**3.10**
7	Dense Scrub	17.97	18.83	**0.87**
8	Open Scrub	27.26	14.84	**-12.42**
9	OB Dump	1.68	0.00	**-1.68**
10	Water Body	6.71	7.12	**0.41**

Conclusion:

Based on the interpretation of 1993 data, in the southern part of the core area an OB dump of 22.86 ha and the same area is found to be developed with a plantation. Based on the broad interpretation of temporal data of 1993 and 2019 it is observed that:

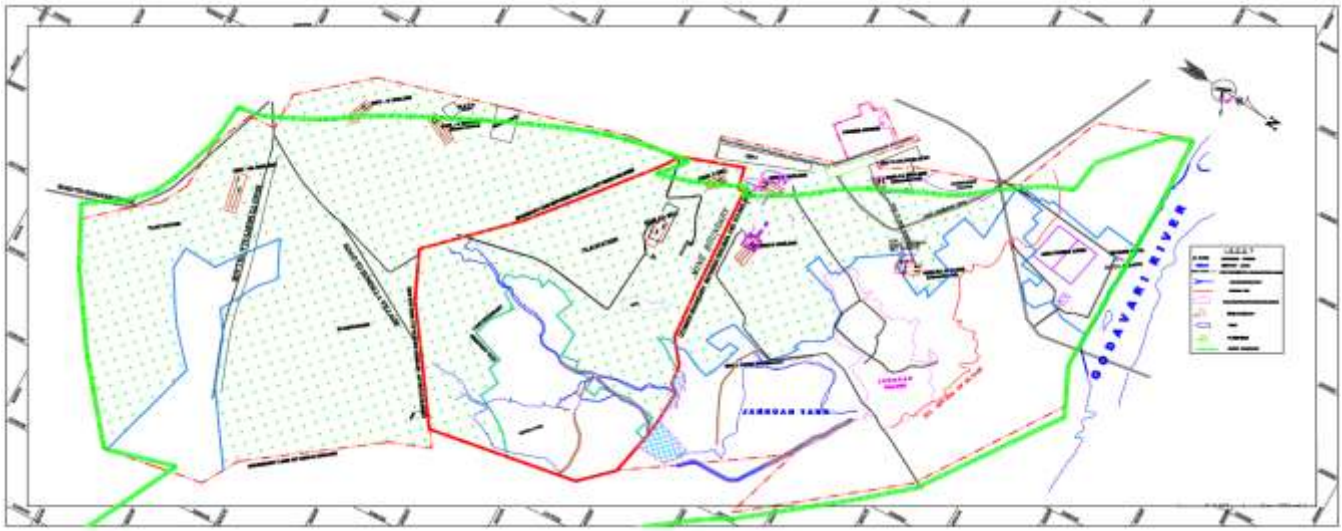
- Builtup area increased by 5.30%
- Kharif crop reduced by 6.05%
- Rabi crop has increased by 4.25%
- Double crop reduced by 2.39%
- Agricultural plantation increased by 8.63%
- Agricultural fallow land is increased to 3.10%
- Dense scrub increased by 0.87%
- Open scrub reduced by 12.42%
- Water body increased by 0.41%

There is overall increase in agricultural lands.

Post Mining Land Use Details

Land use	Proposed land use at the mine closure stage in ha.			
	GDK 1&3	*GDK 2&2A*	*GDK 5*	*Total*
Existing Plantation	82.00	118.00	315.00	515.00
Plantation proposed after closure	79.06	71.81	106.88	257.75
Sub-total	***161.06***	***189.81***	***421.88***	**772.75**
Other areas like roads, infrastructure, etc., left for public use.	*34.48*	*12.16*	*24.01*	70.65
Undisturbed land not acquired	*346.12*	*80.79*	*86.54*	513.45
Total	**541.66**	**282.76**	**532.43**	**1356.85**

Post Mining Land Use Plan



6. Distance of Sivaram Wildlife Sanctuary from boundary of cluster of mine and the certification if it is around 10 kms from core zone boundary.

Sivaram Wildlife Sanctuary is 11.20 km away from Northeast side mine boundary of GDK 5 incline. Letter and plan certifying the same by the DFO Peddapalli is enclosed here under.

GOVERNMENT OF TELANGANA
FOREST DEPARTMENT

From
Sri M. Ravi Prasad.,S.F.S.,
District Forest Officer
Peddapally

To
The Advisor (Forestry),
The S.C.Co.Ltd.,
Singareni Bhavan,
Hyderabad, Telangana

Rc. No. 242/2013/S4 Dated: 06-02-2020.

Sir,

Sub:- Request for confirming the distance of "Cluster of Godavarikhani No.1&3 Inclines, Godavarikhani No.2&2A Inclines and Godavarikhani No.5 Incline" from Siwaram Wild Life Sanctuary- Report Submission - Reg.

Ref:- From the Advisor SCCL, Hyderabad Lr.No.ADF/HYD/ SCCL/NUA-3, dt. 22.01.2020.

**

With reference to the subject cited above, it is submitted that, vide ref cited the Advisor SCCL, Hyderabad has requested to furnish the distance of "Cluster of Godavarikhani No.1&3 Inclines, Godavarikhani No.2&2A Inclines and Godavarikhani No.5 Incline" from Siwaram Wild Life Sanctuary.

In this connection it is submitted that, it is to certify that as per the coordinates submitted by SCCL of the mines Godavarikhani No.1&3 Inclines, Godavarikhani No.2&2A Inclines and Godavarikhani No.5 Incline, the distance of Siwaram Wild Life Sanctuary from the above group of mines is **11.2 KMs only**.

This is submitted for favour of kind information and necessary action.

Yours faithfully,

Encl:- Map showing the distance to the

District Forest Officer,
Peddapally District

Plan Certified by District Forest Officer

7. Compliance of earlier ground Water Clearance issued on 18.02.2014. Submit the 3D ground water modelling studies and the impact due to pumping of ground water from these mines based on modelling.

S.No.	Condition	Compliance
1	The water should be treated to control SO4 concentration before supplying to the people. For which water treatment plants to be established.	Mines water is being treated in RO plants before supplying to the employees working in the mines. The mine water is not being used for drinking purpose and further Establishing RO water treatment plants in the surrounding 5 villages is in process and will be completed within 6 months.
2	The Artificial recharge structures like roof top harvesting structures has to be taken up in the area for groundwater recharge as well as for dilution of groundwater salinity in non-command area. The locations of artificial recharge structures are marked on toposheet and depicted in Map-3. The locations of artificial recharge structures like Roof top harvesting structures are as follows: (1). Sharadanagar colony (2).NTPC Township (3). NTPC power plant (4). Pothana colony (5). Sector Colony- I (6). Sector Colony- II (7). Sector colony- III (8). Bangalaw area (9). Centenary Colony etc.	**Complied** About 112 rain water harvesting pits of 10.125 M^3 capacities were constructed in and around the Ramagundam group of mines. The detailed co-ordinates are furnished in **Annexure-I**. Roof top harvesting structures will be established very soon.
3	In the SRSP command area part of the study area water logged conditions are prevailing eg: Rompikunta village of Kamanpur mandal. Here conjunctive use of Groundwater to be encouraged for prevention of groundwater salinity.	Conjunctive use of Groundwater is being encouraged for prevention of groundwater salinity.
4	The SCCL has to regularly monitor the water levels and water quality from the observation wells and piezometers established by them. The above data has to furnish periodically to the Ground Water Department, Karimnagar, so as to assess the effects of coal mining on groundwater regime.	**Complied:** Attitude of Phreatic/ piezometric levels are being monitored in 57 phreatic surfaces/39 piezometric wells in four times a year (seasonally, i.e winter, Pre-monsoon, monsoon and post-monsoon). The compliance report is submitted on half yearly basis to the Ground water Department, Peddapalli. **(Annexure-II).**

Annexure-I

Location of the Rain water harvesting pits

S. No.	Village Name	Address	Location
1	Penchikalpet	Eruguralla Madhanaiah	18° 41’ 13.75”, 79° 30’ 35.05”
2	Penchikalpet	Vinayaka mandapam	18° 41’ 19.76”, 79° 30’ 44.60”
3	Penchikalpet	Near Nalla cheruvu	18° 41’ 42.46”, 79° 30’ 35.86”
4	Penchikalpet	Govt Primary School	18° 41’ 34.74”, 79° 30’ 41.01”
5	Penchikalpet	Reddy Colony	18° 41’ 31.70”, 79° 30’ 54.54”
6	Narsingapur	New Marudupaka	18° 41’ 20.43”, 79° 31’ 01.68”
7	New Marudupaka	Mallanna temple	18° 41’ 11.99”, 79° 30’ 46.80”
8	Siddapalli	Govt Primary School	18° 40’ 03.52”, 79° 30’ 07.57”
9	Kamanpur	Pittala Kanakaiah	18° 38’ 32.12”, 79° 29’ 56.41”
10	Kamanpur	Bapuji Nagar	18° 38’ 30.91”, 79° 30’ 04.72”

11	Kamanpur	Police station common	18° 38’ 30.44”, 79° 30’ 09.50”
12	Kamanpur	Ambedkar Nagar	18° 39’ 19.53”, 79° 30’ 14.25”
13	Kamanpur	Aadivaraha swamy temple	18° 39’ 24.76”, 79° 30’ 39.16”
14	Julapalli	Adarsh Nagar	18° 39’ 52.72”, 79° 31’ 29.98”
15	Julapalli	Opp. Kadasi Mudinaiah	18° 39’ 56.62”, 79° 31’ 04.41”
16	Julapalli	Govt Secondary School	18° 39’ 58.81”, 79° 31’ 03.01”
17	Julapalli	Sri Matha Varalamma temple	18° 39’ 38.39”, 79° 31’ 04.36”
18	Julapalli	Sri Mallikarjuna swamy temple	18° 39’ 25.46”, 79° 31’ 03.25”
19	Mulkalapalli	C/o Mancha Banaiah	18° 38’ 48.82”, 79° 32’ 32.56”
20	Dubbapalli	Govt Primary School	18° 42’ 33.70”, 79° 34’ 56.15”
21	Dubbapalli	GPS	18° 42’ 39.93”, 79° 34’ 57.52”
22	Chillapalli	GPS	18° 42’ 15.34”, 79° 35’ 16.07”
23	Chillapalli	Opp.Katkuri Ravi	18° 42’ 13.43”, 79° 35’ 19.81”
24	Chillapalli	Anganwadi kendram	18° 42’ 15.48”, 79° 35’ 16.26”
25	Chillapalli	Buddarthi Prabhakar	18° 42’ 13.64”, 79° 35’ 10.11”
26	Chillapalli	Akkepaka Bondaiah	18° 42’ 13.49”, 79° 35’ 10.74”
27	Gunjapadugu	Pochamma temple	18° 42’ 11.19”, 79° 35’ 24.65”
28	Gunjapadugu	Bhulaxmi temple	18° 42’ 09.88”, 79° 36’ 30.79”
29	Gunjapadugu	SC Colony	18° 41’ 47.83”, 79° 36’ 17.83”
30	Gunjapadugu	P Mallaiah	18° 41’ 43.52”, 79° 36’ 21.67”
31	Gunjapadugu	Govt.Secondary School	18° 41’ 18.13”, 79° 36’ 21.62”
32	Gunjapadugu	Anganwadi kendram	18° 41’ 25.79”, 79° 36’ 14.71”
33	Nagaram	Main road	18° 40’ 24.54”, 79° 36’ 39.65”
34	Nagaram	Yellamma temple	18° 40’ 32.27”, 79° 37’ 03.40”
35	Nagaram	G P S	18° 40’ 25.69”, 79° 37’ 00.64”
36	Nagaram	Hanuman temple	18° 39’ 55.80”, 79° 36’ 44.43”
37	Nagaram	PHC	18° 40’ 23.01”, 79° 36’ 58.77”
38	Kannala	RO plant	18° 39’ 42.53”, 79° 36’ 50.15”
39	Kannala	Sri Venkateswara swamy temple	18° 39’ 33.48”, 79° 36’ 42.82”
40	Kannala	Sri Venkateswara swamy temple	18° 39’ 33.69”, 79° 36’ 40.84”
41	Pandulapalli/Kannala	Govt.Secondary School	18° 39’ 58.30”, 79° 36’ 51.79”
42	Pandulapalli	P RAJAIAH	18° 40’ 12.75”, 79° 37’ 02.08”
43	Pandulapalli	CH Sudhakar	18° 39’ 47.88”, 79° 36’ 55.58”
44	Pandulapalli	Near rice mill	18° 39’ 55.03”, 79° 36’ 35.62”
45	Kamalapur	Gokul Nagar	18° 39’ 28.60”, 79° 30’ 01.83”
46	Bungalows Area	Yellandu Club premisses	18° 44’ 42.60”, 79° 29’ 56.15”
47	Bungalows Area	Yellandu Club premisses	18° 44’ 42.54”, 79° 29’ 55.92”
48	Bungalows Area	Yellandu Club premisses	18° 44’ 42.47”, 79° 29’ 55.69”
49	Bungalows Area	Yellandu Club premisses	18° 44’ 42.41”, 79° 29’ 55.46”
50	Bungalows Area	Yellandu Club premisses	18° 44’ 42.34”, 79° 29’ 55.23”
51	Bungalows Area	Yellandu Club premisses	18° 44’ 42.27”, 79° 29’ 55.01”
52	Bungalows Area	Yellandu Club premisses	18° 44’ 38.86”, 79° 29’ 58.75”
53	Bungalows Area	Near Temple	18° 44’ 57.62”, 79° 29’ 57.49”

54	Bungalows Area	Temple filter bed-Left	18° 44’ 59.42”, 79° 29’ 55.37”
55	Bungalows Area	Temple filter bed-Right	18° 44’ 59.57”, 79° 29’ 55.60”
56	Bungalows Area	Near 2nd gate, plantation	18° 45’ 10.88”, 79° 29’ 51.76”
57	Bungalows Area	Director's Bungalow	18° 44’ 49.14”, 79° 30’ 02.84”
58	Bungalows Area	Between Security gates 1&2-Road Left side	18° 45’ 29.30”, 79° 29’ 52.63”
59	Bungalows Area	Between Security gates 1&2-Road Right side	18° 45’ 28.77”, 79° 29’ 51.96”
60	Ratnapur	Ramnagar	18° 37’ 48.90”, 79° 32’ 35.94”
61	Ratnapur	Ramnagar	18° 37’ 49.03”, 79° 32’ 30.21”
62	Ratnapur	SC Colony	18° 37’ 24.77”, 79° 33’ 16.02”
63	Ratnapur	Renuka Yellamma Temple	18° 37’ 43.87”, 79° 33’ 20.01”
64	Ratnapur	Govt.Upper Primary School	18° 37’ 53.64”, 79° 33’ 15.00”
65	Ratnapur	Govt.Secondary School	18° 37’ 54.51”, 79° 33’ 13.84”
66	Ratnapur	Rice mill	18° 38’ 02.67”, 79°33’ 16.02”
67	Nagepalli	Govt. High School	18° 37’ 43.84”, 79° 33’ 49.81”
68	Nagepalli	Anganwadu kendram	18° 37’ 44.59”, 79° 33’ 53.02”
69	Nagepalli	Grampanchayat	18° 37’ 44.59”, 79° 33’ 46.23”
70	Nagepalli	Hanuman Nagar	18° 37’ 45.19”, 79° 33’ 45.41”
71	Nagepalli	Main Road	18° 37’ 54.00”, 79° 33’ 49.78”
72	Nagepalli	Main Road	18° 37’ 54.06”, 79° 33’ 53.60”
73	Nagepalli	Burial ground site	18° 37’ 53.88”, 79° 34’ 05.08”
74	Ladnapur	Grampanchayat	18° 37’ 49.39”, 79° 34’ 39.83”
75	Adivarampet	SC Colony	18° 37’ 26.78”, 79° 34’ 31.21”
76	Adivarampet	OH Tank	18° 37’ 25.27”, 79° 34’ 34.69”
77	Aadivarampet	Sange Parvathalu	18° 37’ 37.85”, 79° 36’ 76.72”
78	Aadivarampet	Jagari Komuraiah	18° 37’ 32.53”, 79° 36’ 05.87”
79	Adivarampeta	GPS, Opp RO Plant, 4 th Ward	18° 37’ 30.84”, 79° 34’ 16.68”
80	Adivarampeta	Near OHT, SC Colony	18° 37’ 25.20”, 79° 34’ 33.94”
81	Rajapur	Menthi Mogilaiah, SC Colony	18° 37’ 39.04”, 79° 35’ 10.69”
82	Rajapur	Sangi Odelu, SC Colony	18° 37’ 36.42”, 79° 35’ 8.75”
83	Rajapur	R Venkateswar Rao	18° 37’ 53.37”, 79° 35’ 16.13”
84	Rajapur	Anganwadikendram	18° 37’ 45.06”, 79° 36’ 13.51”
85	Rajapur	SC Colony	18° 37’ 41.72”, 79° 36’ 12.31”
86	Ramaiahpalli/ Budavarampeta	Chinna Mallaiah	18° 37’ 48.43”, 79° 36’ 28.53”
87	Ramaiahpalli/ Budavarampeta	Anganwadi kendram	18° 37’ 41.23”, 79° 36’ 25.21”
88	Ramaiahpalli/ Budavarampeta	ZPHS	18° 37’ 34.84”, 79° 36’ 28.97”
89	Sector-II, RG-I	Front of Qtr No. A-17	18° 44’ 00.08”, 79° 31’ 18.31”
90	Sector-II, RG-I	Transit Guest house	18° 43’ 56.29”, 79° 31’ 21.37”
91	Sector-II, RG-I	Q.No C-39/ Civil office	18° 44’ 01.17”, 79° 31’ 17.40”
92	Sector-II, RG-I	Dispensary, Vitalnagar	18° 44’ 07.61”, 79° 31’ 08.74”
93	Sector-II, RG-I	TS Minarity Urdu School	18° 44’ 26.35”, 79° 30’ 40.86”
94	Sector-II, RG-I	TS Minarity Urdu School	18° 44’ 24.68”, 79° 30’ 41.19”

95	Sector-II, RG-I	Singareni Main Hospital	18° 44’ 40.11”, 79° 31’ 08.24”
96	Sector-II, RG-I	Singareni Main Hospital	18° 44’ 40.56”, 79° 31’ 12.09”
97	Sector-II, RG-I	CRO Club	18° 44’ 30.14”, 79° 31’ 16.97”
98	Sector-II, RG-I	Sai baba Temple	18° 45’27.68”, 79° 30’ 54.24”
99	Sector-II, RG-I	Singareni High School	18° 45’ 23.63”, 79° 30’ 52.28”
100	Sector-II, RG-I	Singareni High School	18° 45’ 26.40”, 79° 30’ 50.87”
101	Sector-II, RG-I	TS Mitionary High School	18° 44’ 23.36”, 79° 30’ 38.80”
102	Godavarikhani	Saint paul high school, location no. 01	18° 45’ 24.91”, 79° 30’38.73”
103	Godavarikhani	Saint paul high school, location no. 02	18° 45’ 25.08”, 79° 30’38.89”
104	Godavarikhani	Saint paul high school, location no. 03	18° 45’ 25.24”, 79° 30’39.06”
105	Godavarikhani	Saint paul high school, location no. 04	18° 45’ 25.41”, 79° 30’39.22”
106	Godavarikhani	Saint paul high school, location no. 05	18° 45’ 25.58”, 79° 30’39.39”
107	Pannuru	Opp. MRO Office	18° 38’ 15.71”, 79° 33’ 01.87”
108	Pannuru	Road to Manthani	18° 38’ 04.91”, 79° 33’ 10.74”
109	Pannuru	Govt.Primary School	18° 38’ 20.38”, 79° 33’ 07.35”
110	Pannuru	Hanuman Temple	18° 38’ 15.84”, 79° 33’ 05.14”
111	Pannuru	Q.No. BCH-15	18° 38’ 15.08”, 79° 33’ 03.64”
112	Centinary colony	Behind Q.No. NC-79	18° 38’ 06.43”, 79° 33’ 07.16”

Annexure-II

Well No.	Name of village	Location	Owner’s name	Type of well	Dimensions (m)	Total depth (m)	MP (m)	DTW (m) Post-monsoon‘19
1	Jangaon	Village centre, 18º46'18", 79º31'32"	Mende Mallesh Advocate	DW	1.00	9.00	0.60	2.54
2	Jangaon	Village centre, 18º46'21", 79º31'37"	Nukala Tirupathi	DW	2.00	10.00	0.55	2.46
3	Jangaon	Near tank, 18º46'16", 79º31'43"	Chukka Rajaiah	DW	1.00	10.00	0.60	0.95
4	Jangaon	Siva temple, 18º46'21", 79º31'48"	Temple	DW	2.20	11.50	0.50	3.20
5	Jangaon	SC colony, 18º46'25", 79º31'45"	Govt. Well	DW	2.00	9.00	0.40	1.65
6	Sondila	Road side, 18º45'42", 79º32'60"	Chada Ravinder Reddy	DW	1.00	10.50	0.60	8.10
7	Gaddampalli	Road side, 18º44'10.37", 79º31'38.30"	Gaddam Venkati	DW	1.30	9.50	0.30	4.32
8	Narsimhulapalli	End of village, 18º44'59", 79º33'37"	Govt.well	DW	2.00	11.00	0.60	7.22
9	Mustyala	End of village, 18º44'6", 79º34'20"	Goshika. Chandraiah	DW	1.50	11.00	0.50	2.77
11	Chandanapur	S.C. Colony, 18º42'52", 79º34'31"	Dasari shankar	DW	1.00	10.00	0.75	2.80

12	Singa Reddypalli	18º43'18.92", 79º34'26.41"	Kattta Bhumaiah	DW	1.50	9.30	0.65	2.45
13	Chandanapur	Opp. Primary School, 18º43'14", 79º35'11"	Saparapu Rajaiah/*Nalluri Shankar	DW	1.30	9.50	0.40	4.95
14	Dubbapalli	Village centre, 18º42'32", 79º34'53"	Voravelli Naryana Rao	DW	3.00	10.00	0.55	4.35
15	Gunjapadugu	Road side, 18º41'32", 79º36'19"	Sadula Rajalingu S/o. Ramaiah	DW	2.50	8.85	0.40	3.32
17	Pandula palli	Road side, 18º40'00", 79º36'55"	Govt.well / *Kunaram Kanakaiah	DW	0.90	10.60	0.45	2.32
18	Pandula palli	Road side, 18º39'59", 79º36'55"	Botla Rajam	DW	1.00	9.30	0.25	4.52
19	Kannala	Kanda Pochaiah, 18º39'56", 79º36'37"	Talla Narsaiah /*Govt.well	DW	2.00	10.10	0.60	4.82
20	Rachhapalli	18º39'33", 79º36'04"	Govt. well	DW	2.00	6.30	0.50	4.22
21	Adriyala	Old Panchyat office, 18º39'24", 79º35'27"	Rampalli Rajaiah	DW	1.00	8.35	0.50	3.40
22	Akkapalli	Village centre, 18º38'60", 79º36'15"	Govt.well	DW	2.00	6.28	0.45	2.45
23	Vempadu	End of the village 18º39'08", 79º36'36"	Chiluveru. Rajaiah	DW	1.00	6.50	0.45	1.66
24	Vempadu	Road side 18º39'08", 79º36'44"	Govt.well	DW	2.00	6.80	0.50	1.50
25	Ladnapur	Road side, 18º37'50", 79º34'41"	Vannampalli Raju	DW	1.50	9.25	0.60	4.45
26	Ladnapur	Road side, 18º37'49", 79º34'28"	Thati laxmamma	DW	1.50	8.30	0.45	2.94
28	Pannuru	Village center, 18º38'16.310", 79º33'10.407"	Thotla Kumaraswamy	DW	1.00	8.60	0.40	4.95
29	Mulkalpalli	In Village centre, 18º38'49", 79º32'23"	Gajula chinnaiah	DW	1.00	9.50	0.60	3.75
30	Mulkalpalli	Adjecent to SCCL Colony, 18º38'35", 79º32'27"	G.Komaraiah	DW	1.00	5.00	0.60	2.50
32	Kalvacherla	Peddapalli 17km stone, 18º38'07", 79º32'02"	Odelu	DW	1.00	9.00	0.60	3.30
33	Kamanpur (old)	Opp. Theater, 18º39'44", 79º30'23"	Merugu. Chinna Lakshmaiah	DW	1.00	8.00	0.50	2.40
34	Kamanpur (old)	Road side, 18º39'41", 79º30'43"	Kovuri Rayamallu	DW	1.00	9.50	0.50	1.49
35	Julapalli	Nr transformer, 18º39'43", 79º30'53"	Sriramula lingaiah	DW	1.00	11.00	0.60	1.41

36	Adarsa Nagar	OC I Silo, 18º40'02", 79º31'25"	Durgam Gattaiah	DW	1.00	12.64	0.50	1.12
37	Alluru	Near Pochamma Temple, 18º40'51", 79º31'42"	Durgam Pocham	DW	1.00	13.50	0.50	5.52
38	Santosh Nagar (8 inc.colony)	Santhinikethan degree college, 18º41'08", 79º31'58"	Narsimha Rao.	DW	1.00	9.37	0.50	1.52
39	New Maredupaka	Near Rly. Track, 18º41'08", 79º31'06"	Sidda Rajaiah	DW	1.20	11.10	0.60	2.93
40	Veerlapalli	In Village centre, 18º42'55", 79º31'02"	Kummari Narayana/ *Penagonda Chandraiah	DW	1.25	10.00	0.50	1.17
41	K K Nagar	Behind 8Inc.Bunker, 18º41'29", 79º32'42"	Choppari. Gattaiah	DW	1.00	9.37	0.50	4.90
42	Vitalnagar (Gdk)	Near Dispensary, 18º44'11", 79º31'07"	Mysa Komaraiah	DW	1.00	7.50	0.60	1.30
44	Ganganagar, GDK	Hanuman temple, 18º46'11", 79º30'43"	Hanuman temple	DW	1.00	8.55	0.60	3.23
45	Ramagundam (Old)	Entrance of the village, 18º48'00", 79º27'17"	Bodddula Ramulu	DW	1.20	6.00	0.60	1.20
46	Lingapur	Junction of village, 18º48'07", 79º27'33"	Gaddam. Raga Gaud	DW	1.00	7.10	0.60	1.68
47	Lingapur	Adjecent to OB Dump, 18º48'07", 79º27'44"	SCCL Water Supply well	DW	6.00	9.00	0.75	3.20
48	Medapalli	S.C. Colony, 18º47'11", 79º29'06"	Alladi Narasihmulu	DW	1.00	13.00	0.40	5.77
49	Medapalli	In Village centre, 18º46'53", 79º29'04"	Mamidala Ramaiah	DW	1.20	10.00	0.50	1.86
50	Medapalli	Road side, 18º46'41", 79º28'58"	Chilakani. Venkataiah	DW	1.00	4.20	0.50	1.95
51	Narsingapur	Beside U.Primary school, 18º46'33", 79º29'17"	Govt. well	DW	2.00	7.00	0.70	1.74
52	Malkapur	In Village centre, 18º46'27", 79º29'43"	Utturi Venkatesham	DW	1.20	8.00	0.80	1.31
53	Mustyala	Middle of the village 18º44'26", 79º33'56"	Nalluri Shankar	DW	3.00	11.90	0.42	7.22
54	Nagaram	Near Bus stop, 18º40'18.961", 79º36'59.320"	Kondavena Rajakomuraiah	DW	1.75	9.00	0.45	5.82
55	Adivarampeta	Road Side, Near OC-II Store, 18º37'50.615", 79º34'22.153"	Chippa Ravi	Ag W	4.40	10.00	0.40	3.50
56	Adivarampeta	18º37'25.72", 79º34'14.70"	SCCL Water Supply Well	DW	9.35	13.00	0.50	3.82
57	Ratnapur	Begumpeta X Road, 18º37'36", 79º33'49.715"	Kamineni Rajaram, S/o Rajaiah	DW	0.75	10.00	0.40	1.40

Note: - DW: Domestic Well, Ag.W: Agriculture Well, MP: Measuring Point.

ATTITUDE OF PIEZOMETRICSURFACE IN THE BUFFER ZONE AREA

Well No.	Location	Depth (m)	Dia (m)	Measuring point	Period / Year	Depth to water (m)				
						2014	2015	2016	2017	2018
I. South side of River Godavari										
RGOCP-I						**Area: Ramagundam III**				
RGOC I-PW1	Near filterbed 18°40'4.30"N	50	0.1	0.2	Pre-	1.75	2.22	3.2	2.57	3.5
					Post-	1.57	2.26	1.69	2.2	1.72
RGOC I-PW2	Near conveyer belt	50	0.1	0.2	Pre-	8.3	8.64	9.35	8.73	8.43
					Post-	7.63	7.99	7.55	7.72	7.72
RGOC I-PW3	In UMTI 18°40'34.20"	50	0.1	0.2	Pre-	12.3	13.2	14.09	12.9	13.67
					Post-	11.6	13.7	10.41	12.2	10.27
RGOC I-PW4	In GDK 10 shaft,	50	0.1	0.2	Pre-	WD	14.8	16.03	13.9	16.17
					Post-	14.3	14.0	12.07	14.0	12.46
RGOC I-PW7	Substation 18°38'59"N,	50	0.1	0.7	Pre-	-	3.85	5.42	4.00	5.00
					Post-	-	3.65	2.40	2.85	3.19
RGOC I-PW8	OC-I Site Office,	50	0.1	0.7	Pre-	-	12.6	12.79	11.2	13.59
					Post-	-	12.1	8.78	11.2	8.25
RGOCP-II						**Area: Ramagundam III**				
RGOC II-PW4	Nr Adriyalashaft	50	0.1	0.2	Pre-	3.74	2.89	3.14	3.80	3.80
					Post-	2.84	2.72	2.45	3.07	2.03
RGOC II-CPW1	S&PC Office 18°38'35.87",	50	0.1	0.7	Pre-	-	-	-	6.11	7.02
					Post-	-	-	-	6.33	5.45
RGOC II-CPW2	Near MCC, 18°39'05.21",	50	0.1	0.7	Pre-	-	-	-	8.67	7.9
					Post-	-	-	-	7.59	6.35
RGOC II-CPW3	NrD2DchargePoint	50	0.1	0.7	Pre-	-	-	-	10.5	9.88
					Post-	-	-	-	7.47	7.87
RGOC II-CPW9	Rachapalli, 18°39'31.19",	50	0.1	0.7	Pre-	-	-	-	3.70	5.11
					Post-	-	-	-	5.58	2.55
RGOC II-CPW10	Nr L6 canal 18°38'54.52",	50	0.1	0.7	Pre-	-	-	-	7.42	9.48
					Post-	-	-	-	9.15	7.95
RGOC II-CPW11	Nr GDK-10 Fan H	50	0.1	0.7	Pre-	-	-	-	8.97	8.59
					Post-	-	-	-	8.80	7.58
ADRIYALA-LW PROJECT						**Area: Ramagundam III**				
ALP-PW-1/16	Over ALP-Pnl-I,	225	0.1	0.5	Pre-	-	-	9.63	3.80	5.06
					Post-	-	-	5.29	4.28	3.03
ALP-TW	Over ALP-Pnel-I	30	0.15	0.35	Pre-	-	-	-	6.82	8.72
					Post-	-	-	5.25	6.1	4.25
ALP-OW	Over ALP-Pnl-I	30	0.1	0.65	Pre-	-	-	-	6.86	8.82
					Post-	-	-	5.14	6.17	4.24
Alp-PzW-05/17	OverALP-Pnl-II,	150	0.10	0.50	Pre-	-	-	-	-	8.48
					Post-	-	-	-	6.86	6.23
RGOCP-III						**Area: Ramagundam II**				
RGOC III-PW1	BhndtimberYard	50	0.1	0.2	Pre-	10.6	10.8	9.45	9.13	9.12
					Post-	9.26	9.3	7.78	9.13	9.1
RGOC III-PW2	Nr Veerlapalli 18°42'55.40"	50	0.1	0.2	Pre-	6.88	WD	WD	6.34	7.52
					Post-	WD	WD	WD	4.50	5.18
RGOC III-PW3	In PothanaClny	50	0.1	0.2	Pre-	6.9	7.57	8.1	7.10	8.21
					Post-	5.23	6.62	3.5	5.95	3.03
RGOC III-PW4	In 8 incline Clny	50	0.1	0.2	Pre-	5.02	5.12	5.85	5.18	5.48
					Post-	4.09	4.06	3.13	3.67	3.85
RGOC III-PW5	Nr 11A incline	50	0.1	0.2	Pre-	20.8	24.5	30.46	25.0	27.2
					Post-	21.8	25.1	27.1	25.9	26.05

MOCP-IV										Area: Ramagundam-I
MOC-PW8	Lingapur 18°48'05"N,	50	0.1	0.7	Pre-	-	4.64	4.6	5.74	5.27
					Post-	4.02	4.04	3.27	3.87	3.9
MOC-PW9	Lingapur 18°48'02"N,	50	0.1	0.7	Pre-	-	5.33	5.54	5.45	5.6
					Post-	4.7	4.84	3.88	4.69	4.86
MOC-PW10	Lingapur 18°47'48"N,	50	0.1	0.7	Pre-	-	13.8	14.28	14	13.7
					Post-	-	12.8	11.42	12.3	12.75
JSK-PW2	18°43'39.5"N ,	7.00	0.40	0.60	Pre-	4.17	5.16	5.76	6.13	6.97
					Post-	4.56	4.65	4.24	NR	5.46
JSK-PW4	Nr Chandanapu	5.10	0.40	0.70	Pre-	3.15	3.47	3.40	3.11	2.85
					Post-	3.05	3.24	2.39	4.41	2.73

Groundwater Sampling Locations

S.No.	Sampling code	Date of sampling	Sampling Location	Latitude	Longitude
		7th quarter			
1.	GW-1	21.05.2019	Medapalli Village	N18˚47’13.6”	E79˚28’56.7”
2.	GW-2	21.05.2019	Lingapur Village	N18˚48’08.5”	E79˚27’31.4”
3.	GW-3	21.05.2019	Old Ramagundam	N18˚48’02.0”	E79˚27’12.0”
4.	GW-4	21.05.2019	Janagam village	N18˚46’21.5”	E79˚31’36.2”
5.	GW-5	21.05.2019	Sundilla village	N18˚45’32.5”	E79˚32’32.8”
6.	GW-6	21.05.2019	Dubbapalli village	N18˚26’13.0”	E79˚51’50.0”
7.	GW-7	21.05.2019	Sector-2 Township	N18˚43’52.1”	E79˚27’31.4”
8.	GW-8	21.05.2019	Peddampet village	N18˚43’03.6”	E79˚33’02.4”

Physico-Chemical, Bacteriological Characteristics of Groundwater Collected within the Study Area

Organoleptic and Physical Parameters

S.No.	Parameters	Unit	Test Method	IS: 10500 Requirement (Acceptable Limit)	IS: 10500 Permissible Limit in the absence of alternate source	RESULT(21.05.2019)			
						GW-1 (Medipalli village)	**GW-2** (Lingapur)	**GW-3** (Old Ramagundam)	**GW-4** (Janagam village)
1	Colour	Pt-co-	2120. B	5	15	<5	<5	<5	<5
2	Odour	TON	2150. B	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	pH	-	4500-H^+B	6.5 to 8.5	No relaxation	7.2	7.3	7.4	7.5
4	Taste	FTN	2160. B	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5	Turbidity	NTU	2130. B	1	5	1.9	1.5	1.2	1.8
6	Total Dissolved Solids at 180^o C	mg/L	2540. C	500	2000	1220	850	488	860

General Parameters Concerning Substances Undesirable in Excessive Amounts

S.No.	Parameters	Unit	Test Method	IS: 10500 Requirement (Acceptable Limit)	IS: 10500 Permissible Limit in the absence of alternate source	RESULT (21.05.2019)			
						GW-1 (Medipalli village)	**GW-2** (Lingapur)	**GW-3** (Old Ramagundam)	**GW-4** (Janagam village)
1.	Aluminium as Al	mg/L	3120-B	0.03	0.2	BDL	BDL	BDL	BDL
2.	Barium as Ba	mg/L	3120. B	0.7	No relaxation	0.16	0.04	0.08	0.14
3.	Boron as B	mg/L	3120-B	0.5	1.0	0.15	0.36	0.35	0.45
4.	Calcium as Ca	mg/L	3500-Ca.B	75	200	118	98	58	72
5.	Chlorides as Cl^-	mg/L	4500-Cl^-.B	250	1000	280	183	73	215
6.	Copper as Cu	mg/L	3120-B	0.05	1.5	BDL	BDL	BDL	BDL
7.	Fluoride as F^-	mg/L	4500-F^-.C	1.0	1.5	0.72	0.64	0.42	0.68

8.	Residual free chlorine	mg/L	4500-Cl^-.B	0.2	1.0	BDL	BDL	BDL	BDL
9.	Iron as Fe	mg/L	3120-B	0.3	No relaxation	0.57	0.63	0.27	0.48
10.	Magnesium as Mg	mg/L	3500-Mg.B	30	100	60	42	28	36
11.	Manganese as Mn	mg/L	3120-B	0.1	0.3	BDL	BDL	BDL	BDL
12.	Nitrates as NO_3	mg/L	4500-NO_3^-.B	45	No relaxation	***65***	36	12	24
13.	Phenolic compounds as C_6H_5OH	mg/L	5530-D	0.001	0.002	BDL	BDL	BDL	BDL
14.	Selenium as Se	mg/L	3120-B	0.01	No relaxation	BDL	BDL	BDL	BDL
15.	Silver as Ag	mg/L	3120. B	0.1	No relaxation	BDL	BDL	BDL	BDL
16.	Sulphates as SO_4^{2-}	mg/L	4500-SO_4^{2-}.E	200	400	120	96	46	97
17.	Sulfide as S^{2-}	mg/L	4500. S^2- G	-	-	BDL	BDL	BDL	BDL
18.	Total Alkalinity as $CaCO_3$	mg/L	2320. B	200	600	515	263	273	257
19.	Total Hardness as $CaCO_3$	mg/L	2340. C	200	600	545	420	260	330
20.	Zinc as Zn	mg/L	3120-B	5	15	0.07	0.11	0.17	0.16

Parameters Concerning Toxic Substances

S.No.	Parameters	Unit	Test Method	IS: 10500 Requirement (Acceptable Limit)	IS: 10500 Permissible Limit in the absence of alternate source	RESULT(21.05.2019)			
						GW-1 (Medipalli village)	GW-2 (Lingapur)	GW-3 (Old Ramagundam)	GW-4 (Janagam village)
1	Cadmium as Cd	mg/L	3120-B	0.003	No relaxation	BDL	BDL	BDL	BDL
2	Cyanide as CN-	mg/L	4500-CN^-.F	0.05	No relaxation	BDL	BDL	BDL	BDL
3	Lead as Pb	mg/L	3120-B	0.01	No relaxation	BDL	BDL	BDL	BDL
4	Mercury as Hg	µg/L	3500-Hg.B	0.001	No relaxation	BDL	BDL	BDL	BDL
5	Molybdenum as Mo	mg/L	3120. B	0.07	No relaxation	BDL	BDL	BDL	BDL
6	Nickel as Ni	mg/L	3120-B	0.02	No relaxation	BDL	BDL	BDL	BDL

7	**Pesticides:** α–BHC, β-BHC, γ-BHC, δ-BHC, o,p-DDT, p,p' –DDT, Endosulfan, β-Endosulfan, Aldrin, Dieldrin	µg/L	6630. D	Absent	0.001	ND	ND	ND	ND
	2,4-D, Carboryl (Carbonate) Malathion Methyl Parathion Anilophos, Chloropyriphos	Qualitative analysis	6630. D	Absent	0.001	ND	ND	ND	ND
8	**Polyaromatic Hydrocarbons (PAH's):**Acenaphthene,Acenaphthylene,Anthracene,B(a)A,B(a)P,B(b)F,B(k)F,Pyrene,Dibenz(a,h)anthracene,Fluoranthene,Fluorene,Indeno(1,2,3(d)Pyrene,Naphthalene,Phenanthrene, Pyrene,Methyl Naphthalene	µg/L	6440.C	--	--	ND	ND	ND	ND
9	Total Arsenic as As	mg/L	3120-B	0.01	0.05	-	-	-	BDL
10	Total Chromium as Cr	mg/L	3120-B	0.05	No relaxation	-	-	-	BDL

Bacteriological Quality of Drinking water

S.No.	Parameters	Unit	Test Method	IS: 10500 Requirement (Acceptable Limit)	IS: 10500 Permissible Limit in the absence of alternate source	RESULT(21.05.2019)			
						GW-1 (Medipalli village)	**GW-2** (Lingapur)	**GW-3** (Old Ramagundam)	**GW-4** (Janagam village)
1	*E. coli*	Presence or Absence/ 100 mL	9221 F	-	-	Absent	Absent	Absent	Absent
2	Total Coliforms	MPN/100 mL	9221A & B	-	-	<1.8	<1.8	<1.8	<1.8
3	Fecal Coliforms	MPN/100 mL	9221 E	-	-	<1.8	<1.8	<1.8	<1.8

*NTU – Nephelometric Turbidity Unit; TON – Threshold Odour Number; FTN – Flavor Threshold Number; BDL – Below Detection Limit, Detection Limit – Phenols – 0.1 mg/L; Mercury – 20 µg/L; Cyanide – 0.05 mg/L Hex. Chromium – 0.05 mg/L; Copper – 0.02 mg/L; Manganese – 0.01 mg/L; Cadmium – 0.01 mg/L; Selenium – 0.04 mg/L; Arsenic –0.04 mg/L; Lead – 0.04 mg/L; Aluminum – 0.04 mg/L; Chromium – 0.03 mg/L; Nickel – 0.03 mg/L; Residual free chlorine – 1 mg/L; Nitrites – 0.01 mg/L; Orthophosphates – 0.05 mg/L; ND-Not Detected; Detection Limit : Pesticides– 1 ppm; PAHs – 1 ppm .*Not Performed –PCBs, Trihalomethanes, Radioactive materials,Alachlor, Atrazine, Butachlor, Ethion, Monocrotoph*

Physico-Chemical, Bacteriological Characteristics of Groundwater Collected within the Study Area

Organoleptic and Physical Parameters

S.No.	Parameters	Unit	Test Method	IS: 10500 Requirement (Acceptable Limit)	IS: 10500 Permissible Limit in the absence of alternate source	RESULT(21.05.2019)			
						GW-5 (Sundilla Village)	GW-6 (Dubbapalli Village)	GW-7 (Sector-2 Township)	GW-8 (Peddampet Village)
1	Colour	Pt-co-	2120. B	5	15	<5	<5	<5	<5
2.	Odour	TON	2150. B	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3.	pH	--	4500-H^+B	6.5 to 8.5	No relaxation	7.3	6.7	6.9	7.3
4.	Taste	FTN	2160. B	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5.	Turbidity	NTU	2130. B	1	5	1.3	0.9	2.0	1.8
6.	Total Dissolved Solids at 180^o C	mg/L	2540. C	500	2000	890	340	***2420***	1180

General Parameters Concerning Substances Undesirable in Excessive Amounts

S.No.	Parameters	Unit	Test Method	IS: 10500 Requirement (Acceptable Limit)	IS: 10500 Permissible Limit in the absence of alternate source	RESULT(21.05.2019)			
						GW-5 (Sundilla Village)	GW-6 (Dubbapalli Village)	GW-7 (Sector-2 Township)	GW-8 (Peddampet Village)
1.	Aluminium as Al	mg/L	3120-B	0.03	0.2	BDL	0.04	0.04	BDL
2.	Barium as Ba	mg/L	3120. B	0.7	No relaxation	0.07	0.06	0.15	0.07
3.	Boron as B	mg/L	3120-B	0.5	1.0	0.15	0.31	0.27	0.26
4.	Calcium as Ca	mg/L	3500-Ca.B	75	200	120	46	***380***	180
5.	Chlorides as Cl^-	mg/L	4500-Cl^-.B	250	1000	240	65	***1080***	300
6.	Copper as Cu	mg/L	3120-B	0.05	1.5	BDL	BDL	BDL	BDL

7.	Fluoride as F^-	mg/L	4500-F^-.C	1.0	1.5	0.57	0.29	0.81	0.72
8.	Residual free chlorine	mg/L	4500-Cl^-.B	0.2	1.0	BDL	BDL	BDL	BDL
9.	Iron as Fe	mg/L	3120-B	0.3	No relaxation	0.29	0.48	0.24	0.27
10.	Magnesium as Mg	mg/L	3500-Mg.B	30	100	47	21	***149***	75
11.	Manganese as Mn	mg/L	3120-B	0.1	0.3	BDL	0.05	0.06	BDL
12.	Nitrates as NO_3	mg/L	4500-NO_3^-.B	45	No relaxation	20	16	*12*	34
13.	Phenolic compounds as C_6H_5OH	mg/L	5530-D	0.001	0.002	BDL	BDL	BDL	BDL
14.	Selenium as Se	mg/L	3120-B	0.01	No relaxation	BDL	BDL	BDL	BDL
15.	Silver as Ag	mg/L	3120. B	0.1	No relaxation	BDL	BDL	BDL	BDL
16.	Sulphates as SO_4^{2-}	mg/L	4500-SO_4^{2-}.E	200	400	79	38	132	99
17.	Sulfide as S^{2-}	mg/L	4500. S^{2-}- G	-	-	BDL	BDL	BDL	BDL
18.	Total Alkalinity as $CaCO_3$	mg/L	2320. B	200	600	257	110	215	215
19.	Total Hardness as $CaCO_3$	mg/L	2340. C	200	600	495	200	***1565***	***760***
20.	Zinc as Zn	mg/L	3120-B	5	15	0.08	0.51	0.10	0.05

Parameters Concerning Toxic Substances

S. No.	Parameters	Unit	Test Method	IS: 10500 Requirement (Acceptable Limit)	IS: 10500 Permissible Limit in the absence of alternate source	RESULT(21.05.2019)			
						GW-5 (Sundilla Village)	GW-6 (Dubbapalli Village)	GW-7 (Sector-2 Township)	GW-8 (Peddampet Village)
1	Cadmium as Cd	mg/L	3120-B	0.003	No relaxation	BDL	BDL	BDL	BDL
2	Cyanide as CN-	mg/L	4500-CN^-.F	0.05	No relaxation	BDL	BDL	BDL	BDL
3	Lead as Pb	mg/L	3120-B	0.01	No relaxation	BDL	BDL	BDL	BDL
4	Mercury as Hg	µg/L	3500-Hg.B	0.001	No relaxation	BDL	BDL	BDL	BDL
5	Molybdenum as Mo	mg/L	3120. B	0.07	No relaxation	BDL	BDL	BDL	BDL
6	Nickel as Ni	mg/L	3120-B	0.02	No relaxation	BDL	BDL	BDL	BDL

7	**Pesticides:** α–BHC, β-BHC, γ-BHC, δ-BHC, o,p-DDT, p,p' – DDT, Endosulfan, β-Endosulfan, Aldrin, Dieldrin	µg/L	6630. D	Absent	0.001	ND	ND	ND	ND
	2,4-D, Carboryl (Carbonate) Malathion Methyl Parathion Anilophos, Chloropyriphos	Qualitative analysis	6630. D	Absent	0.001	ND	ND	ND	ND
8	**Polyaromatic Hydrocarbons (PAH's):** Acenaphthene, Acenaphthylene,Anthracene,B(a)A,B(a)P,B(b)F,B(k)F,Pyrene,Dibenz(a,h)anthracene,Fluoranthene, Fluorene, Indeno(1,2,3(d)Pyrene, Naphthalene, Phenanthrene, Pyrene, Methyl Naphthalene	µg/L	6440.C	-	-	ND	ND	ND	ND
9	Total Arsenic as As	mg/L	3120-B	0.01	0.05	BDL	BDL	BDL	BDL
10	Total Chromium as Cr	mg/L	3120-B	0.05	No relaxation	BDL	BDL	BDL	BDL

Bacteriological Quality of Drinking Water

S.No.	Parameters	Unit	Test Method	IS: 10500 Requirement (Acceptable Limit)	IS: 10500 Permissible Limit in the absence of alternate source	RESULT(21.05.2019)			
						GW-5 (Sundilla Village)	GW-6 (Dubbapalli Village)	GW-7 (Sector-2 Township)	GW-8 (Peddampet Village)
1	*E. coli*	Presence or Absence/ 100 mL	9221 F	-	-	Absent	Absent	Absent	Absent
2	Total Coliforms	MPN/100 mL	9221 A & B	-	-	<1.8	<1.8	<1.8	<1.8
3	Fecal Coliforms	MPN/100 mL	9221 E	-	-	<1.8	<1.8	<1.8	<1.8

NTU – Nephelometric Turbidity Unit; TON – Threshold Odour Number; FTN – Flavor Threshold Number; BDL – Below Detection Limit, Detection Limit – Phenols – 0.1 mg/L; Mercury – 20 µg/L; Cyanide – 0.05 mg/L; Hex. Chromium – 0.05 mg/L; Copper – 0.02 mg/L; Manganese – 0.01 mg/L; Cadmium – 0.01 mg/L; Selenium – 0.04 mg/L; Arsenic –0.04 mg/L; Lead – 0.04 mg/L; Aluminum – 0.04 mg/L; Chromium – 0.03 mg/L; Nickel – 0.03 mg/L; Residual free chlorine – 1 mg/L; Nitrites – 0.01 mg/L; Orthophosphates – 0.05 mg/L; ND-Not Detected; Detection Limit : Pesticides– 1 ppm; PAHs – 1 ppm .

3D Model Report: 3D ground water flow model is being carried out. Calibration part is completed and validation part is in progress. The extent of work so far carried out will be presented during the EAC meeting.

8. Revised ground water clearance if obtained from concerned Authority.

Ground water clearance letter received from District ground water department is enclosed hereunder:

GOVERNMENT OF TELANGANA
GROUND WATER DEPARTMENT

From:
B.Shyamprasad Naik,
M.Sc.,
District Ground Water Officer,
Ground Water Department,
PEDDAPALLI.

To
The General Manager,
The Singareni Collieries
Company limited,
Ramagundam- 1 Area

Letter No. 128/SCCL/2019, Dated:22.02.2020.

Sir,

Sub:- Ground Water Department Peddapalli – Ground Water Clearance for the proposed GDK 1&3,2&2A and 5 incline coalmining project in Ramagundam Area Peddapally Dist - Report Approved- communication – Regarding.

Ref:- 1. Lr.No.RG.I /ENV/03 General manager Ramagundam area ,Peddapally District. Dated:22.06.2019.
2. Director Ground Water Dept., Hyderabad Memo. No. 2182/HgII/2018 Dt : 20.02.2020.

-oooOooo-

Anent to the reference and subject cited above, I am to Inform that, the report of Proposed GDK 1&3,2&2A and 5 incline coalmining project in Ramagundam Area, Peddapally District has been Approved by the Director (HOD) Ground water Department Hyderabad

Hence, The same is communicated for information and further necessary action

Encl: Report

Yours faithfully,

SPNaik 22/02/2020

DISTRICT GROUND WATER OFFICER
GROUND WATER DEPARTMENT
PEDDAPALLI

9. Protective measures taken against inundation as approved by DGMS since the river Godavari is flowing adjacent to the mining lease area.

Regulation No.149 of The Coal Mines Regulations, 2017 stipulates the following measures to be taken against danger from surface water:

CMR No-149: Danger from Surface water (reads as follows)

(1) Where any mine or part thereof is so situated that there is any danger of inrush of surface water into the mine or part, adequate protection against such inrush shall be provided and maintained, and whether such protection is adequate or not may be determined by the Chief Inspector, whose decision shall be final.

(2) Except with the previous permission of the Chief Inspector in writing and subject to such conditions as he may specify therein and subject to the provisions of sub-regulation (1), every entrance into a mine shall be so designed, constructed and maintained that its lowest point (which means the point at which a body of rising water on surface can enter the mine) shall be not less than 1.5 meters above the highest flood level at that point.

(3) Every year, during the rains constant watch shall be kept on the flood levels on the surface of the mine and if at any time the levels cross the highest levels earlier recorded, such levels shall be marked by permanent posts along the edges of water and the new highest levels thus observed shall be recorded with the date as the highest flood level on the plans by an actual survey: Provided that the highest flood level shall not be plotted on plans by interpolations.

(4) If there are water dams or reservoirs built across rivers and water courses on the upstream side of the mine, arrangements shall be made for communication between appropriate authorities for the purpose of ascertaining the quantity and timing of water released from the dams which is likely to endanger safety of the mine and arrangement for similar communication shall be made when water level rises on the upstream side which is likely to endanger any mine.

(5) In every mine which is likely to be endangered by surface water, the highest flood levels and danger levels at least 1.2 meters or as required by the Regional Inspector, below the highest flood level, shall be permanently marked at appropriate places on the surface and whenever water rises towards the danger level at any place, all persons shall be withdrawn from the mine sufficiently in advance and for this purpose adequate arrangements of quick communication to all parts of the mine by effective systems shall be provided and maintained.

(6) No working shall be made in any mine vertically below-

(a) any part of any river, canal, lake, tank or other surface reservoir; or

(b) any spot lying within a horizontal distance of 15 meters from either bank of a river or canal or from the boundary of a lake, tank or other surface reservoir,

The following are the protective measures taken against inundation as approved by DGMS for River Godavari which is adjacent to GDK No.1&3 Incline.

All the provisions of the CMR No.149 are being followed as mentioned under.

The reduced levels of

River Godavari (HFL)		**: 837.167m**
i.	Gdk 1 Main Incline	: 852.885m (+15)
ii.	Gdk 1 Manway Incline	: 852.525m (+15)
iii.	Gdk 3 Main Incline	: 852.413m (+15)
iv.	Gdk 3 Manway Incline	: 850.008m (+12)
v.	Gdk 2 Main Incline	: 858.217m (+21)
vi.	Gdk 2 Manway Incline	: 857.110m (+20)
vii.	Gdk 2A Main Incline	: 851.210m (+14)
viii.	Gdk 2AManway Incline	: 850.520m (+13)
ix.	Gdk 5 Main Incline	: 854.000m (+16)
x.	Gdk 5 Manway Incline	: 854.830m (+17)
xi.	Bore holes surface at No.1 Stowing bunker	: 840.197m (+3)
xii.	No.2 Stowing bunker	: 845.000m (+7)
xiii.	Air Shaft (1 & 3 Incline	: 845.674m (+7)
xiv.	Air Shaft (2 & 2A Incline	: 844.270m (+7)
xv.	Air Shaft (5 Incline)	: 856.690m (+7)

*** All the entries are more than 3m above the HFL of Godavari river ie.837.167m as observed on 20/10/1995.**

Float alarm is fixed at Godavari River bank and are continuously monitored.

Warning level : 830m RL
Danger level : 832m RL
Withdrawal level : 834m RL

2. Continuous monitoring of water level at 1D/52L sump in No.4Seam. The normal water level is being monitored at 473m RL. If the water level exceeds abnormally above 473m RL, water leakage from surface may be suspected and adequate pumping capacity is readily available for pumping.

Make of water	:	900 GPM
Water for drinking + compressors	:	100 GPM
Stowing water	:	300 GPM
Total water	:	1300 GPM
Total pumping capacity to surface:		**1800 GPM**

3. The Surface area where subsidence was observed were effectively dozed and compacted to prevent any leakage of water through the subsidence cracks.

4. To monitor the flow of water, underground galleries were provided with V-notches and are being monitored regularly.

10. Air quality prediction modelling studies based on CMPDI emission factors considering the impact due to handling and transportation of coal for peak production capacity for 1.734 MTPA without control and with control measures and details of air emission year wise of violation period collectively as per the annexure.

Air quality predictions based on CMPDI emission factors for Peak production capacity of 1.734 MT (present proposed capacity), 1993-94 base level production capacity of 1.154 MT and maximum production during violation of 1.377 MT (2010-11) in Kg/day without and with control measures are furnished below:

Production in MT	Without Control	With Control	Without Control	With Control	Without Control	With Control	Without Control	With Control	Without Control	With Control	Without Control	With Control
	Coal loading				Transport				Coal unloading			
	PM10		PM2.5		PM10		PM2.5		PM10		PM2.5	
	Kg/day				kg/VKT				Kg/day			
1.154	5.77	2.88	0.80	0.40	145.60	72.81	20.88	10.44	4.73	2.36	0.53	0.26
1.377	6.89	3.44	0.96	0.48	173.76	86.88	24.92	12.46	5.65	2.82	0.64	0.32
1.734	8.67	4.33	1.21	0.61	218.80	109.41	31.37	15.69	7.10	3.55	0.80	0.40

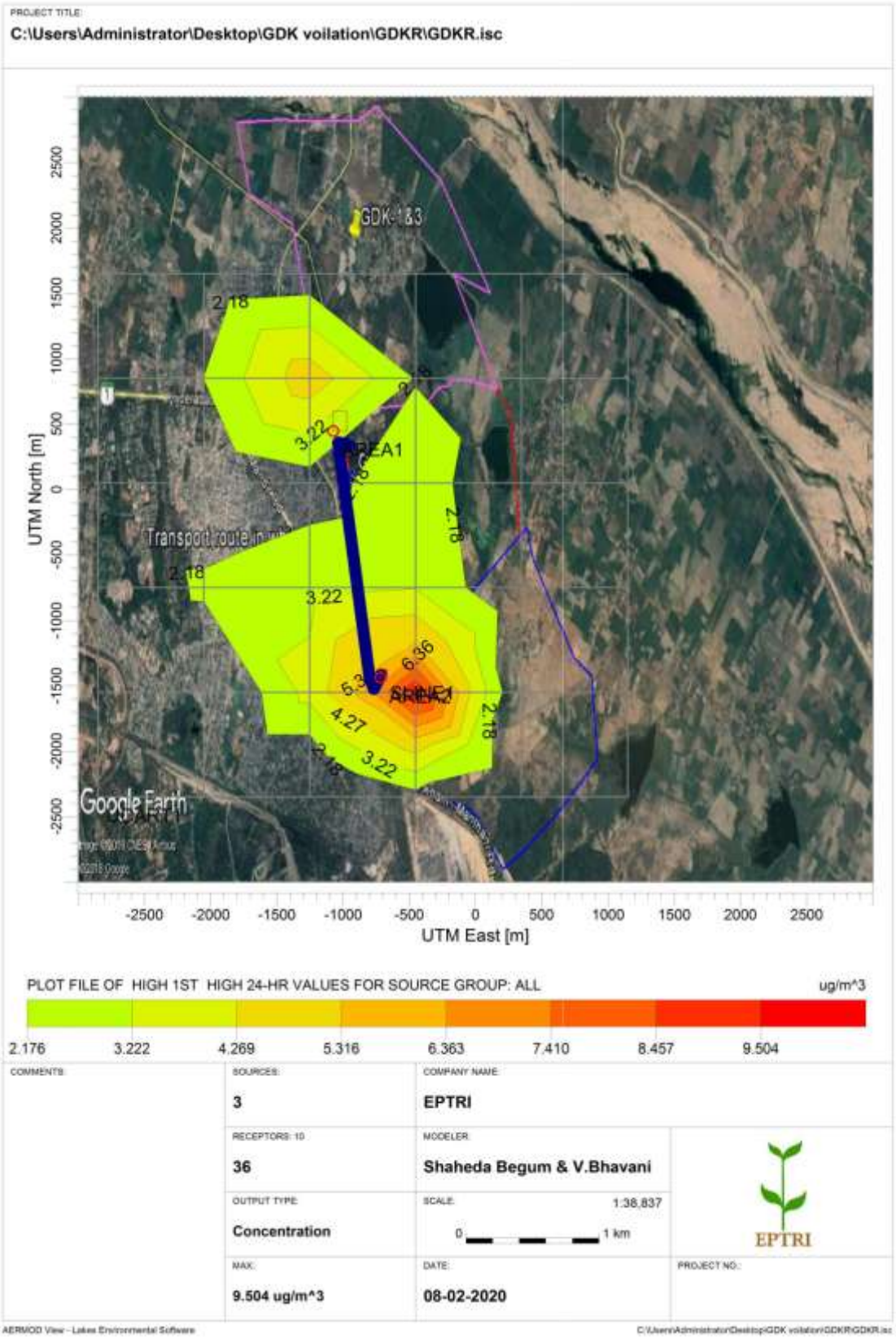
* Emission due to loading: 50% control with Fixed Sprinkling System at loading and transfer points
Transportation of Coal: 50 % Control factor by water sprinkler
Unloading Point: 50% control with Fixed Water Sprinkling System at unloading point

Predicted ground level concentration with control and with control

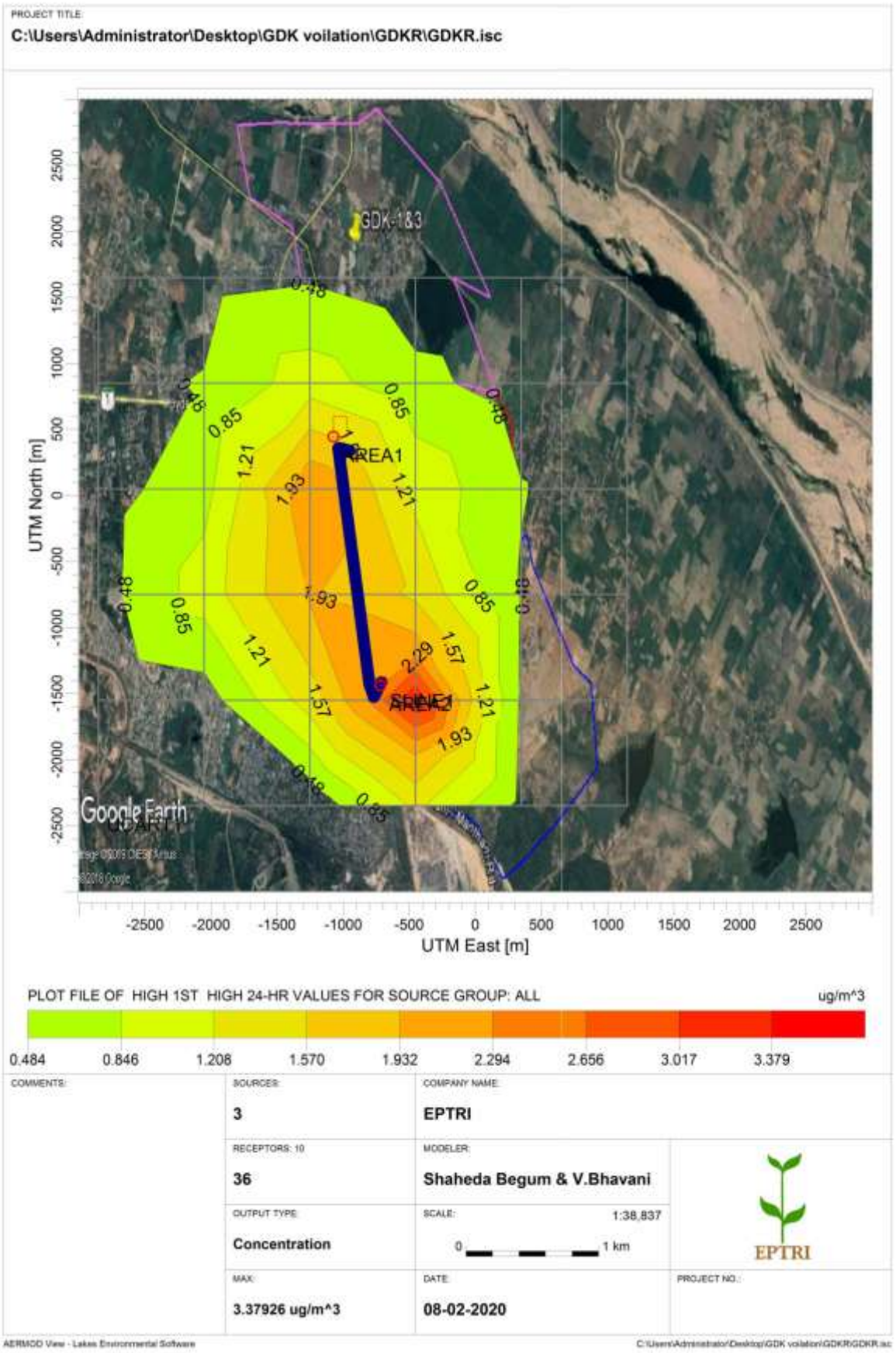
Production in MTPA	Predicted Max. µg/m3			
	PM10		PM2.5	
	Without Control	With Control	Without Control	With Control
1.154	48.019	9.504	6.880	3.379
1.377	57.250	23.185	8.209	3.579
1.734	74.716	24.270	10.714	4.082

Production in MTPA	Predicted Max. µg/m3			
	CO		NOx	
	Without Control	With Control	Without Control	With Control
1.154	25.840	12.920	39.860	19.930
1.377	31.620	15.810	48.308	24.154
1.734	33.454	16.727	53.582	26.791

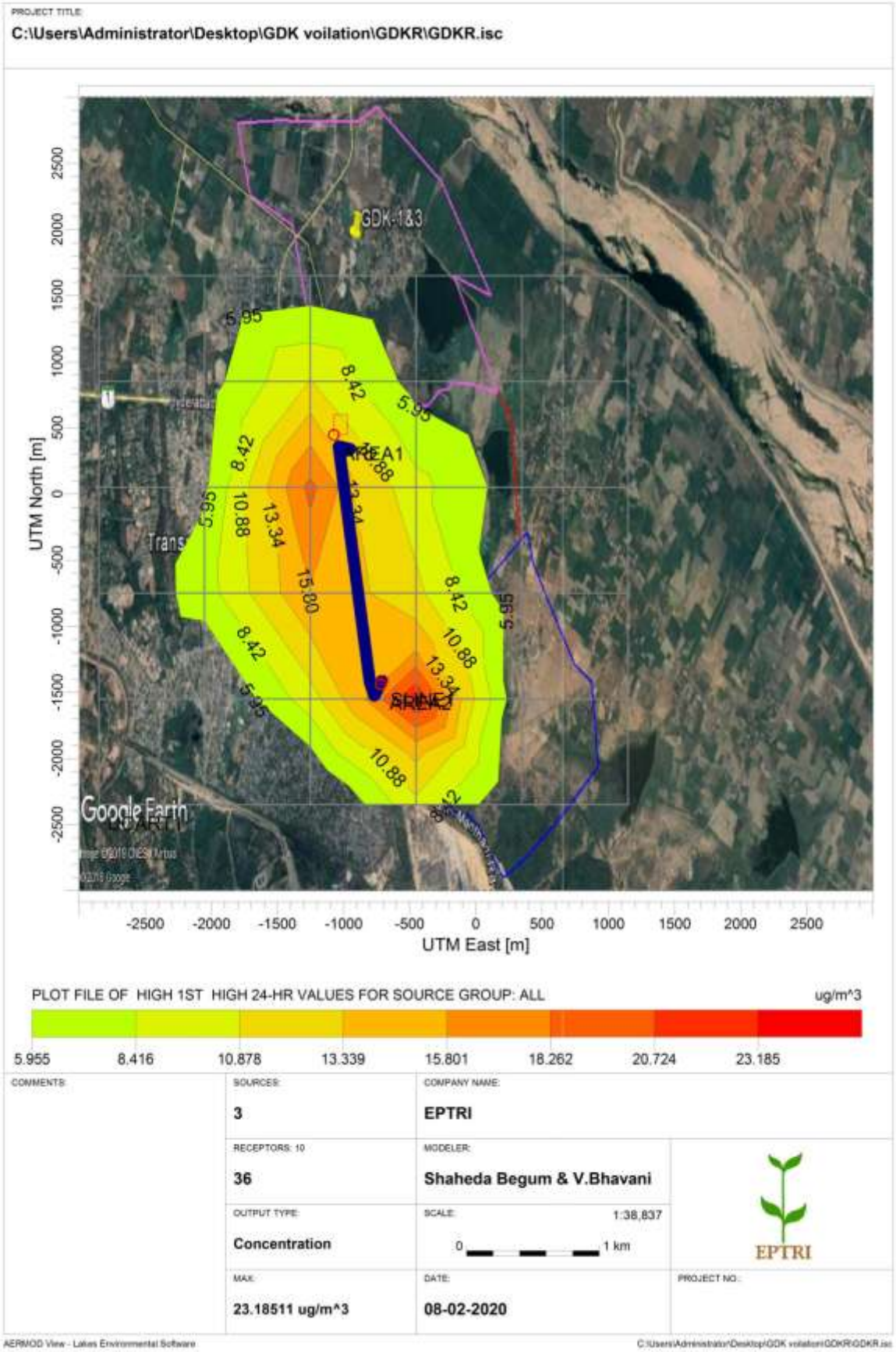
Predicted ground level concentration PM_{10} with control (1.154 MTPA)



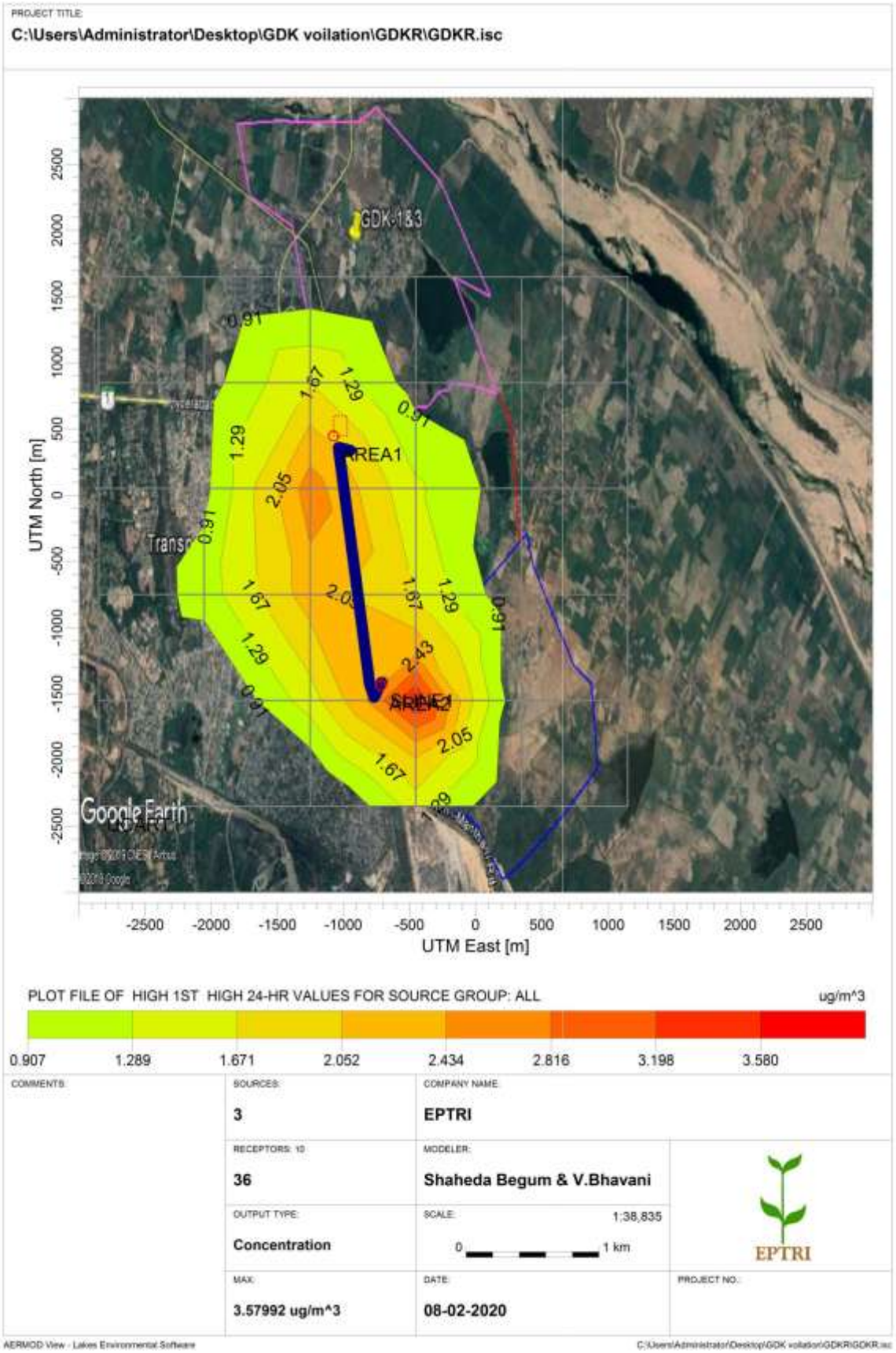
Predicted ground level concentration $PM_{2.5}$ with control (1.154 MTPA)



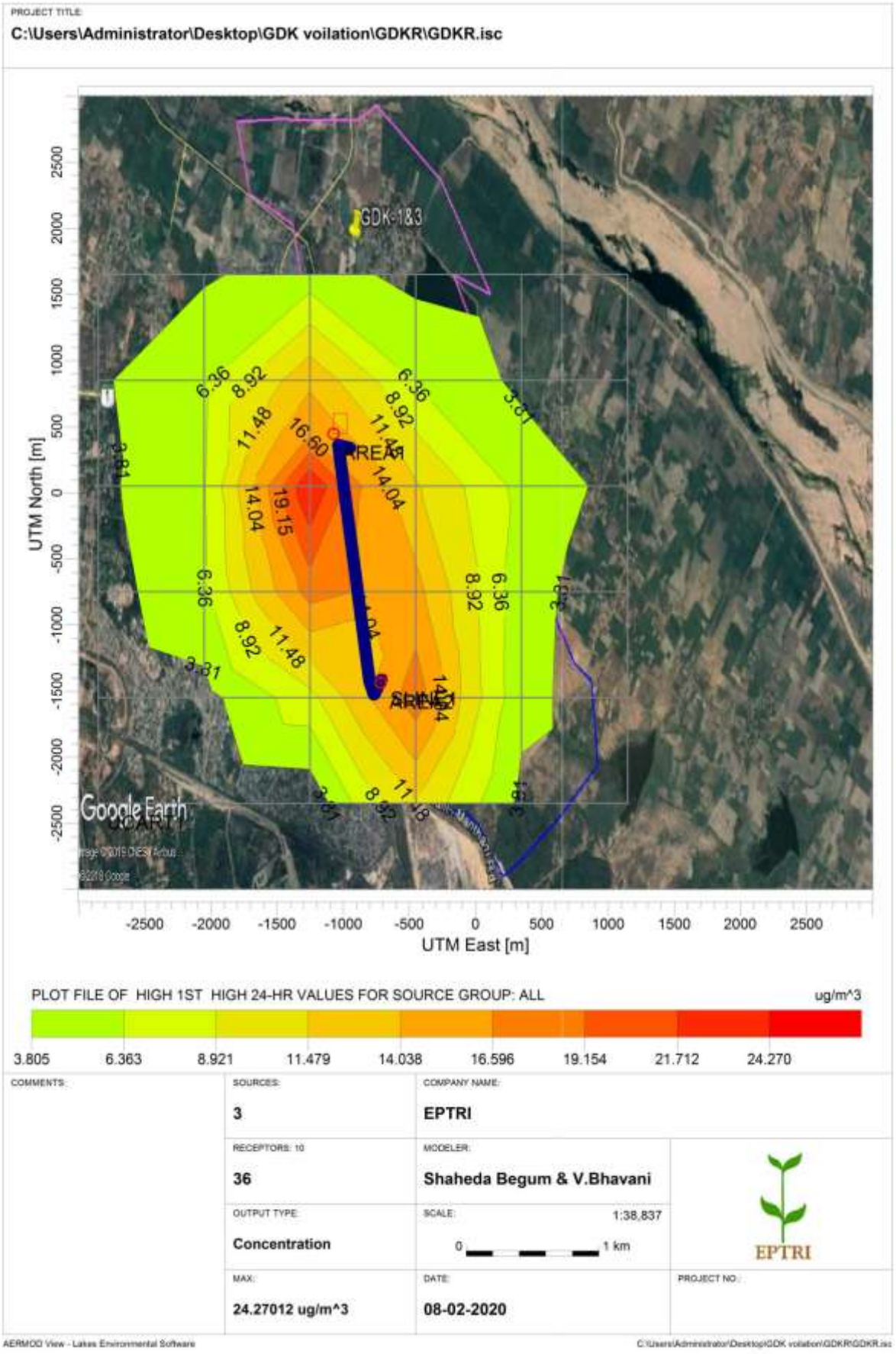
Predicted ground level concentration PM_{10} with control (1.377 MTPA)



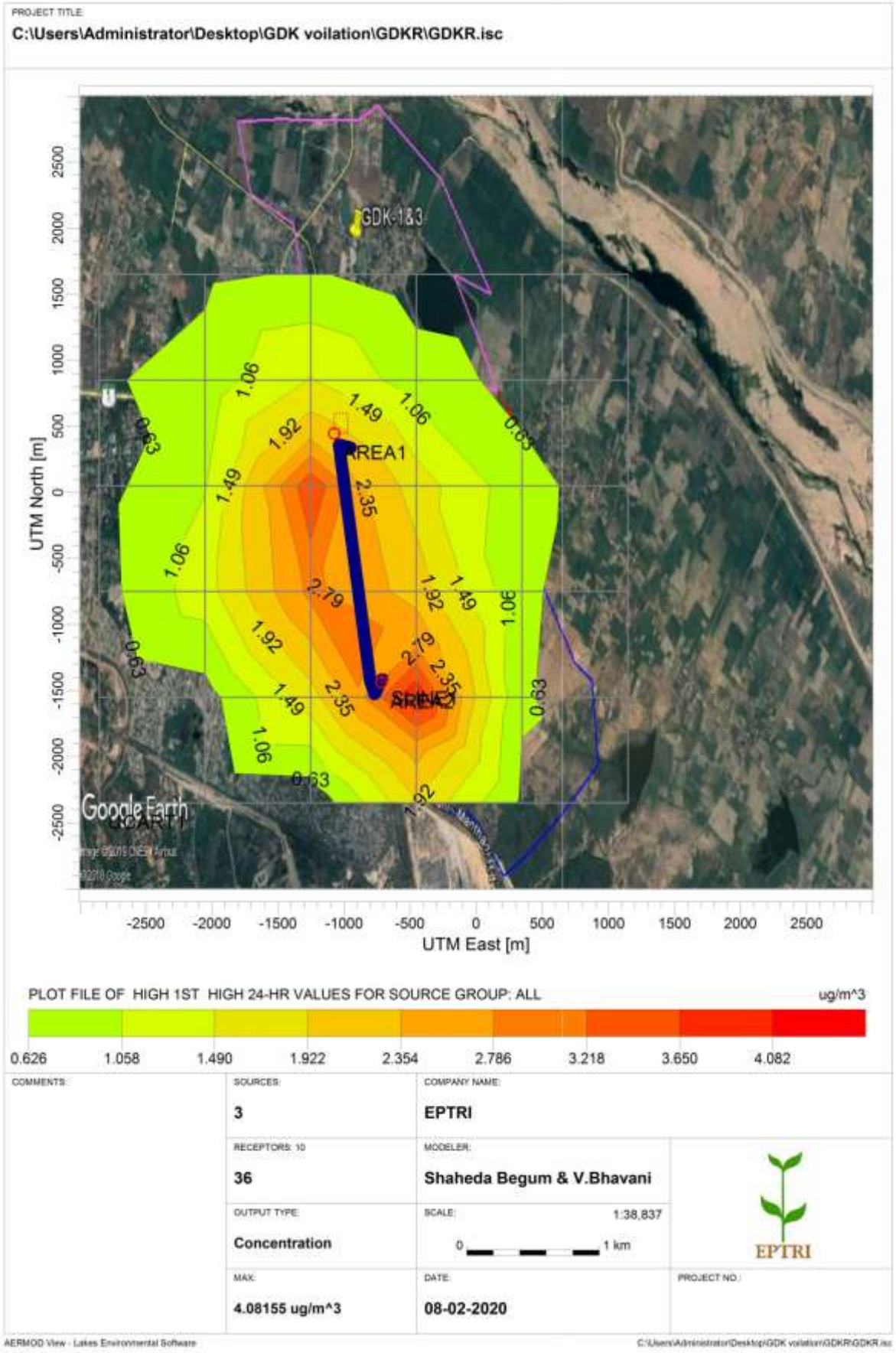
Predicted ground level concentration $PM_{2.5}$ with control (1.377 MTPA)



Predicted ground level concentration PM_{10} with control (1.734 MTPA)



Predicted ground level concentration $PM_{2.5}$ with control (1.734 MTPA)



Emissions in Kg/day as per CMPDI emission factor for violation period
GDK 1&3 Incline

GDK 1 & 3 YEARWISE ANNUAL AIR EMISSION (CONTROLLED) KG/DAY									
YEAR	LOADING		UNLOADING		TRANSPORT				Total No. Of Days (excl. 96 Monsoon days out of 306 Working days)
	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	SO_X	NO_X	
1993-94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
1994-95	0.18	0.02	0.14	0.02	0.31	0.09	0.22	1.08	210
1995-96	0.02	0.00	0.01	0.00	0.00	0.00	0.02	0.12	210
1996-97	0.13	0.02	0.10	0.01	0.16	0.04	0.16	0.79	210
1997-98	0.02	0.00	0.02	0.00	0.01	0.00	0.03	0.16	210
1998-99	0.10	0.01	0.08	0.01	0.09	0.03	0.13	0.63	210
1999-00	0.08	0.01	0.07	0.01	0.05	0.01	10.80	54.00	210
2000-01	0.22	0.03	0.18	0.02	0.37	0.11	0.15	0.73	210
2001-02	0.11	0.02	0.09	0.01	0.09	0.03	0.08	0.40	210
2002-03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2003-04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2004-05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2005-06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2006-07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2007-08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2008-09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2009-10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2010-11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2011-12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2012-13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2013-14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2014-15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2015-16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2016-17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2017-18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2018-19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210

GDK 2&2A Incline

GDK 2 & 2A YEARWISE ANNUAL AIR EMISSION (CONTROLLED) KG/DAY									
YEAR	LOADING		UNLOADING		TRANSPORT				Total No. Of Days (excl. 96 Monsoon days out of 306 Working days)
	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	SO_X	NO_X	
1993-94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
1994-95	0.13	0.02	0.11	0.01	0.10	0.03	0.13	0.64	210
1995-96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
1996-97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
1997-98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
1998-99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
1999-00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2000-01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2001-02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2002-03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2003-04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2004-05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2005-06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2006-07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2007-08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2008-09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2009-10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	210
2010-11	0.36	0.05	0.29	0.03	0.27	0.08	0.11	0.54	210
2011-12	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.01	210
2012-13	0.06	0.01	0.05	0.01	0.01	0.00	0.02	0.08	210
2013-14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2014-15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2015-16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2016-17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2017-18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2018-19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210

GDK 5 Incline

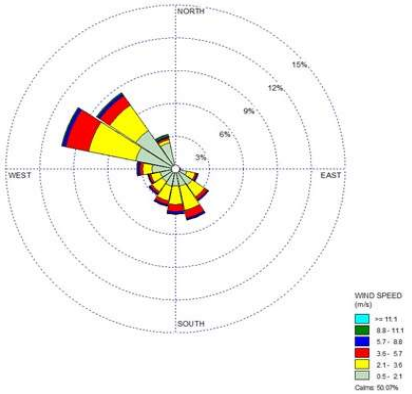
GDK 5 YEARWISE ANNUAL AIR EMISSION (CONTROLLED) KG/DAY									
YEAR	LOADING		UNLOADING		TRANSPORT				Total No. Of Days (excl. 96 Monsoon days out of 306 Working days)
	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	SO_X	NO_X	
1993-94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
1994-95	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.64	210
1995-96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
1996-97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
1997-98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
1998-99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
1999-00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2000-01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2001-02	0.16	0.02	0.13	0.02	0.46	0.13	0.19	0.96	210
2002-03	0.30	0.04	0.24	0.03	1.58	0.45	0.32	1.61	210
2003-04	0.42	0.06	0.35	0.04	3.19	0.91	0.43	2.13	210
2004-05	0.36	0.05	0.30	0.03	2.38	0.68	0.38	1.90	210
2005-06	0.54	0.08	0.45	0.05	5.29	1.52	0.51	2.56	210
2006-07	0.01	0.00	0.01	0.00	0.00	0.00	0.01	0.06	210
2007-08	0.30	0.04	0.24	0.03	1.26	0.36	0.32	1.61	210
2008-09	0.42	0.06	0.35	0.04	2.55	0.73	0.43	2.13	210
2009-10	0.50	0.07	0.41	0.05	3.64	1.04	0.49	2.43	210
2010-11	0.45	0.06	0.37	0.04	2.86	0.82	0.44	2.22	210
2011-12	0.28	0.04	0.23	0.03	1.09	0.31	0.30	1.51	210
2012-13	0.48	0.07	0.40	0.05	3.34	0.96	0.47	2.35	210
2013-14	0.41	0.06	0.34	0.04	2.42	0.69	0.42	2.08	210
2014-15	0.30	0.04	0.24	0.03	1.13	0.32	0.32	1.61	210
2015-16	0.08	0.01	0.06	0.01	0.08	0.02	0.10	0.50	210
2016-17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2017-18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2018-19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210

11. Air quality monitoring locations table showing the distance and direction w.r.t. to predominant wind directions.

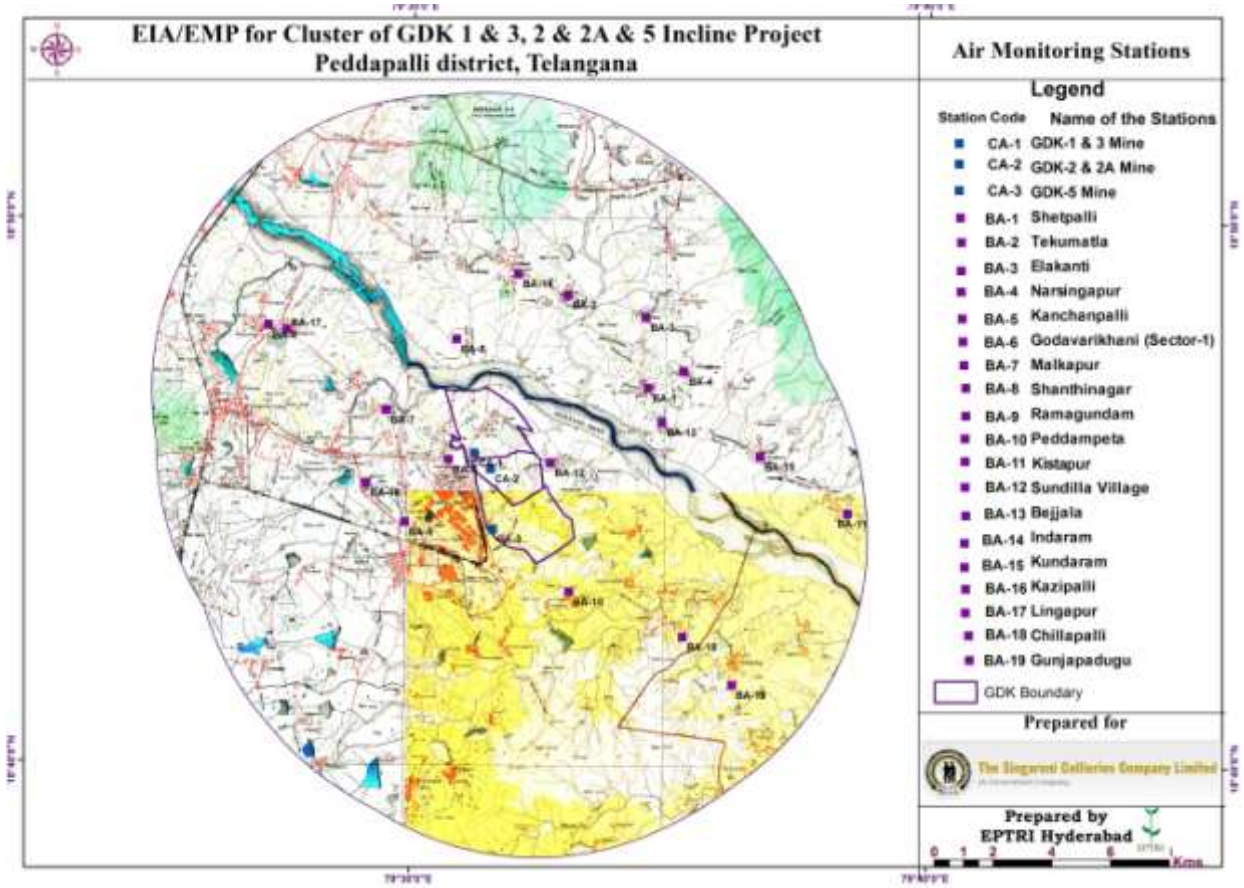
Based on annual wind rose (as shown below) of previous year, the predominant wind direction is NNW followed by NW direction. Accordingly, twenty two air quality monitoring locations have been identified in the 10 kms radius of the project area. The distance and direction of AAQ locations is given below:

S. No	Station Code	Name of the station	Latitude	Longitude	Cat.	Distance km	Direction
Core Zone							
1.	CA-1	GDK-1 & 3 Mine	N 18° 45' 42.6"	E 79° 31' 12.8"	I	0.70	E
2.	CA-2	GDK-2 & 2A Mine	N 18° 45' 25.7"	E 79° 31' 31.6"	I	0.92	E
3.	CA-3	GDK-5 Mine	N 18° 44' 19.2"	E 79° 31' 34.5"	I	0.36	E
Buffer Zone							
4.	BA1	Shetpalli	N 18° 46' 55.8"	E 79° 34' 33.9"	R	4.66	W
5.	BA2	Tekumatla	N 18° 48' 37.8"	E 79° 33' 00.3"	R	4.73	NW
6.	BA3	Elakanti	N 18° 48' 13.7"	E 79° 34' 30.8"	R	5.45	W
7.	BA4	Narsingapur	N 18° 47' 14.2"	E 79° 35' 15.5"	R	6.03	W
8.	BA5	Kanchanpalli	N 18° 47' 48.4"	E 79° 30' 51.2"	R	1.7	N
9.	BA-6	Godavarikhani	N 18° 45' 35.6"	E 79° 30' 42.8"	R	0.64	E
10.	BA-7	Malkapur	N 18° 46' 29.9"	E 79° 29' 30.1"	R	2.56	E
11.	BA-8	Shanthinagar	N 18° 44' 26.6"	E 79° 29' 52.1"	R	2.69	E
12.	BA-9	Ramagundam	N 18° 48' 03.0"	E 79° 27' 12.2"	R	6.73	NE
13.	BA-10	Peddampeta	N 18° 43' 10.6"	E 79° 33' 03.6"	R	1.38	SW
14.	BA-11	Kistapur	N 18° 43' 24.9"	E 79° 39' 36.0"	R	4.15	E
15.	BA-12	Sundilla	N 18^0 45'19.8"	E 79^0 30'58.8"	R	0.47	E
16.	BA-13	Bejjala	N 18° 46' 18.1"	E 79° 34' 50.5"	R	4.53	W
17.	BA-14	Indaram	N 18° 49' 01.0"	E 79° 32' 02.3"	R	4.05	N
18.	BA-15	Kundaram	N 18° 45' 41.0"	E 79° 36' 44.9"	R	3.79	E
19.	BA-16	Kazipalli	N 18° 45' 09.1"	E 79° 29' 06.8"	R	5.77	NE
20.	BA-17	Lingapur	N 18° 47' 58.0"	E 79° 27' 33.7"	R	5.14	SW
21.	BA-18	Chillapalli	N 18° 42' 21.7"	E 79° 35' 16.1"	R	7.42	SW
22.	BA-19	Gunjapadugu	N 18° 41' 28.8"	E 79° 36' 13.7"	R	5.15	NE

Annual Wind Rose



Map showing the monitoring locations is given below:



12. During presentation it was mentioned that air quality locations stations are identified based on annual Wind rose data but this details are not furnished in the EIA/EMP report and same to be submitted.

The sampling locations for ambient air quality were established on the basis of the following considerations:

- Meteorological conditions like wind direction;
- Topography of the study area;
- Representativeness of regional background air quality for obtaining baseline status;

To assess the baseline ambient air quality, twenty two air quality monitoring locations were identified in core zone and buffer zone (10 km radius study area) of the project, three air sampling locations represents core zone and nineteen locations represents the buffer zone of the project site. The stations were identified considering upwind, downwind and cross wind directions in order to have representative assessment of air quality in and around the project.

SCCL has been monitoring ambient air quality including micro-meteorology in Ramagundam region as a part of post project environmental monitoring. Based on annual wind rose (as shown below) of previous year, the predominant wind direction is NNW followed by NW direction. Accordingly, twenty two air quality monitoring locations have been identified in the 10 kms radius of the project area, out of this three locations are identified in downwind direction.

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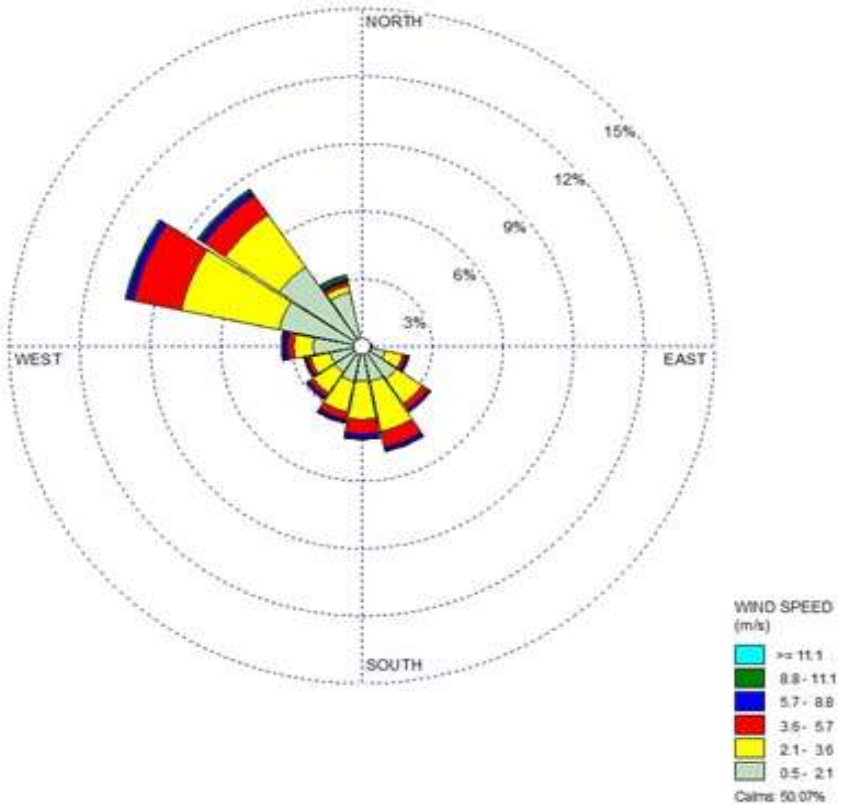


PPEM Annual Windrose

13. Revisit the data of chemical characteristics of coal.

The data was revisited and the coal sample collected from conveyer belt was analyzed for the metal parameters viz., Chromium (as Cr), Cadmium (as Cd), Lead (as Pb), Zinc (as Zn), Iron (as Fe), Cobalt (as Co), Manganese (as Mn), Copper (as Cu), Nickel (as Ni), Selenium (as Se), Vanadium (as V), Silver (as Ag) etc. The results of these parameters are furnished below:

Parameter (s)	Test Method	Units	Results
Chromium	SW-846-6010.B	mg/kg	28
Cadmium	SW-846-6010.B	mg/kg	BDL
Lead	SW-846-6010.B	mg/kg	25
Zinc	SW-846-6010.B	mg/kg	18
Iron	SW-846-6010.B	mg/kg	3236
Cobalt	SW-846-6010.B	mg/kg	5
Manganese	SW-846-6010.B	mg/kg	43
Copper	SW-846-6010.B	mg/kg	32
Molybdenum	SW-846-6010.B	mg/kg	BDL
Nickel	SW-846-6010.B	mg/kg	15
Vanadium	SW-846-6010.B	mg/kg	24
Silver	SW-846-6010.B	mg/kg	BDL
Aluminium	SW-846-6010.B	mg/kg	1464
Arsenic	SW-846-6010.B	mg/kg	BDL
Selenium	SW-846-6010.B	mg/kg	BDL
Mercury	SW-846-7471 B	µg/kg	BDL
Sulphar	NABL SOP No.142 for environmental analysis CHNS Analyzer (Elementarvario- EL)	%	0.52
Ash content	BIS method IS-1350 Part 1-1984	%	35

BDL: Below Detection Limit:

14. Certified CFO compliance report to be obtained from concerned regional office of SPCB.

Environmental Engineer, RO, Ramagundam (TSPCB) inspected the mines on 26.02.2020 and submitted the report to Head Office, Hyderabad, TSPCB. The report will be submitted to the Member Secretary and the Members of EAC through post or at the time of presentation soon after the report is received from TSPCB.

15. Proposed STP details like capacity and technology.

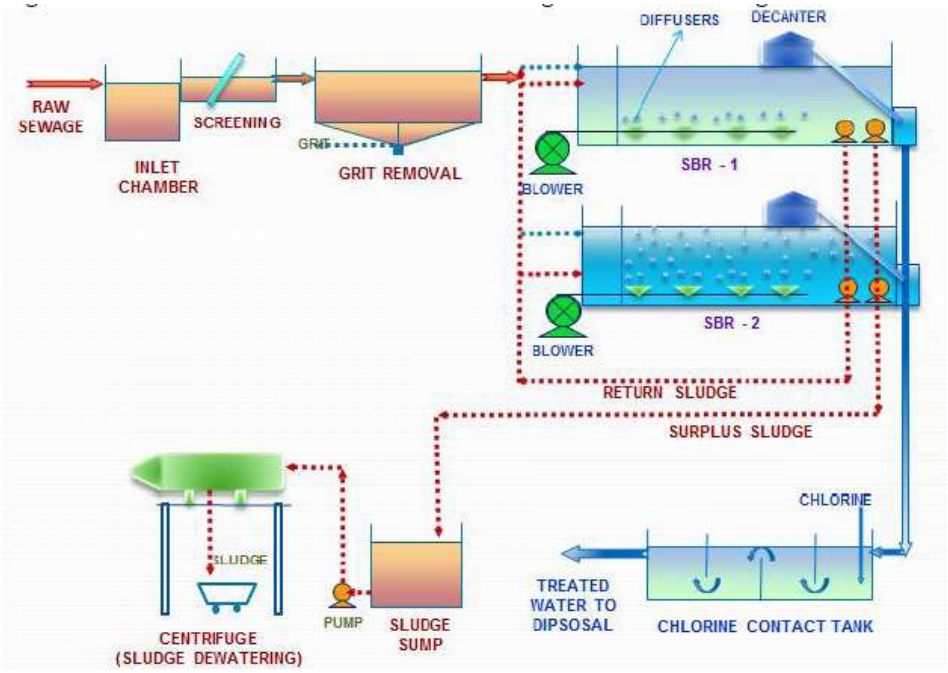
STP Capacity

It is proposed to construct **17 MLD STP** at Ramagundam RG1, to treat the sewage emanating from the catchments of 2-incline, 5-incline nallahs and Ganganagar Colony. A DPR was prepared by M/s E M Solutions, Hyderabad.

Technology

Considering the characteristics and the stringent effluent parameters required as per latest statutes, **Sequential Batch Reactor (SBR)** process is recommended

Schematic Diagram of SBR Process



The operation of an SBR is based on fill-and-draw principle, which consists of five steps – fill, react, settle, decant and idle. These steps can be altered for different operational applications.

After SBR, the treated water will then be disinfected in chlorination unit & collected in a sump of 1 ML capacity provided with pump house over the sump as a provision to reuse the water by way of supplying to gardening, cleaning and flushing purposes. The remaining treated water is allowed into outlet to balance the irrigation needs downstream.

16. Heavy metals concentrations in the mineralogical composition of RPM is to be rechecked.

The mineralogical composition analysis was rechecked and found that the units given in the earlier presentation / EMP were in ng/m^3. Now the units are changed to µg/m^3 except As and Ni (as per the standards). Summary of mineralogical composition of RPM is given in below table.

Summary of Minerological Composition of RPM (PM_{10})

S.No	Parameters	Units	Station code									
			GDK 1 & 3	GDK 2 & 2A	GDK5	Godavarikhani	Shanthinager	Ramagundam	Peddampet	Lingapur	Chillipalli	Gunjapadu
1	Lead as Pb (1.0µg)	µg/m^3	0.052	0.046	0.038	BDL	0.037	0.028	BDL	0.068	0.032	0.041
2	Arsenic as As	ng/m^3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
3	Nickel as Ni	ng/m^3	8	BDL	5	2	4	5	3	2	5	3
4	Chromium as Cr	µg/m^3	0.005	0.006	0.012	0.014	0.018	0.012	0.016	0.014	0.012	0.010
5	Cadmium as Cd	µg/m^3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
6	Zinc as Zn	µg/m^3	0.097	0.542	0.257	0.296	0.307	1.425	0.326	0.418	0.364	0.458
7	Iron as Fe	µg/m^3	0.556	0.645	1.406	0.886	2.185	2.682	1.947	1.693	0.837	1.561
8	Cobalt as Co	µg/m^3	0.003	BDL	0.002	0.001	0.002	0.002	0.002	0.001	BDL	0.002
9	Manganese as Mn	µg/m^3	0.024	0.019	0.036	0.034	0.043	0.069	0.039	0.074	0.037	0.052
10	Copper as Cu	µg/m^3	0.007	0.004	0.008	0.006	0.007	0.013	0.007	0.006	0.005	0.009
11	Molybdenum as Mo	µg/m^3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12	Vanadium as V	µg/m^3	0.120	0.094	0.116	0.248	0.296	0.108	0.312	0.116	0.267	0.347
13	Silver as Ag	µg/m^3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14	Aluminium as Al	µg/m^3	0.265	0.320	0.168	0.347	0.234	0.167	0.167	0.658	0.524	0.296
15	Selenium as Se	µg/m^3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

The values are verified with NAAQS standards for arsenic, lead and nickel. Arsenic is not present and lead, nickel concentrations are well within the limits.

Note: BDL: Below Detectable Limit;

17. Capital cost of the project with certificate from finance department of the company to be submitted and also EMP capital and recurring cost incurred year wise if spent to be submitted.

Certificate from the Finance depatment is enclosed here under:

(A Government Company)

Ref.No.CRP/FAD/CB/123 Date: 05.03.2020

Certification of Capital Cost pertaining to GDK 1&3, GDK 2&2A and GDK 5 Inclines for submission to MoEF&CC for grant of Environmental Clearance

Rs. Crore

Mine	Original Value	End Book Value
GDK 1&3	32.21	13.27
GDK 2&2A	30.52	17.07
GDK 5	49.29	26.08
Total	**112.02**	**56.42**

DGM(F&A)

(GM (F&A) / Corp

General Manager(F&A)
The Singareni Collieries Co. Ltd.,
Kothagudem Collieries -507 101.

Budget Provision for EMP Implementation and Monitoring

The feasibility of this Mine includes a full financial assessment of the cost of development of the mine and its operation. Sufficient investment is made towards environmental management and monitoring by way of infusion of direct capital. A number of other environmental control and management items are also included in indirect cost under various other capital heads. In order to implement the environmental protection measures, an amount of Rs. 11.86 Crores was spent on environmental management as recurring cost for last five years, whereas one time expenditure of Rs.3.46 Crores as capital cost and details are given in **Table below.**

EMP Cost of the Project

Sl. No.	**Description**	**Item**	**Recurring cost for 5 years** (Rs. in Crores)	**Capital cost** (Rs. in Crores)
1	Air Quality Management & Monitoring	Base line data collection & Provision of environmental monitoring equipment	1.12	0.39
2	Water Quality Management & Monitoring and soil erosion	Pipe line arrangements for Water spraying along belts and bunkers to arrest dust.	7.64	0.15
		Filter bed construction		0.60
		Rain water harvesting pits for ground water recharge and its maintenance		0.30
		Black topping of road from GDK-5 inc to CHP		1.65
3	Greenbelt development	Development & Maintenance of plantation inside mine areas	1.45	--
4	Subsidence Management	Subsidence study by IT BHU	1.65	0.15
5	Environment data generation and EMP preparation, etc.	Public Consolation for Environment related issues within mine lease area	--	0.22
TOTAL			**11.86**	**3.46**

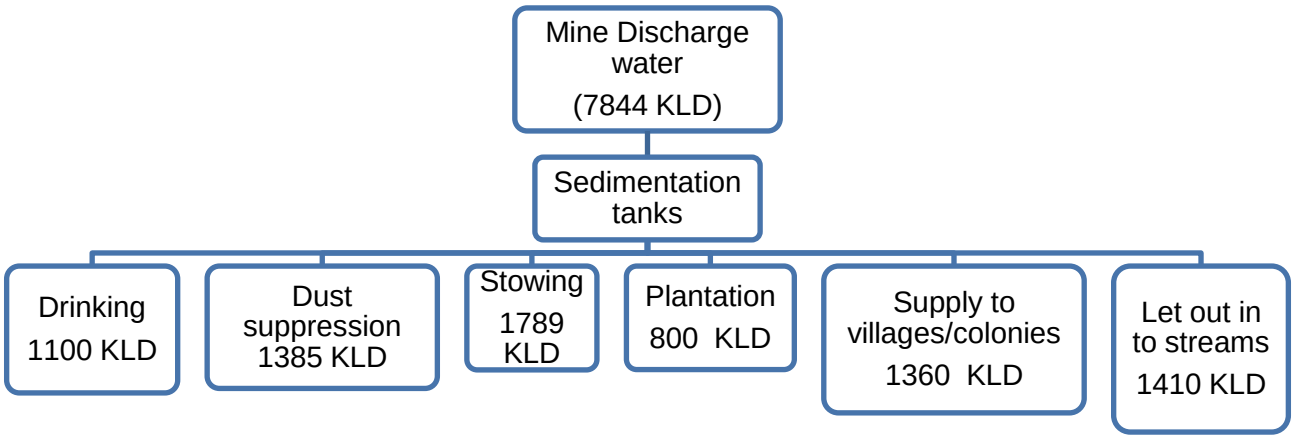
18. Flow sheet of water treatment and other water management (ground and surface water) system with detailed quantity shall be submitted.

In the process of mining, water will be accumulated in the dip most places of the mine due to natural seepage and mining operations such as stowing operations etc. The water so accumulated is collected in sumps at different places in the mine and is pumped out to the surface with suitable capacity pumps. The pumped out water is filtered on surface to make it potable and used for drinking and other purposes on the pit head as well as in the colonies. The utilization pattern of total pumped out water from the three mines is given in below:

Water Requirement

Purpose	Quantity KLD			
	GDK 1&3 Incline	GDK 2&2A Incline	GDK 5 Incline	Total
Drinking at mine	100	600	400	1100
Dust suppression	300	300	785	1385
Stowing	140	549	1100	1789
Plantation	200	200	400	800
Supply to villages / Colonies	400	200	760	1360
Let out into streams	0	320	1090	1410
Total	**1140**	**2169**	**4535**	**7844**

Flow chart showing details of Mine Discharge Water Treatment



19. Submit in tabular form the gist of written representations received in the public hearing along with commitment by project proponent with time bound action plan

The gist of written representations received in the public hearing conducted for cluster of GDK 1&3, GDK-2&2A and GDK-5 incline:

S.No	Representation	Commitment by the Project Proponent	Time line	Monetary provision in lakhs
1.	Provide employment to educated youth and conduct skill development training programmes.	In RG-1 area from 2003-04 to 2019-20 SCCL has given skill development training to about 12,053 unemployed youth in different fields like Computer hardware, motor mechanic, tailoring, fashion designing, beautician, Army, police recruitment, etc. In future also, SCCL will provide necessary training to locals to improve their skill so that they can get employment and also give the priority in outsourcing employment to the land losers and local people where their services are required.	3 - 4 years	24.00
2.	Providing infrastructure developments likes Mineral Water Plants, C.C. Roads, side drainage arrangements, LED street lighting and Sulabh complex to surrounding villages.	Infrastructure development works are being carried out as per the CSR policy of the company. DMFT funds and CER funds will also be used for infrastructure development. Since 2003 to 2019-20 about Rs.16.57 Cr have been spent in and around the area for creating infrastructure development like CC roads, drainages, supply of drinking water, bore wells, de silting of tanks, construction of school rooms, etc. Further as per the requirements of the surrounding villages infrastructure development will be carried out in future also.	3 - 4 years	144.00

S.No	Representation	Commitment by the Project Proponent	Time line	Monetary provision in lakhs
3.	Providing medical facilities to the surrounding villages	Number of medical camps were organized by SCCL in the project surrounding villages and about 39,595 villagers were treated and given free medicines and SCCL will continue to organize the free medical camps.	Every quarter	27.00
4.	Air, water, noise pollution are effecting the surrounding villages and controlling measuring shall be taken and monitoring shall be done as per statute.	All the controlling/mitigation measures to reduce air, water and noise pollution in the mines and in the surrounding villages are being done. SCCL is monitoring Air quality ($PM_{10,}$ $PM_{2.5,}$ SO_2, NO_X), surface water quality, ground water quality and noise levels in mines and in the 10 km buffer zone by EPTRI, Hyderabad and the results of all the parameters are well within the CPCB standards. All the control measures will be taken throughout the life of the project.	Every day	52.20 / year
5.	Green belt development in and around the project and surrounding villages to control the pollution and development of gardens/ parks in the nearby villages.	Up to 2019-20 about 1532.00 ha of green belt has been developed in and around mines and vacant lands of surrounding villages with 24.00 lakhs saplings. Around 1.2 lakhs saplings were freely distributed in 2019 in the surrounding villages and further plantation will be carried out as per EMP/ Mining plan. SCCL already developed 5 parks and 7 gardens in the surrounding villages and townships and some more parks are proposed in this year and will continue such activities in	2 years	24.00

S.No	Representation	Commitment by the Project Proponent	Time line	Monetary provision in lakhs
		the surrounding villages in future also.		
6.	CSR, CER and DMFT funds are to be spent in Project effected Villages only and district collector is requested to see that the funds are properly utilized in the effected villages only.	Around Rs.16.87 Crores of CSR funds were spent for development activities in the affected villages like CC roads, digging of bore wells, repair of school buildings, water supply, free medical camps in past few years and SCCL will continue to develop the infrastructure facilities in the affected villages in future also under CSR/CER. Around Rs.2.18 Crores of CER funds will be allotted to spend in the surrounding villages for development of infrastructure, health, water supply & skill development. DMFT fund of about Rs.703.00 Crores was deposited with the district collector Peddapalli and these funds will be utilized for development of the affected villages.	3 – 4 years	218.00
7.	Establishing RO plants in the surrounding villages and construction of Sewage Treatment Plant (STP) so that the drainage water shall be discharged out in the nearby nallahs/tanks only after treating in STP.	Establishing 5 No.s of RO water treatment plants in the surrounding 4 villages (Jangoan, Sundilla, Musthyala and Jallaram villages) is in process and will be completed within 6 months. It is proposed to construct 17 MLD STP at Ramagundam RG1, to treat the sewage emanating from the catchments of 2-Incline, 5-Incline nallahs and Ganganagar Colony.	6 months 2 years	15.00 1,500.00

20. **Revised CER cost along with activities based on revised capital cost to be prepared. CER details excluding the activities proposed under CSR with time bound implementation (maximum three years) shall be submitted.**

Corporate Environmental Responsibility (CER)

M/s.Singareni Colliries Company Limited has undertaken various initiatives in terms of public sanitation, drainage facilities, drinking water facilities, public infrastructure development, and green area development through plantation to decrease the carbon footprints due to mining and social activities as part of CER.

The Total Investment made for the project is Rs. 112.02 Crore. Hence, the total cost for CER has been calculated as per notification dated 1st May, 2018 is mentioned in following table,

S. No.	As per MOEF&CC notification dated 1st May, 2018	Our Capital Investment (In Rs.)	For Greenfield Project - % of Capital Investment	Cost (in Lakhs)
1	≤ 100 Crores	≤ 100 Crores	2%	**200**
2	>100 Crores to ≤ 500 Crores	>100 Crores to ≤ 112.02 Crores	1.5%	**18**
Total				**218**

Following work will be done under CER in 3 years after the accordance of EC of the project

Sl. No.	Activity	Provision	Areas / Location	Total Cost (Lakhs)	2020 - 21 (Rs.)	2021 - 22 (Rs.)	2022 - 23 (Rs.)
1.	Infrastructure creation for Underground drainage system.	Providing access to houses to discharge effluent to drainage system	• Ganganagar R&R colony	45	20	20	5
2.	De-silting of tanks in villages inside mine lease area	Improving the quality and quantity of water catchment in respective tanks	• Jangoan tank • Sundilla tank	15	5	5	5

Sl. No.	Activity	Provision	Areas / Location	Total Cost (Lakhs)	2020 - 21 (Rs.)	2021 - 22 (Rs.)	2022 - 23 (Rs.)
3.	Installation of water treatment plants by Reverse Osmosis (250 to 500 LPH Capacity)	Supply of drinking water to minimum 50 Households in respective villages	• Jangoan • Sundilla • Musthyala • Jallaram	30	15	15	0
4.	Road construction works	Construction of CC roads for better road connectivity	• Jangoan • Sundilla	45	20	15	10
5.	Public Infrastructure development under social welfare cause	Construction of community hall and library	• Musthyala village	10	4	4	2
6.	Public Infrastructure development for improvement of sanitation	Construction of 10 Nos Public Toilets and 2 Nos one room and shed	• Kranthi Patham (IKP) Centre in Jongoan village • Sundilla village	15	7.5	7.5	0
7.	Public Infrastructure development under social welfare cause and sanitation	Construction of compound wall around the temple, 4 Nos rooms and toilets	• Bheemeswaralayam temple in JangoanVillage.	28	18	7.5	2.5
8.	Public Infrastructure development under social welfare cause and sanitation	Construction of pushkar ghat and 10 Nos bathrooms for pilgrims near River Godavari.	• Banks of River Godavari	30	20	7.5	2.5
TOTAL				**218**	**109.5**	**81.5**	**27**

21. **Presentation to be made as per the specific ToR and standard ToR issued to the project.**

    Presentation will be made as per the specific ToR and Standard ToR.

22. **Plantation and Green Belt details with the name of species and photographs.**

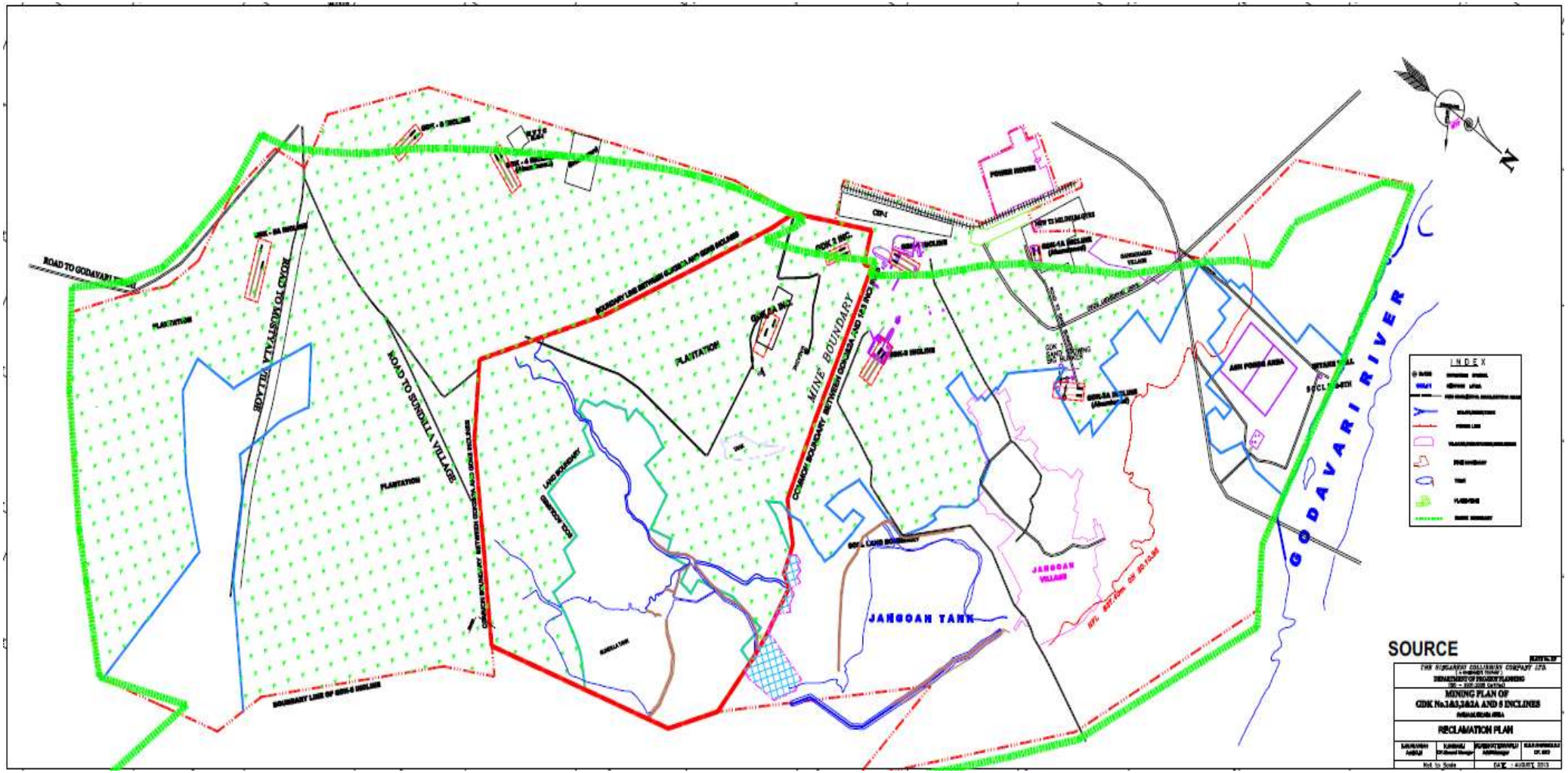
- As part of afforestation program over the mining areas, already 515.00 ha of plantation was carried over the acquired project area of 843.40 ha (61% brought under plantation) with the native plants and mixed species by forestry department.
- The green belt provided all around the project as a boundary plantation and along the approach roads as an avenue plantation and also in the vacant places within the surface infrastructure. Eventually at the end of the mining operations, the green belt available in the project will be 772.75 ha as mentioned in the below table.

Land use	Proposed land use at the mine closure stage in ha.			
	GDK 1&3	*GDK 2&2A*	*GDK 5*	*Total*
Existing Plantation	82.00	118.00	315.00	515.00
Plantation proposed after closure	79.06	71.81	106.88	257.75
Sub-total	***161.06***	***189.81***	***421.88***	**772.75**
Other areas like roads, infrastructure, etc., left for public use.	*34.48*	*12.16*	*24.01*	70.65
Un disturbed land	*346.12*	*80.79*	*86.54*	513.45
Total	**541.66**	**282.76**	**532.43**	**1356.85**

List of Species planted

S.No	Name of the Species	S.No	Name of the Species
1	Adina cordifolia	12	Hardwilda binata
2	Aegle marmelos	13	Limonia acidissima
3	Albizzia lebbek	14	Mitragyna parvifolia
4	Albizzia procera	15	Pithecelobiwn dulci
5	Annona squamosa	16	Pongamia pinnata
6	Azadirachta indica	17	Pterocwpus marsupium
7	Dalbergia latifolia	18	Pterocwpus santalinus
8	Dendrocalamus strictus	19	Terminalia bellarica
9	Emblica officina/is	20	Terminalia chebula
10	Ficus bengalensis	21	Sterculia urens
11	Ficus religiosa		

Plantation plan of Cluster of Godavarikhani No.1&3 , No2&2A and No.5 Incline



BLOCK PLANTATION GDK-5 INCLINE (7 years old Plantation)

BAMBOO PLANTATION GDK-5 INCLINE (5 Year old)

BLOCK PLANTATION GDK-1&3 INCLINE (7 years old Plantation)

AVENUE PLANTATIONM GDK-1&3 INCLINE (1 Year old)

BLOCK PLANTATION GDK-2&2 INCLINE (6 years old Plantation)

23. **Declaration about that no Schedule I species in the core and buffer zone of the proposed project with the list of flora and fauna in the required format.**

Certificate from the District forest officer Peddapalli declaring no schedule -1 species are present in the core and buffer zone of the project.

GOVERNMENT OF TELANGANA
FOREST DEPARTMENT

From
Sri M. Ravi Prasad.,S.F.S.,
District Forest Officer
Peddapally

To
The Advisor (Forestry),
The S.C.Co.Ltd.,
Singareni Bhavan,
Hyderabad, Telangana

Rc. No. 242/2013/S4 Dated: 06-02-2020.

Sir,

Sub:- Request for confirming the distance of "Cluster of Godavarikhani No.1&3 Inclines, Godavarikhani No.2&2A Inclines and Godavarikhani No.5 Incline" from Siwaram Wild Life Sanctuary- Report Submission - Reg.

Ref:- From the Advisor SCCL, Hyderabad Lr.No. **ADF/HYD/SCCL/NUA-1, dt. 22.01.2020.**

**

With reference to the subject cited above, it is submitted that, vide ref cited the Advisor SCCL, Hyderabad has requested to furnish the presence or absence of Schedule-I species in the core and buffer zone of the project "Cluster of Godavarikhani No.1&3 Inclines, Godavarikhani No.2&2A Inclines and Godavarikhani No.5 Incline".

In this connection it is submitted that, there is no forest land in the core and buffer zone of the project "Cluster of Godavarikhani No.1&3 Inclines, Godavarikhani No.2&2A Inclines and Godavarikhani No.5 Incline"

However in the adjacent forest area, the following Schedule-I species are present.

SCHEDULE - I SPECIES		
PART -I	PART - II	PART - III
MAMMALS	AMBHIBIANS AND REPTILES	BIRDS
Chinkara or Indian Gazelle (*Gazella gazella bennetti*)	Crocodiles Crocodiles palustris	Forest Spotted Owlet (*Athene blewitti)*

This is submitted for favour of kind information and necessary action.

Yours faithfully,

District Forest Officer,
Peddapally District

List of Flora present in the study area

S.No.	Name	Family	Vernacular name	Habit	CZ	BZ	IUCN
1	*Abutilon hirtum* (Lam.) Sweet	Malvaceae		S	-	+	
2	*Abutilon indicum* (L.) Sweet	Malvaceae	Thuttutubenda	S	+	+	
3	*Acacia leucophloea* (Roxb.) Willd.	Leguminosae	Tella thumma	T	+	+	LC
4	*Acacia nilotica* (L.) Delile	Leguminosae	Nalla thumma	T	-	+	LC
5	*Acalypha indica* L.	Euphorbiaceae	Muripinda	H	+	+	
6	*Achyranthes aspera* L.	Amaranthaceae	Uttareni	H	-	+	
7	*Actinoscirpus grossus* (L.f.) Goetgh. & D.A.Simpson	Cyperaceae		H	-	+	LC
8	*Aegle marmelos* (L.) Corrêa	Rutaceae	Maredu, Bilvumu	T	-	+	
9	*Aerva lanata* (L.) Juss.	Amaranthaceae	Thelaga pindi	H	+	+	
10	*Agave americana* L.	Asparagaceae	Kathai chettu	S	-	+	
11	*Ageratum conyzoides* (L.) L.	Compositae		H	+	+	
12	*Ailanthus excelsa* Roxb.	Simaroubaceae	Pedda manu	T	+	+	
13	*Alangium salviifolium* (L.f.) Wangerin	Cornaceae	Nallaoodaga	T	-	+	
14	*Albizia amara* (Roxb.) B.Boivin	Leguminosae	Konda sigara	T	-	+	
15	*Alternanthera ficoidea* (L.) Sm.	Amaranthaceae		H	-	+	
16	*Alternanthera sessilis* (L.) R.Br. ex DC.	Amaranthaceae	Ronaganthi aku	H	+	+	LC
17	*Alysicarpus hamosus* Edgew.	Leguminosae		H	-	+	
18	*Amaranthus viridis* L.	Amaranthaceae		H	-	+	
19	*Ammannia baccifera* L.	Lythraceae		H	-	+	LC
20	*Anisomeles indica* (L.) Kuntz.	Lamiaceae	Adabeera	S	+	-	
21	*Annona squamosa* L.	Annonaceae	Seetaphalam	T	+	+	
22	*Anogeissus latifolia* (Roxb. ex DC.) Wall. ex Guillem. & Perr.	Combretaceae	Sirimanu	T	-	+	
23	*Apluda mutica* L.	Poaceae	Adavikorre gaddi	H	-	+	
24	*Aristida adscensionis* L.	Poaceae	Cheepuru gaddi	H	+	+	
25	*Aristida hystrix* L.f.	Poaceae		H	+	-	
26	*Aristida setacea* Retz.	Poaceae		H	-	+	
27	*Aristolochia indica* L.	Aristolochiaceae	Govela teega	C	-	+	
28	*Azadirachta indica* A.Juss.	Meliaceae	Vepa chettu	T	+	+	LC
29	*Bacopa monnieri* (L.) Wettst.	Plantaginaceae		H	+	+	LC
30	*Balanites aegyptiaca* (L.) Delile	Zygophyllaceae		S	-	+	
31	*Barleria montana* Nees	Acanthaceae	Adavi desembaralu	H	-	+	
32	*Barleria prionitis* L.	Acanthaceae	Pachagorinta	H	+	-	
33	*Barringtonia acutangula* (L.) Gaertn.	Lecythidaceae		T	-	+	LC
34	*Bauhinia racemosa* Lam.	Leguminosae	Arichettu	T	+	-	
35	*Blepharis maderaspatensis* (L.) B.Heyne ex Roth	Acanthaceae		H	-	+	
36	*Blumea axillaris* (Lam.) DC.	Compositae		H	+	+	
37	*Boerhavia diffusa* L.	Nyctaginaceae	Atikimamidi	H	+	+	
38	*Brachiaria ramosa* (L.) Stapf	Poaceae		H	+	+	LC

S.No.	Name	Family	Vernacular name	Habit	CZ	BZ	IUCN
39	*Brachiaria reptans* (L.) C.A.Gardner & C.E.Hubb.	Poaceae		H	+	-	LC
40	*Buchanania cochinchinensis* (Lour.) M.R.Almeida	Anacardiaceae	Chinnasara	T	+	+	
41	*Butea monosperma* (Lam.) Taub.	Leguminosae	Modhuga	T	+	+	
42	*Caesalpinia bonduc* (L.) Roxb.	Leguminosae	Gacha podha	S	-	+	LC
43	*Cajanus scarabaeoides* (L.) Thouars	Leguminosae	Pedda adavikandhi	C	+	+	LC
44	*Calotropis gigantea* (L.) Dryand.	Apocynaceae	Tella Jelledu	S	-	+	
45	*Calotropis procera* (Aiton) Dryand.	Apocynaceae		S	+	+	
46	*Canthium coromandelicum* (Burm.f.) Alston	Rubiaceae	Balasa	S	+	+	
47	*Capparis spinosa* L.	Capparaceae		L	-	+	
48	*Cardiospermum halicacabum* L.	Sapindaceae	Budda teega	C	-	+	
49	*Careya arborea* Roxb.	Lecythidaceae	Budhadharmi	T	-	+	
50	*Cassia fistula* L.	Leguminosae	Rela, Semarela	T	+	-	LC
51	*Catunaregam spinosa* (Thunb.) Tirveng.	Rubiaceae	Manga	S	+	-	
52	*Ceiba pentandra* (L.) Gaertn.	Malvaceae		T	+	-	LC
53	*Celosia argentea* L.	Amaranthaceae	Gurugu	H	-	+	
54	*Chloris barbata* Sw.	Poaceae		H	+	+	
55	*Chloroxylon swietenia* DC.	Rutaceae	Billudu	T	-	+	V
56	*Chromolaena odorata* (L.) R.M.King & H.Rob.	Compositae		S	+	+	
57	*Cissus vitiginea* L.	Vitaceae	Adavi gummuduteega	S	+	-	
58	*Cleistanthus collinus* (Roxb.) Benth. ex Hook.f.	Phyllanthaceae	Wodisiaku	T	-	+	V
59	*Cleome gynandra L.*	Cleomaceae	Erra vominta	H	-	+	
60	*Cleome viscosa* L.	Cleomaceae	Kukka vominta	H	+	+	
61	*Clitoria ternatea* L.	Leguminosae	Sankupulu	C	+	+	
62	*Coccinia grandis* (L.) Voigt	Cucurbitaceae	Donda, Kakidonda	C	+	+	
63	*Cocculus hirsutus* (L.) W.Theob.	Menispermaceae	Chinnadusar teega	C	+	+	
64	*Combretum albidum* G.Don	Combretaceae		L	-	+	
65	*Corchorus trilocularis* L.	Malvaceae	Banki tutturu	H	-	+	
66	*Cordia dichotoma* G.Forst.	Boraginaceae		T	+	+	
67	*Crotalaria hebecarpa* (DC.) Rudd	Leguminosae		H	+	-	
68	*Crotalaria verrucosa* L.	Leguminosae	Gilligicha, yerri janumu	H	-	+	
69	*Croton bonplandianus* Baill.	Euphorbiaceae	Vanamokka	H	+	+	
70	*Cucumis melo* L.	Cucurbitaceae		C	-	+	
71	*Cuscuta reflexa* Roxb.	Convolvulaceae		C	+	-	
72	*Cymbopogon caesius* (Hook. & Arn.) Stapf	Poaceae		H	-	+	
73	*Cynodon dactylon* (L.) Pers.	Poaceae	Garika	H	+	+	

S.No.	Name	Family	Vernacular name	Habit	CZ	BZ	IUCN
74	*Cyperus corymbosus* Rottb.	Cyperaceae		H	+	-	
75	*Cyperus difformis* L.	Cyperaceae		H	+	+	LC
76	*Cyperus exaltatus* Retz.	Cyperaceae		H	+	+	LC
77	*Cyperus iria* L.	Cyperaceae		H	+	-	LC
78	*Cyperus pangorei* Rottb.	Cyperaceae		H	-	+	LC
79	*Cyperus rotundus* L.	Cyperaceae		H	+	+	LC
80	*Dactyloctenium aegyptium* (L.) Willd.	Poaceae	Nela ragi	H	+	+	
81	*Dalbergia lanceolaria* subsp. *paniculata* (Roxb.) Thoth.	Leguminosae	Sopera	T	-	+	
82	*Dalbergia sissoo* DC.	Leguminosae	Sisso	T	+	+	
83	*Datura metel* L.	Solanaceae		S	+	-	
84	*Datura stramonium* L.	Solanaceae	Umetta	S	+	+	
85	*Dendrocalamus strictus* (Roxb.) Nees	Poaceae		T	+	+	
86	*Dendrophthoe falcata* (L.f.) Ettingsh.	Loranthaceae	Kukka naluka	S	-	+	
87	*Dentella repens* (L.) J.R.Forst. & G.Forst.	Rubiaceae		H	+	-	LC
88	*Dichanthium annulatum* (Forssk.) Stapf	Poaceae		H	+	-	
89	*Dichrostachys cinerea* (L.) Wight & Arn.	Leguminosae	Sarathumma	S	+	+	LC
90	*Dicliptera paniculata* (Forssk.) I.Darbysh.	Acanthaceae	Chebera	H	-	+	
91	*Digera muricata* (L.) Mart.	Amaranthaceae		H	-	+	
92	*Digitaria bicornis* (Lam.) Roem. & Schult.	Poaceae		H	-	+	
93	*Diospyros chloroxylon* Roxb.	Ebenaceae	Ullinda	T	-	+	
94	*Diospyros melanoxylon* Roxb.	Ebenaceae	Beediakulu	T	+	-	
95	*Dodonaea viscosa* (L.) Jacq.	Sapindaceae	Banderu	S	+	-	
96	*Dregea volubilis* (L.f.) Benth. ex Hook.f.	Apocynaceae	Bandigurija teega	C	-	+	
97	*Echinochloa colona* (L.) Link	Poaceae		H	+	-	LC
98	*Echinochloa frumentacea* Link	Poaceae		H	-	+	LC
99	*Echinops echinatus* Roxb.	Compositae		H	-	+	
100	*Eclipta prostrata* (L.) L.	Compositae		H	+	+	LC
101	*Eleocharis geniculata* (L.) Roem. & Schult.	Cyperaceae		H	+	-	LC
102	*Eragrostis riparia* (Willd.) Nees	Poaceae		H	+	-	
103	*Eragrostis viscosa* (Retz.) Trin.	Poaceae	Banka sigarantha	H	-	+	
104	*Erythroxylum monogynum* Roxb.	Erythroxylaceae	Devadaru	S	-	+	
105	*Euphorbia hirta* L.	Euphorbiaceae	Nanubalu	H	+	+	
106	*Euphorbia maculata* L.	Euphorbiaceae		H	+	-	
107	*Evolvulus alsinoides* (L.) L	Convolvulaceae	Vishnukrantha	H	-	+	
108	*Ficus benghalensis* L.	Moraceae	Marri	T	+	+	
109	*Ficus hispida* L.f.	Moraceae	Bemmedu akulu	S	+	-	

S.No.	Name	Family	Vernacular name	Habit	CZ	BZ	IUCN
110	*Ficus racemosa* L.	Moraceae	Medi	T	-	+	
111	*Ficus religiosa* L.	Moraceae	Ragi, Ravi	T	-	+	
112	*Fimbristylis argentea* (Rottb.) Vahl	Cyperaceae		H	-	+	LC
113	*Flacourtia indica* (Burm.f.) Merr.	Salicaceae	Pullelaka	S	-	+	
114	*Gardenia gummifera* L.f.	Rubiaceae	Bikki	S	-	+	LC
115	*Getonia floribunda* Roxb.	Combretaceae		S	-	+	
116	*Gisekia pharnaceoides* L.	Gisekiaceae	Isakadasarikoora	H	+	-	
117	*Gomphrena globosa* L.	Amaranthaceae	Bendumalli	H	-	+	
118	*Grangea maderaspatana* (L.) Poir.	Compositae	Manchipatri	H	-	+	LC
119	*Grewia hirsuta* Vahl	Malvaceae	Janichettu	S	+	-	
120	*Grewia villosa* Willd.	Malvaceae		S	-	+	
121	*Gymnema sylvestre* (Retz.) R.Br. ex Sm.	Apocynaceae	Padapatri	C	-	+	
122	*Gymnosporia emarginata* (Willd.) Thwaites	Celastraceae	Danthi	S	+	+	
123	*Hardwickia binata* Roxb.	Leguminosae		T	+	+	LC
124	*Helicteres isora* L.	Malvaceae	Gooba thada	S	-	+	
125	*Heliotropium indicum* L.	Boraginaceae	Nagadanti	H	+	-	
126	*Heliotropium scabrum* Retz.	Boraginaceae		H	+	-	
127	*Hemidesmus indicus* (L.) R. Br. ex Schult.	Apocynaceae	Sugandhapala	C	+	-	
128	*Herissantia crispa* (L.) Brizicky	Malvaceae		S	-	+	
129	*Heteropogon contortus* (L.) P.Beauv. ex Roem. & Schult.	Poaceae		H	-	+	
130	*Hibiscus micranthus* L.f.	Malvaceae		S	+	-	
131	*Holarrhena pubescens* Wall. ex G.Don	Apocynaceae	Kolamukhi	S	-	+	LC
132	*Holoptelea integrifolia* Planch.	Ulmaceae		T	+	-	
133	*Hybanthus enneaspermus* (L.) F.Muell.	Leguminosae	Ratna purusha	H	-	+	
134	*Hydrilla verticillata* (L.f.) Royle	Hydrocharitaceae	Valakada	AH	-	+	LC
135	*Hygrophila auriculata* (Schumach.) Heine	Acanthaceae		AH	+	-	LC
136	*Hyptis suaveolens* (L.) Poit.	Lamiaceae	Danthitulasi	H	+	+	
137	*Indigofera linnaei* Ali	Leguminosae	Yerrapalleru	H	+	-	
138	*Indoneesiella echioides* (L.) Sreem.	Acanthaceae	Noogu Nelayemi	H	+	+	
139	*Ipomoea aquatica* Forssk.	Convolvulaceae	Thootiloora	AH	-	+	
140	*Ipomoea carnea* Jacq.	Convolvulaceae	Pandiri thooti	AH	+	-	
141	*Ipomoea nil* (L.) Roth	Convolvulaceae		C	-	+	
142	*Ipomoea obscura* (L.) Ker-Gawl.	Convolvulaceae	Kisaraaku teega	C	-	+	
143	*Ipomoea pes-tigridis* L.	Convolvulaceae	Meka madugu	C	+	+	
144	*Ixora pavetta* Andr.	Rubiaceae	Korivi chettu	S	-	+	
145	*Jatropha curcas* L.	Euphorbiaceae	Adavi amudam	S	-	+	
146	*Jatropha gossypiifolia* L.	Euphorbiaceae		S	-	+	

S.No.	Name	Family	Vernacular name	Habit	CZ	BZ	IUCN
147	*Justicia betonica* L.	Acanthaceae		H	-	+	
148	*Justicia procumbens* L.	Acanthaceae		H	-	+	
149	*Lagascea mollis* Cav.	Compositae		H	-	+	
150	*Lagerstroemia parviflora* Roxb.	Lythraceae	Chennangi	T	-	+	
151	*Lannea coromandelica* (Houtt.) Merr.	Anacardiaceae	Gumpana chettu	T	-	+	
152	*Lantana camara* L.	Verbenaceae	Cheeki, Pulikampa	S	+	+	
153	*Leucaena leucocephala* (Lam.) de Wit.	Leguminosae	Subabulu	T	+	+	
154	*Limonia acidissima* Groff	Rutaceae	Velaga	T	+	-	
155	*Ludwigia perennis* L.	Onagraceae	Lavangakaya	AH	+	-	LC
156	*Madhuca longifolia* var. *latifolia* (Roxb.) A.Chev.	Sapotaceae	Ippa	T	-	+	
157	*Malvastrum coromandelianum* (L.) Garcke	Malvaceae	Gaayapu alam	H	+	-	
158	*Mangifera indica* L.	Anacardiaceae	Mamidi	T	+	+	
159	*Manilkara hexandra* (Roxb.) Dubard	Sapotaceae	Palachetu	T	-	+	
160	*Marsilea quadrifolia* L.	Marsileaceae		AH	+	-	LC
161	*Melochia corchorifolia* L.	Malvaceae		H	-	+	
162	*Merremia tridentata* (L.) Hallier f.	Convolvulaceae	Mududantla	C	-	+	
163	*Mitragyna parvifolia* (Roxb.) Korth	Rubiaceae	Battaganapa	T	-	+	
164	*Mollugo nudicaulis* Lam.	Molluginaceae		H	+	-	
165	*Morinda pubescens* Sm.	Rubiaceae	Togarumogli	T	-	+	
166	*Mucuna pruriens* (L.) DC.	Leguminosae		L	-	+	
167	*Nyctanthes arbor-tristis* L.	Oleaceae	Parijatham	T	-	+	
168	*Ocimum americanum* L.	Lamiaceae	Kukka tulasi	H	+	-	
169	*Ocimum tenuiflorum* L.	Lamiaceae		H	+	+	
170	*Oldenlandia umbellata* L.	Rubiaceae		H	+	+	
171	*Operculina turpethum* (L.) Silva Manso	Convolvulaceae		C	-	+	
172	*Oxystelma esculentum* (L. f.) Sm.	Apocynaceae	Dudipala	C	-	+	
173	*Panicum curviflorum* Hornem.	Poaceae		H	-	+	
174	*Parthenium hysterophorus* L.	Compositae	Vayyaribhama	H	+	+	
175	*Paspalidium geminatum* (Forssk.) Stapf	Poaceae		H	+	-	LC
176	*Paspalum scrobiculatum* L.	Poaceae		H	-	+	LC
177	*Passiflora foetida* L.	Passifloraceae	Tellajumiki	C	+	+	
178	*Pavonia zeylanica* (L.) Cav.	Malvaceae	Karubenda	S	+	-	
179	*Pergularia daemia* (Forssk.) Chiov.	Apocynaceae	Dustapa teega	C	+	+	
180	*Persicaria glabra* (Willd.) M.Gómez	Polygonaceae		AH	-	+	LC
181	*Phoenix sylvestris* (L.) Roxb.	Arecaceae	Etha chettu	T	+	+	
182	*Phyla nodiflora* (L.) Greene	Verbenaceae		H	+	-	LC

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183	*Phyllanthus amarus* Schumach. & Thonn.	Phyllanthaceae	Nelausiri	H	+	+	
184	*Phyllanthus emblica* L.	Phyllanthaceae	Usirikaya	T	+	-	
185	*Phyllanthus maderaspatensis* L.	Phyllanthaceae		H	+	+	
186	*Phyllanthus reticulatus* Poir.	Phyllanthaceae	Purugudu	S	+	+	
187	*Physalis minima* L.	Solanaceae	Budda bhushada	H	-	+	
188	*Pithecellobium dulce* (Roxb.) Benth.	Leguminosae	Seemasinthaguddu	T	+	+	
189	*Plumbago zeylanica* L.	Plumbaginaceae	Tellachitramulamu	S	-	+	
190	*Premna mollissima Roth*	Lamiaceae		T	-	+	
191	*Prosopis juliflora* (Sw.) DC.	Leguminosae		T	+	+	
192	*Psydrax dicoccos* Gaertn.	Rubiaceae	Nalla balasa	S	-	+	V
193	*Pterolobium hexapetalum* (Roth) Santapau & Wagh	Leguminosae		L	-	+	
194	*Pulicaria wightiana* (DC.) C.B.Clarke	Compositae		H	-	+	
195	*Pycreus polystachyos* (Rottb.) P.Beauv.	Cyperaceae		H	-	+	LC
196	*Rhynchosia minima* (L.) DC.	Leguminosae	Gaddi chikkudu	C	+	-	LC
197	*Rivea hypocrateriformis* Choisy	Convolvulaceae		L	-	+	
198	*Ruellia tuberosa* L.	Acanthaceae		H	-	+	
199	*Rungia repens* (L.) Nees	Acanthaceae		H	-	+	
200	*Sapindus emarginatus* Vahl.	Sapindaceae	Knkudu	T	+	+	
201	*Schoenoplectiella articulata* (L.) Lye	Cyperaceae		H	-	+	LC
202	*Scoparia dulcis* L.	Plantaginaceae		H	-	+	
203	*Senna auriculata* (L.) Roxb.	Leguminosae	Thangedu	S	+	+	
204	*Senna occidentalis (L.) Link*	Leguminosae	Eddukomimaku	S	+	-	
205	*Senna tora* (L.) Roxb.	Leguminosae	Thantipumokka	H	+	+	
206	*Sesbania bispinosa* (Jacq.) W.Wight	Leguminosae		S	+	-	LC
207	*Sida acuta* Burm.f.	Malvaceae	Medabirusaku	H	+	+	
208	*Sida cordifolia* L.	Malvaceae	Bala, Tellagorra	H	+	+	
209	*Sida spinosa* L.	Malvaceae	Nagabala	H	+	+	
210	*Solanum surattense* Burm.f.	Solanaceae	Challamulaka	H	+	-	
211	*Soymida febrifuga* (Roxb.) A. Juss.	Meliaceae	Somi	T	-	+	
212	*Spermacoce hispida* L.	Rubiaceae	Madhanakattu	H	-	+	
213	*Sphaeranthus indicus* L.	Compositae	Bodasaramu	H	-	+	LC
214	*Sporobolus wallichii* Munro ex Thwaites	Poaceae		H	+	-	
215	*Streblus asper* Lour	Moraceae	Barraniki	T	-	+	
216	*Strychnos nux-vomica* L.	Loganiaceae	Mustichettu	T	-	+	
217	*Stylosanthes scabra* Vogel	Leguminosae		H	+	-	
218	*Tamarindus indica* L.	Leguminosae	Chinta	T	+	+	
219	*Tamarix ericoides* Rottler & Willd.	Tamaricaceae		S	-	+	

S.No.	Name	Family	Vernacular name	Habit	CZ	BZ	IUCN
220	*Tectona grandis* L.f.	Lamiaceae	Teku	T	+	+	
221	*Tephrosia purpurea* (L.) Pers.	Leguminosae	Vempali	H	+	+	
222	*Tephrosia villosa* (L.) Pers.	Leguminosae	Nuguvempali	H	+	-	LC
223	*Terminalia alata* Wall.	Combretaceae		T	-	+	
224	*Terminalia arjuna* (Roxb.ex DC.) Wt. & Arn.	Combretaceae	Tellamaddhi	T	-	+	
225	*Terminalia bellirica* (Gaertn.) Roxb.	Combretaceae	Thandra	T	-	+	
226	*Terminalia chebula* Retz.	Combretaceae		T	-	+	
227	*Tinospora sinensis* (Lour.) Merr.	Menispermaceae	Tipa teega	C	+	+	
228	*Trianthema portulacastrum L.*	Aizoaceae		H	-	+	
229	*Tribulus terrestris* L.	Zygophyllaceae	Palleru chinna palleru	H	-	+	
230	*Trichodesma zeylanicum* (Burm.f.) R.Br.	Boraginaceae		H	-	+	
231	*Tridax procumbens* (L.) L.	Compositae	Bella paku	H	+	+	
232	*Triumfetta rotundifolia* Lam.	Malvaceae		S	+	-	
233	*Typha angustifolia* L.	Typhaceae	Jammu	AH	+	+	
234	*Urena lobata* L.	Malvaceae	Anturasam	H	-	+	
235	*Vitex negundo* L.	Lamiaceae	Nalla vavilli	S	+	+	
236	*Waltheria indica* L.	Malvaceae	Nallabenda	S	+	+	
237	*Wrightia tinctoria* R.Br.	Apocynaceae	Reppala	T	-	+	
238	*Xanthium strumarium* L.	Compositae	Marulamathangi	S	+	+	
239	*Xylia xylocarpa* (Roxb.) Taub.	Leguminosae	Boja	T	-	+	
240	*Ziziphus jujuba* Mill.	Rhamnaceae	Regi chettu	S	+	+	LC
241	*Ziziphus oenopolia* (L.) Mill.	Rhamnaceae	Pariki kampa	L	-	+	
242	*Ziziphus xylopyrus* (Retz.) Willd.	Rhamnaceae	Pindu parighamu	S	-	+	

Note: T-Tree; S-Shrub; H-Herb; C-Climber; L-Liana; AH-Aquatic Herb; LC-Least Concern; V-Vulnerable

List of species present in the study area

List of Butterflies and Moths recorded in the study area (Core & Buffer zones)					
S. No.	**Common Name**	**Scientific name**	**Family**	**IWPA Status**	**IUCN Status**
1	Crimson rose	*Pachliopta hector*	Papilionidae	-	Not assessed
2	Lime swallowtail	*Papilio demoleus*	Papilionidae	-	Not assessed
3	Common Mormon	*Papilio polytes*	Papilionidae	-	Not assessed
4	Common emigrant	*Catopsilia pomona*	Pieridae	-	Not assessed
5	Mottled emigrant	*Catopsilia pyranthe*	Pieridae	-	Not assessed
6	Indian cabbage white	*Pieris canidia*	Pieridae	-	Not assessed
7	Common jezebel	*Delias eucharis*	Pieridae	-	Not assessed
8	Common evening brown	*Melanitis leda*	Nymphalidae	-	Not assessed
9	Yellow pansy	*Junonia hierta*	Nymphalidae	-	Least concern
10	Plain tiger	*Danaus chrysippus*	Nymphalidae	-	Not assessed
11	Striped tiger	*Danaus genutia*	Nymphalidae	-	Not assessed
12	Gram blue	*Euchrysops cnejus*	Lycaenidae	-	Not assessed
13	Small cupid	*Chilades parrhasius*	Lycaenidae	-	Not assessed
14	Tiny grass blue	*Zizula hylax*	Lycaenidae	-	Not assessed
15	Common grass dart	*Taractrocera maevius*	Hesperiidae	-	Not assessed

List of Aves

S. No.	Common Name	Scientific Name	Family	IWPA Status	IUCN Status
1	Brahminy starling	*Sturnia pagodarum*	Sturnidae	Schedule IV	Least concern
2	Laughing dove	*Spilopelia senegalensis*	Columbidae	Schedule IV	Least concern
3	Long-tailed shrike	*Lanius schach*	Laniidae	-	Least concern
4	Eurasian collared dove	*Streptopelia decaocto*	Columbidae	Schedule IV	Least concern
5	Red-naped ibis	*Pseudibis papillosa*	Threskiornithidae	Schedule IV	Least concern
6	Little Grebe	*Tachybaptus ruficollis*	Podicipedidae	Schedule IV	Least concern
7	Indian pond heron	*Ardeola grayii*	Ardeidae	Schedule IV	Least concern
8	Cattle egret	*Bubulcus ibis*	Ardeidae	Schedule IV	Least concern
9	Little egret	*Egretta garzetta*	Ardeidae	Schedule IV	Least concern
10	Grey heron	*Ardea cinerea*	Ardeidae	Schedule IV	Least concern
11	Black-shouldered kite	*Elanus axillaris*	Accipitridae	Schedule IV	Least concern
12	Crested serpent eagle	*Spilornis cheela*	Accipitridae	Schedule IV	Least concern
13	Common quail	*Coturnix coturnix*	Phasianidae	Schedule IV	Least concern
14	Indian peafowl	*Pavo cristatus*	Phasianidae	Schedule I	Least concern
15	Common moorhen	*Gallinula chloropus*	Rallidae	Schedule IV	Least concern
16	Red-wattled lapwing	*Vanellus indicus*	Charadriidae	-	Least concern
17	Yellow-wattled lapwing	*Vanellus malabaricus*	Charadriidae	-	Least concern
18	Common sandpiper	*Actitis hypoleucos*	Scolopacidae	Schedule IV	Least concern
19	Wood sandpiper	*Tringa glareola*	Scolopacidae	Schedule IV	Least concern
20	Spotted dove	*Spilopelia chinensis*	Columbidae	Schedule IV	Least concern
21	Rose ringed parakeet	*Psittacula krameri*	Psittacidae	Schedule IV	Least concern
22	Lesser coucal	*Centropus bengalensis*	Cuculidae	Schedule IV	Least concern
23	Brown-throated martin	*Riparia paludicola*	Hirundinidae	-	Least concern

S. No.	Common Name	Scientific Name	Family	IWPA Status	IUCN Status
24	Common Kingfisher	*Alcedo atthis*	Alcedinidae	Schedule IV	Least concern
25	White-throated kingfisher	*Halcyon smyrnensis*	Alcedinidae	Schedule IV	Least concern
26	Chestnut-headed Bee-eater	*Merops leschenaulti*	Meropidae	-	Least concern
27	Green bee-eater	*Merops orientalis*	Meropidae	-	Least concern
28	Indian roller	*Coracias benghalensis*	Coraciidae	Schedule IV	Least concern
29	Indian Pygmy Woodpecker	*Dendrocopos nanus*	Picidae	Schedule IV	Least concern
30	*Paddyfield Pipit*	*Anthus rufulus*	Motacillidae	Schedule IV	Least concern
31	House Sparrow	*Passer domesticus*	Passeridae	-	Least concern
32	Black Drongo	*Dicrurus macrocercus*	Dicruridae	Schedule IV	Least concern
33	White- bellied Drongo	*Dicrurus caerulescens*	Dicruridae	Schedule IV	Least concern
34	Common myna	*Acridotheres tristis*	Sturnidae	Schedule IV	Least concern
35	House crow	*Corvus splendens*	Corvidae	Schedule V	Least concern
36	Red-vented bulbul	*Pycnonotus cafer*	Pycnonotidae	Schedule IV	Least concern
37	Red-whiskered bulbul	*Pycnonotus jocosus*	Pycnonotidae	Schedule IV	Least concern
38	Common babbler	*Argya caudata*	Leiothrichidae	Schedule IV	Least concern
39	Jungle babbler	*Turdoides striatus*	Leiothrichidae	Schedule IV	Least concern
40	Indian Robin	*Saxicoloides fulicata*	Muscicapidae	Schedule IV	Least concern

List of Herpetofauna (Reptiles & Amphibians)

S. No.	Common Name	Scientific name	Family	IWPA Status	IUCN Status
1	Indian rat snake	*Ptyas mucosa*	Colubridae	Schedule II	Least concern
2	Forest Calotis	*Calotes rouxi*	Agamidae	-	Least concern
3	Oriental Garden Lizard	*Calotes versicolor*	Agamidae	--	Not assessed
4	Common Indian monitor	*Varanus bengalensis*	Varanidae	Schedule I	Least concern
5	Ferguson's toad	*Duttaphrynus scaber*	Bufonidae	--	Least concern
6	Indian Green frog	*Euphlyctis hexadactylus*	Dicroglossidae	--	Least concern
7	Ant frog	*Microhyla ornata*	Microhylidae	--	Least concern
8	Narrow-mouthed frog	*Microhyla rubra*	Microhylidae	--	Least concern
9	Indian Bullfrog	*Hoplobatrachus tigerinus*	Dicroglossidae	--	Least concern

List of mammals

S. No.	Common Name	Scientific Name	Family	IWPA Status	IUCN Status
1	Little Indian Field Mouse	*Mus booduga*	Muridae	Schedule IV	Least concern
2	Common mongoose	*Herpestes edwardsii*	Herpestidae	Schedule II	Least concern
3	Wild boar	*Sus scrofa*	Suidae	Schedule III	Not assessed
4	House mouse	*Mus musculus*	Muridae	Schedule IV	Not assessed
5	Indian Palm squirrel	*Funambulus palmarum*	Sciuridae	-	Not assessed
6	*Indian Hare*	*Lepus nigricollis*	Leporidae	Schedule IV	Least concern
7	Rhesus monkey	*Macaca mulatta*	Cercopithecidae	Schedule II	Least concern
8	Indian flying fox	*Pteropus giganteus*	Pteropodidae	Schedule IV	Least concern

24. **Social Impact Assessment and R&R, if any details to be submitted in the chapter 7 of the EIA/EMP report as per the generic structure.**

Social Impact Assessment (SIA)

SIA is an important part of Resettlement Action Plans (RAPs). This project doesn't involve any Rehabilitation and Resettlement. As a part of Environmental & Social baseline study, Socio Economic Survey on demography/infrastructure/education was carried out in the mine vicinity of 18 villages in Manthani, Kannala and Ramagundam mandal, of Peddapalli district and Jaipur mandal of Mancherial district.
The information regarding facilities available and the opinion of the people was sought by floating questionnaires and interaction with the people. This is done for identifying the impacts due to the project on social aspects, so that proper actions/measures could be taken up for the benefit of people of the surrounding villages (economically and quality of life). Being an operating mine, the capital investments and the CSR activities will add for development of the region.

The proposed mine area is not a major agrarian based area only a few are cultivating. The major crop is paddy, cotton and fodder for their cattle. Due to the present mine, the locals are expecting some employment and development activities.

Focussed group discussion was carried out with stakeholders to minimize the negative impacts in the area and make them feel that they are the ultimate beneficiaries of the project.

The details of village wise facilities requested by the villagers during FGD are given below:

1. **Jangaon village (10th ward Ramagundam Corporation):** Medical camps, Dobhi ghat, Books for Library, Bheemeshwar temple renovation works, Sewage water should be treated with STP and release into the pond, Employment to local people, Compound wall to play ground, Shivalayam to Godavarikhani CC Road (1.5 km), Toilet and one room and shed at Indira Kranthi Patham (IKP) Centre.
2. **Sundilla village (Hamlet villages- Narasimhapalli and Guddellapalli):** Fill the water into Bakka cheruvu with mine discharge water for irrigation, Employment to local youth, Veterinary hospital, Medical camp, Renovation works for Raja Rajeswhara temple, Graveyard/ Burial ground, Basic amenities for Narasimha Swamy temple, Indira Kranthi Patham (IKP) Centre for farmers, Tailoring, Cutting, beautification training courses to women, Medical camps and Public toilets at temple for tourists.
3. **Mustyala village:** SC, BC and Mahila bhavan community halls, Central Library, Drinking water treatment plant, Employment to local students, Computer training, Tailoring, Cutting & maggum works and Blows designing.
4. **Bestapalli village:** Grama Panchayat building, Sanitation infrastructure, Internal CC road 5 no's, Drinking water treatment plant, Village approach road, Benches and sport kit for school, Community hall, Graveyard / Burial ground, Library, Street lights, Skill training programmes for women, Heavy Driving licence programme and Small culvert bridge for village to reach the agriculture fields in rainy season.
5. **Dubbapalli village:** CC roads(3 – 4km), Sewage drainage channels, water treatment plant, Grama Panchayat building, Medical health camp, street light, high max light, Library, school compound wall and Training programmes for women and youth.
6. **Veerlapalli village (Ramagundam 38 division):** Community hall, School building renovation, Graveyard / Burial ground, Health camps, Drinking water treatment plant, Benches and sport kit for school, Skill development training programmes for women, Cricket kit for youth and Play ground renovation.

7. **Chillapalli village:** Sewage drainage channels, community hall, Cement roads (2 to 3 km), Bore wells 2 no's, Medical camp, water treatment plant, Gate, girls toilet, sports kit for school and Training programmes for women and youth.
8. **Siripuram Village:** Dhobhighat, Internal CC roads (2 km), Bore wells -5 no's, Grama panchayat compound wall, Health camps, Skill training programmes for women and Sanitation/Drainage infrastructure.
9. **Chandanapuram village:** Dhobhighat, Veterinary hospital, Sanitation infrastructure, Internal CC road for village, Village approach road, Benches and sport kit for school, Community hall, Library, Street lights, Skill development training programmes for women, Heavy Driving licence programme, Bus shelter, Anganwadi building and Medical camp.
10. **Shettipalli village:** Internal CC road and Compound wall to village temples.
11. **Godavari Khani (Vittalnagar, Sithanagar, Lenin nagar, Bapuji nagar and Ganganara):** Employment to local people, Drinking water treatment plant, Skill development training programmes for women and Heavy Driving licence programme.
12. **Malkapur:** Employment to local people, Sanitation infrastructure, Drinking water treatment plant, Skill development training programmes for women and Heavy Driving licence programme.

It was observed that the Quality of Life index of the sample households is Fair (as per the gradation of scores mentioned earlier), indicating that living conditions and infrastructural facilities are fair enough in the region and also the individual resource base has also been fair. This indicates that life support system has been sufficient and the social sector development also has been at fair level.

However, the project is expected to yield a positive impact on the socio-economic environment. It helps in sustaining the development of this area including further development of infrastructure facilities. It is evident from the past history of SCCL that it is putting on continuous efforts and instrumental in enhancing the living conditions of the mining and surrounding communities. The proposed expansion of mining activities in the mine will provide indirect employment, medical and communication facilities etc.

SCCL has taken up certain developmental activities in surrounding villages of Ramagundam Area-1 (RG-1 Area) under "SHAPE" and CSR activities like construction of Roads & Culverts, Drainage & Sanitation, Education, Drinking Water Supply, street lighting, drinking water taps, bore wells etc.The other CSR Activities taken up at Ramagundam Area are Vocational Training programmes in Tailoring, Beautician, Computer Multi Media & Computer DTP, Computer Hard ware, Fabric Painting, L.M.V Driving, Spoken English, Electrician, Cell Phone Repairing, Saree Rolling Paper Carry Bag at Hyderabad, DSC - Group – II, AP Police & Army Soldiers and Literacy Programme for spouses of work person.

Medical camps are being conducted frequently for the benefit of surrounding villagers of existing mines. Free treatment is being extended to the Project Affected Families by admitting them as in patients in SCCL Hospitals, in case of emergency, they are being provided with Health Cards to avail the medical facility at SCCL Hospitals. Mobile medical camps are being organized in surrounding villages of Ramagundam Area including free supply of medicines.

Total cost of the CSR works carried out in RG-1 Area up to 2019 is Rs.16.57 Crores.

S.No	Activities	Expenditure in Rs.Cr
1	Infrastructure development like laying of CC roads, construction of drainages, bus shelters , arranging street lighting , etc.	8.59

2	Providing Education facilities and skill development training	5.75
3	Drinking water supply including construction of Bore wells and drinking water pipe lines, over head tanks for water supply etc.	1.73
4	Medical facilities	0.50
Total		**16.57**

Further, fund provision is made under CER for taking up various activities for development of project affected areas.

Rehabilitation and Resettlement Plan

The proposed project for cluster of GDK 1&3, 2&2A and 5 inclines which does not involve Rehabilitation and Resettlement.

Hence, Rehabilitation and Resettlement plan is not envisaged for this project. The additional facilities requested by the villagers during FGD will be addressed as part of CSR/CER activities.

25. **As suggested by the committee, revised remediation plan, community and natural resource augmentation plan should be submitted. Activities along with the budgetary provision proposed under remediation plan should be revisited.**

Revised remediation plan, community and natural resource augmentation plan as suggested by the Committee is furnished below:

Introduction to damage assessment:

The objective of Damage Assessment report is to comply with violation notification Ref. no. S.O. 804 (E), dated 14.03.2017 and prepare assessment report of Environmental Damage, Remediation Plan and Natural & Community Resource Augmentation plan. Thus, in this report data have been collected and analyzed for relevant environmental parameters. For identification of overall impact due to mining activity during operation, the air, water, noise, soil, land environment and other relevant data has been assessed.

Remediation Plan

The objectives of remediation plan are to identify mitigation and control measures and its cost.

Natural and Community Resource Augmentation Plan:

Augmentation plan includes various activities which will be done for augmentation of Natural Resources like water, land, vegetative cover, etc. Activities considered for augmentation of community resources has been mentioned below:

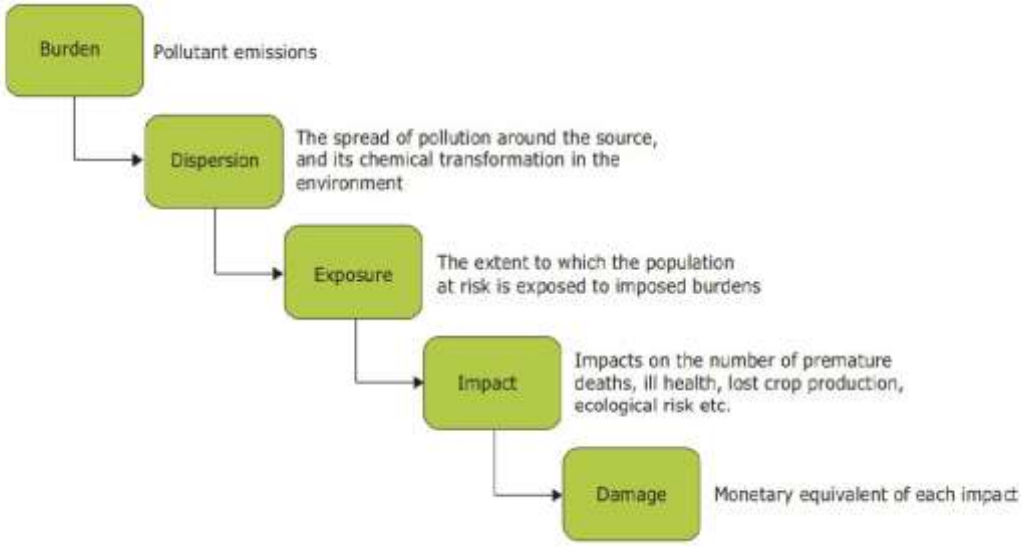
- It may be physical structure or place – as a school, hospital, library or recreation center or others.
- It may be a community service that makes life better for majority of community members - public transportation, early childhood education center, community recycling facilities, cultural organization, etc. (or)
- It may be an activity that provides jobs and supports the local economy.

IMPACT ASSESSMENT PATHWAY

Assessment of Ecological Damage

Impact on Air Environment due to excess Production of Coal

The impact of pollutants emission into the air atmosphere is assessed for the operation period between 1993-94 and 2018-19. For the assessment, the maximum production during the year 1993-



94 is taken as baseline production value and any excess production in the corresponding years till 2018-19 from base value is considered as violation. The emissions are quantified based on the activity involved during the production like loading, unloading and transportation of coal.

Since the mines have valid consent for operation from 1994-95 onwards, only the difference in the excess amount is considered for damage assessment. Different air pollution parameters Particulate Matters less than 10µ (PM10), Particulate Matter less than 2.5µ (PM2.5), Sulphur Dioxide (SO2) and Nitrogen Oxides (NOx) have been identified as critical parameters relating to project activities based on the standard ToR. Please refer below table of summarized details for the mines that have exceeded the base level production to a total of 8 years, 5 years and 15 years for GDK 1&3, 2&2A and 5 inclines respectively with corresponding quantified emission values of respective pollutants.

Years	GDK-1&3	GDK 2&2A	GDK 5	Total in MT	GDK-1&3 Excess	GDK-2&2A Excess	GDK -5 Excess	Excess Total in MT
	MT	MT	MT		MT	MT	MT	
1993-94	**0.344**	**0.45**	**0.36**	**1.154**	**0**	**0**	**0**	**0**
1994-95	0.393	0.486	0.324	1.203	**0.049**	**0.036**	0	0.085
1995-96	0.349	0.384	0.267	1.000	**0.005**	0	0	0.005
1996-97	0.379	0.427	0.300	1.106	**0.035**	0	0	0.035
1997-98	0.351	0.386	0.301	1.038	**0.007**	0	0	0.007
1998-99	0.371	0.415	0.29	1.076	**0.027**	0	0	0.027
1999-00	0.367	0.386	0.308	1.061	**0.023**	0	0	0.023
2000-01	0.406	0.427	0.331	1.164	**0.062**	0	0	0.062
2001-02	0.375	0.395	0.405	1.175	**0.031**	0	**0.045**	0.076

Years	GDK-1&3	GDK 2&2A	GDK 5	Total in MT	GDK-1&3 Excess	GDK-2&2A Excess	GDK -5 Excess	Excess Total in MT
	MT	MT	MT		MT	MT	MT	
2002-03	0.343	0.327	0.443	1.113	0	0	**0.083**	0.083
2003-04	0.3	0.31	0.478	1.088	0	0	**0.118**	0.118
2004-05	0.338	0.325	0.462	1.125	0	0	**0.102**	0.102
2005-06	0.304	0.306	0.512	1.122	0	0	**0.152**	0.152
2006-07	0.162	0.307	0.363	0.832	0	0	**0.003**	0.003
2007-08	0.271	0.368	0.443	1.082	0	0	**0.083**	0.083
2008-09	0.298	0.367	0.478	1.143	0	0	**0.118**	0.118
2009-10	0.307	0.451	0.501	1.259	0	**0.001**	**0.141**	0.142
2010-11	0.342	0.55	0.485	1.377	0	**0.100**	**0.125**	0.225
2011-12	0.264	0.452	0.437	1.153	0	**0.002**	**0.077**	0.079
2012-13	0.272	0.467	0.495	1.234	0	**0.017**	**0.135**	0.152
2013-14	0.29	0.364	0.475	1.129	0	0	**0.115**	0.115
2014-15	0.287	0.339	0.443	1.069	0	0	**0.083**	0.083
2015-16	0.255	0.338	0.382	0.975	0	0	**0.022**	0.022
2016-17	0.228	0.292	0.303	0.823	0	0	0	0
2017-18	0.21	0.312	0.31	0.832	0	0	0	0
2018-19	0.236	0.294	0.29	0.82	0	0	0	0
Total	**8.041**	**9.925**	**10.186**	**28.15**	**0.239**	**0.156**	**1.402**	**1.797**

Summarized Details of Air pollutant Emission into Environment for Excess production in Kg/day

GDK 1 & 3 ANNUAL AIR EMISSION FOR YEARS EXCEEDING BASE PRODUCTION (CONTROLLED)									
YEAR	LOADING		UNLOADING		TRANSPORT				Total No. Of Days (excl. 96 Monsoon days out of 306 Working days)
	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	SOX	NOX	
1993-94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
1994-95	0.18	0.02	0.14	0.02	0.31	0.09	0.22	1.08	210
1995-96	0.02	0.00	0.01	0.00	0.00	0.00	0.02	0.12	210
1996-97	0.13	0.02	0.10	0.01	0.16	0.04	0.16	0.79	210
1997-98	0.02	0.00	0.02	0.00	0.01	0.00	0.03	0.16	210
1998-99	0.10	0.01	0.08	0.01	0.09	0.03	0.13	0.63	210
1999-00	0.08	0.01	0.07	0.01	0.05	0.01	10.80	54.00	210
2000-01	0.22	0.03	0.18	0.02	0.37	0.11	0.15	0.73	210
2001-02	0.11	0.02	0.09	0.01	0.09	0.03	0.08	0.40	210
GDK 2 & 2A ANNUAL AIR EMISSION FOR YEARS EXCEEDING BASE PRODUCTION (CONTROLLED)									
YEAR	LOADING		UNLOADING		TRANSPORT				Total No. Of Days (excl. 96 Monsoon days out of 306 Working days)
	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	SOX	NOX	
1993-94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
1994-95	0.13	0.02	0.11	0.01	0.10	0.03	0.13	0.64	210
2009-10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	210
2010-11	0.36	0.05	0.29	0.03	0.27	0.08	0.11	0.54	210
2011-12	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.01	210
2012-13	0.06	0.01	0.05	0.01	0.01	0.00	0.02	0.08	210
GDK 5 ANNUAL AIR EMISSION FOR YEARS EXCEEDING BASE PRODUCTION (CONTROLLED)									
YEAR	LOADING		UNLOADING		TRANSPORT				Total No. Of Days (excl. 96 Monsoon days out of 306 Working days)
	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	SOX	NOX	
1993-94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
2001-02	0.16	0.02	0.13	0.02	0.46	0.13	0.19	0.96	210
2002-03	0.30	0.04	0.24	0.03	1.58	0.45	0.32	1.61	210
2003-04	0.42	0.06	0.35	0.04	3.19	0.91	0.43	2.13	210
2004-05	0.36	0.05	0.30	0.03	2.38	0.68	0.38	1.90	210
2005-06	0.54	0.08	0.45	0.05	5.29	1.52	0.51	2.56	210
2006-07	0.01	0.00	0.01	0.00	0.00	0.00	0.01	0.06	210
2007-08	0.30	0.04	0.24	0.03	1.26	0.36	0.32	1.61	210
2008-09	0.42	0.06	0.35	0.04	2.55	0.73	0.43	2.13	210
2009-10	0.50	0.07	0.41	0.05	3.64	1.04	0.49	2.43	210
2010-11	0.45	0.06	0.37	0.04	2.86	0.82	0.44	2.22	210
2011-12	0.28	0.04	0.23	0.03	1.09	0.31	0.30	1.51	210
2012-13	0.48	0.07	0.40	0.05	3.34	0.96	0.47	2.35	210
2013-14	0.41	0.06	0.34	0.04	2.42	0.69	0.42	2.08	210
2014-15	0.30	0.04	0.24	0.03	1.13	0.32	0.32	1.61	210
2015-16	0.08	0.01	0.06	0.01	0.08	0.02	0.10	0.50	210

- ***-The emission rate is taken as per CMPDI study report for PM 2.5 & 10 (Refer Annexure II)**
- **For the emission rate of NoX from vehicle during the transport, the Bharat stage emission standards is referred**
- **For the emission rate of SoX from vehicle during the transport, 20% of NoX value is considered**

From the above table, it can be observed that there is no appreciable damage on air environment due to excess production. Further the following environmental measures were in place for controlling the emission,

- Effective water spraying arrangements in underground working places, Belt conveyor road ways, crushers, haulage roadways, junctions, transfer points as well as at coal loading bunkers at pithead on surface.
- Enclosures at coal transfer points.
- Water spraying arrangement along coal transport route within the mine premises.
- Clearing off coal dust heaps on surface.
- Black topping of permanent coal transport route.
- Proper periodic maintenance of vehicles, etc.
- Covering the trucks with tarpaulin while transporting coal.
- The underground workings of the mine are well ventilated by adequate ventilation arrangements
- The requirements and standards specified in this regard by Director General of Mines Safety (DGMS) are adhered to.
- Green belt developed at mine premises and along coal transport route by planting with native species.
- Ambient air quality is being monitored every fortnight in and around the project area.

Monetary value of Air pollutants emission due to excess production

DAMAGE COST FOR EMISSION OF POLLUTANTS DURING EXCESS PRODUCTION				
YEAR	INR/KG*			
	PM_{10}	**$PM_{2.5}$**	**SOX**	**NOX**
1994-95	₹ 64,293.06	₹ 19,610.52	₹ 14,812.31	₹ 49,374.36
1995-96	₹ 2,397.66	₹ 533.24	₹ 748.44	₹ 2,494.80
1996-97	₹ 25,757.14	₹ 7,753.86	₹ 4,966.92	₹ 16,556.40
1997-98	₹ 3,476.37	₹ 800.15	₹ 1,020.60	₹ 3,402.00
1998-99	₹ 18,023.80	₹ 5,154.34	₹ 3,946.32	₹ 13,154.40
1999-00	₹ 13,437.12	₹ 3,531.93	₹ 3,402.00	₹ 11,340.00
2000-01	₹ 51,720.39	₹ 16,465.97	₹ 4,611.60	₹ 15,372.00
2001-02	₹ 70,507.52	₹ 23,369.43	₹ 8,550.36	₹ 28,501.20
2002-03	₹ 1,42,229.40	₹ 54,751.30	₹ 10,137.96	₹ 33,793.20
2003-04	₹ 2,65,738.35	₹ 1,06,309.04	₹ 13,403.88	₹ 44,679.60
2004-05	₹ 2,04,600.62	₹ 80,644.18	₹ 11,975.04	₹ 39,916.80
2005-06	₹ 4,21,807.51	₹ 1,72,565.67	₹ 16,125.48	₹ 53,751.60
2006-07	₹ 1,421.16	₹ 312.13	₹ 408.24	₹ 1,360.80
2007-08	₹ 1,21,034.40	₹ 45,253.54	₹ 10,137.96	₹ 33,793.20
2008-09	₹ 2,22,899.16	₹ 87,112.23	₹ 13,403.88	₹ 44,679.60
2009-10	₹ 3,06,694.48	₹ 1,22,064.36	₹ 15,342.08	₹ 51,140.25
2010-11	₹ 3,09,030.11	₹ 1,14,127.41	₹ 17,441.87	₹ 58,139.55
2011-12	₹ 1,07,480.27	₹ 39,612.70	₹ 9,575.21	₹ 31,917.38
2012-13	₹ 2,91,214.44	₹ 1,14,045.19	₹ 15,312.31	₹ 51,041.03
2013-14	₹ 2,12,986.47	₹ 82,994.93	₹ 13,131.72	₹ 43,772.40
2014-15	₹ 1,11,950.83	₹ 41,183.07	₹ 10,137.96	₹ 33,793.20
2015-16	₹ 14,927.80	₹ 4,308.16	₹ 3,129.84	₹ 10,432.80
Total	₹ 29,83,628.06	₹ 11,42,503.32	₹ 2,01,721.97	₹ 6,72,406.56

*Cost are based on various Case studies of European Environmental Agency Air emission penalty paid for environmental damage and only < 20% of cost is taken as per Indian currency value compared with Euro

Impact on Water Environment due to excess Production of Coal

The impact on water environment is assessed based on following modes of its availability,

- Ground Water
- Surface Water

Apart from the above fresh water sources other impacts considered is due to wastewater generated via various activities (Sewage & Effluent),

Impact on Ground Water

In the process of mining, water will be accumulated in the dip most places of the mine due to natural seepage and mining operations such as stowing operations etc. The water so accumulated is collected in sumps at different places in the mine and is pumped out to the surface with suitable capacity pumps. Please find below summarized table of excess water pumped that is considered for violation due to non-availability of NOC from concern department till 2007-08 for respective mines.

Summary of Excess seepage water pumped due to excess production

Years	GDK-1&3 Excess	GDK-2&2A Excess	GDK -5 Excess	GDK-1&3 Excess	GDK-2&2A Excess	GDK -5 Excess
	CuMtr per day seepage			CuMtr per year seepage for 306 working days		
1994-95	376.32	276.48	NA	115153.9	84602.88	NA
1995-96	38.4	NA	NA	11750.4	NA	NA
1996-97	268.8	NA	NA	82252.8	NA	NA
1997-98	53.76	NA	NA	16450.56	NA	NA
1998-99	207.36	NA	NA	63452.16	NA	NA
1999-00	176.64	NA	NA	54051.84	NA	NA
2000-01	476.16	NA	NA	145705	NA	NA
2001-02	238.08	NA	345.6	72852.48	NA	105753.60
2002-03	NA	NA	637.44	NA	NA	195056.64
2003-04	NA	NA	906.24	NA	NA	277309.44
2004-05	NA	NA	783.36	NA	NA	239708.16
2005-06	NA	NA	1167.36	NA	NA	357212.16
2006-07	NA	NA	23.04	NA	NA	7050.24

The pumped out water is filtered on surface using filter beds to make it potable and used for drinking and other purposes on the pit head as well as in the colonies.The details of Filter beds is given in following table,

MINE WATER TREATMENT VIA FILTER BEDS			
Mine	GDK 1&3	GDK 2&2A	GDK-5 INC
No of F.B	1	2	2
Capacity in KL	4557.14	9114.28	9114.28

Using the above data the impact on ground water is analyzed based on two parameters,

- **Depletion of ground water level and mitigation measures adopted -**
  - Based on Long term water level trends and hydrographs it is observed there is no adverse impact of mining on groundwater regime observed in this area.
  - The proposed project is a reconstruction project and the groundwater regime over the area is already redistributed due to underground mining, no significant impact is anticipated on the ground water regime and no villages, streams, cultivation lands etc. will be affected.
  - About 125.63 Ha.M / year of surplus water from the existing mines is being let out into the local streams/tanks which is being used by the local people to meet their agricultural needs. This is also augmenting recharge to the ground water regime of the area.
  - The phreatic surface which is being monitored regularly varies from 1.10m to 12.81m during pre-monsoon season and 1.02m to 11.07m during post-monsoon season. The

average water level fluctuation is 2.63m. Additionally, the attitude of piezometric surface is also being monitored. The piezometric heads vary from 1.02m to 27.10m bgl during post monsoon and 1.75m to 30.46m bgl during pre-monsoon season

- As per GEC-2015, this area is categorised as 'Semi-Critical'. SCCL has taken steps to augment groundwater through construction of Rain water harvesting pits.
- During the year (2017-2018) about 120 Rain water harvesting pits were constructed in RG-III, RG-II and RG-I areas
- In the event of any adverse impact on the surrounding area, SCCL will take remedial measures to maintain the ground water regime.

- **Impact on ground water quality –**
  - To assess the impact on ground water quality Ground water results of 2012-13 and 2019-20 are compared with ISO: 10500 of acceptable and permissible limits which are stipulated for water to be fit for drinking purpose with ground water as source. All the parameters are below the permissible limits.

Impact on Surface Water

- The source of waters that are considered under surface water category are as follows,
  - Ponds or Lakes
  - Catchment Tanks
  - Nallahs
  - Rivers or Streams
- For above all category the primary source of water is rainfall. The impact on the surface hydrology (quantity) and quality depends on the provisions that are in place like check dams, Rain water harvesting and recharge pits, etc. to handle the quantum of monsoon rains in the core area and buffer areas.
- The Jangaon and Sundilla tanks are located in the dip side property of GDK 1&3, 2&2A mines respectively.
- The Erra cheruvu is located on the south eastern edge of GDK 5 Inc. property.
- Seasonal nallahs feeding above tanks are flowing across these cluster mines.
- The following provisions are considered to be installed to address the impacts due to above mentioned points

Summary of damage assessed due to surface water management

S.No	Damage Description	Mitigation Measure to be adopted
a.	Contamination of Jangaon and Sundilla tanks due to excess sediments deposition	Construction of Check dam / settling tank prior to Sundilla & Jangaon tanks
b.	Prevention of excess contaminants to get mixed in the nallah	Plantation on both sides of nala with 7.5 Metre width along the running length of approx. 362 meters in GDK 1 & 3 mine area (Acquired land)

Impact due to Provision for Rain Water Harvesting

About 120 no's rainwater harvesting pits each with storage capacity of 10.125 cubic meters were constructed during 2017-18. The storage capacity of all above structures amounts to 0.001215 Hectare meters and through which 0.068 Hectare meter/year recharge is being occurring in the buffer zone. It is suggested to augment ground water recharge to the extent possible and this measure will restore the groundwater regime.

Table 5- **RAIN WATER HARVESTING CHART WITHING MINE LEASE AREA**

S. NO	DE	GDK 1 &3	GDK 2 & 2A	GDK 5	ANNUAL RAIN WATER ROOFTOP CATCHMENT (CuM)			ANNUAL RAIN WATER SURFACE RUNOFF (CuM)		
1	PIT HEAD INFRA	4.32	4.87	6.05	30410.64	34275.33	42588.98			
2	ADMIN INFRA	5.60	6.27	0.67	39421.20	44151.74	4730.54			
3	ROADS	12.24	5.88	18.34				46395.72	22299.51	69525.35
4	TOWNS	6.00	0.00	0.00				22743.00	0.00	0.00

	HIP / COLONY									
5	SAND STOCK AND STOWING BUNKER	22.60	20.50	47.43				85665.30	77705.25	179783.42
6	PLANTATION EXISTING	62.71	107.45	128.60				237702.26	407289.23	487458.30
7	PLANTATION PROPOSED	27.20	14.75	205.12				103101.60	55909.88	777507.36
8	VACANT	44.23	42.24	34.68				167653.82	160110.72	131454.54
9	OTHERS (GRAVE YARD, SAMMAKKA JATHARA / IDGA YARD))	10.64	0.00	5.00				40330.92	0.00	18952.50
TOTAL		195.54	201.96	445.89	69831.84	78427.07	47319.52	703592.61	723314.58	1664681.47
Formula used to calculate Average rainwater runoff = A x Rf x AvRc Where, A = Total area ; Rf = Rainfall =1082.83 mm (Average Annual Rainfall) AvRc= Avg. run-off coefficient= 0.65 (Rooftop) & 0.30 (Plantation & & Other areas)										

Positive impacts on Water environment (Ground Water & Surface water)

- The excess mine water, which is being discharged into nearby tanks is used by local villagers for agricultural purpose. This is also augmenting recharge of the ground water regime. As there is surplus amount of water is available within the ground water table, there is no significant impact on the ground water table.
- The effluent from service facilities is being collected by a sewerage treatment system and treated by means of septic tanks and soak pits.
- Sewage is being treated in septic tank followed by soak pit for existing townships in RG-I area. A modern sewage treatment plant is also being constructed in this area for treating colony sewage.
- No effluent water is being discharged directly into surface water bodies. Measures have been taken to prevent the contamination of surface water bodies. These tanks are being used to meet the agricultural requirement of the area.

Monetary value for impacts on Water environment (Ground Water & Surface water)

S.No	Damage Description	Damage Costing
a.	**Compensation cost for using excess mine water during excess production till the year 2006-07 and without a valid NOC from concern authority**	• **Total excess mine discharge utilized from 1993-94 till 2006-07 in all three mines(GDK 1, 3, 2, 2A & 5) = 1828.362 Million Litres** • **Damage Cost for water pumped out @ INR 8 Rs/CuMtr** • **Total Damage cost = INR 1.462 Crores**
b.	**Construction of Check dam / settling tank prior to Sundilla & Jangaon tanks**	• **Cost for construction of 2 Nos Check dam / settling tank @ INR 5 Lacs each**
c.	**Plantation on both sides of nallah with 7.5 Metre width along the running length of approx. 362 meters in GDK 1 & 3 mine area (Acquired land)**	• **Total area for plantation = 0.27 Hectares** • **Cost for plantation @ 1500 trees per hectare and INR 500 per tree is INR 2.03 Lacs**

Impact on Land Environment due to excess Production of Coal

Submission of land use details pre and present and post mining for entire land 1356.85 Ha with LULC comparison as interpreted through Satellite imagery.

The total area of cluster of GDK mines is 1356.85 ha. The Landuse land cover of 1993 and 2019 is compared with satellite imagery procured for Kharif and Rabi seasons from National Remote Sensing Data Center (NDC), NRSC. The satellite imagery for kharif and rabi season is shown in Figure No.1 and 2.

Figure No.1 Satellite Imagery of Kharif Season

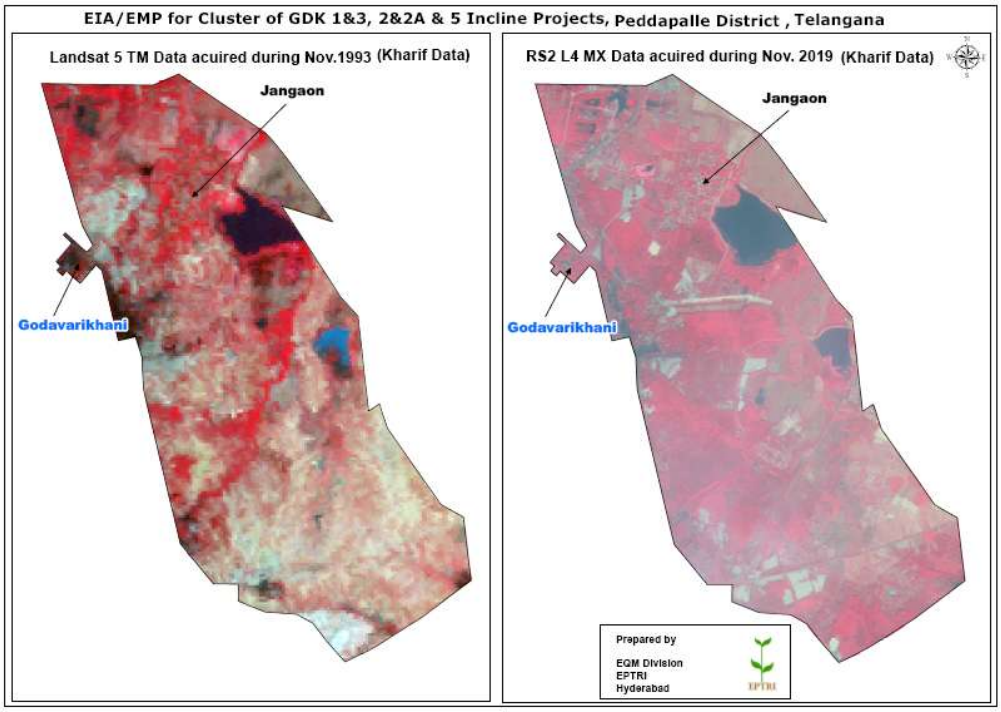


Figure No.2 Satellite Imagery of Rabi Season

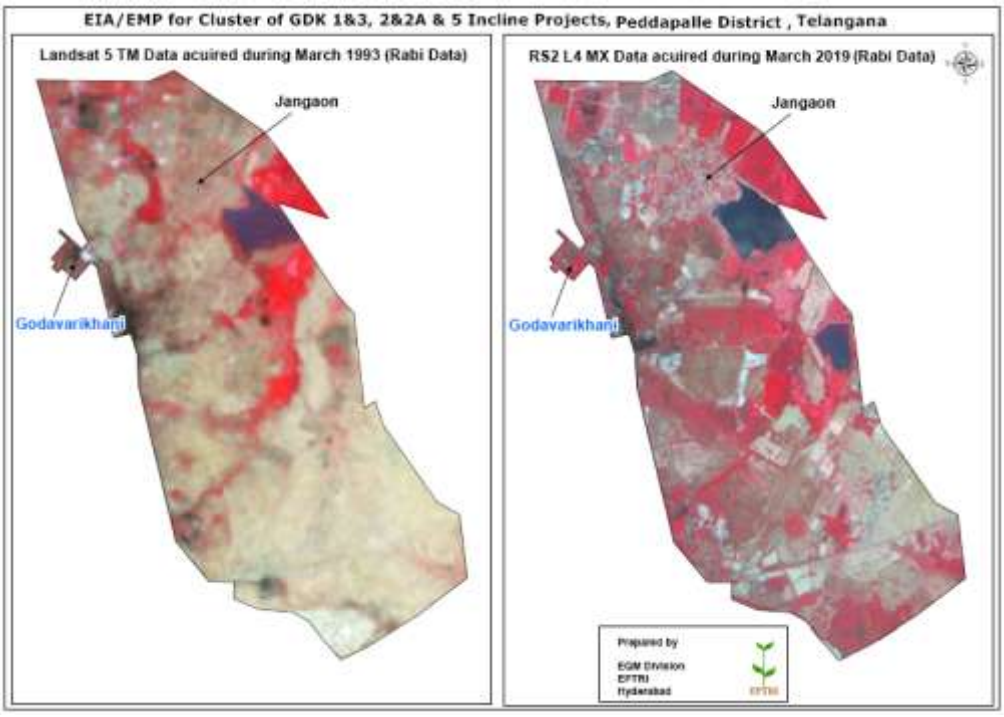
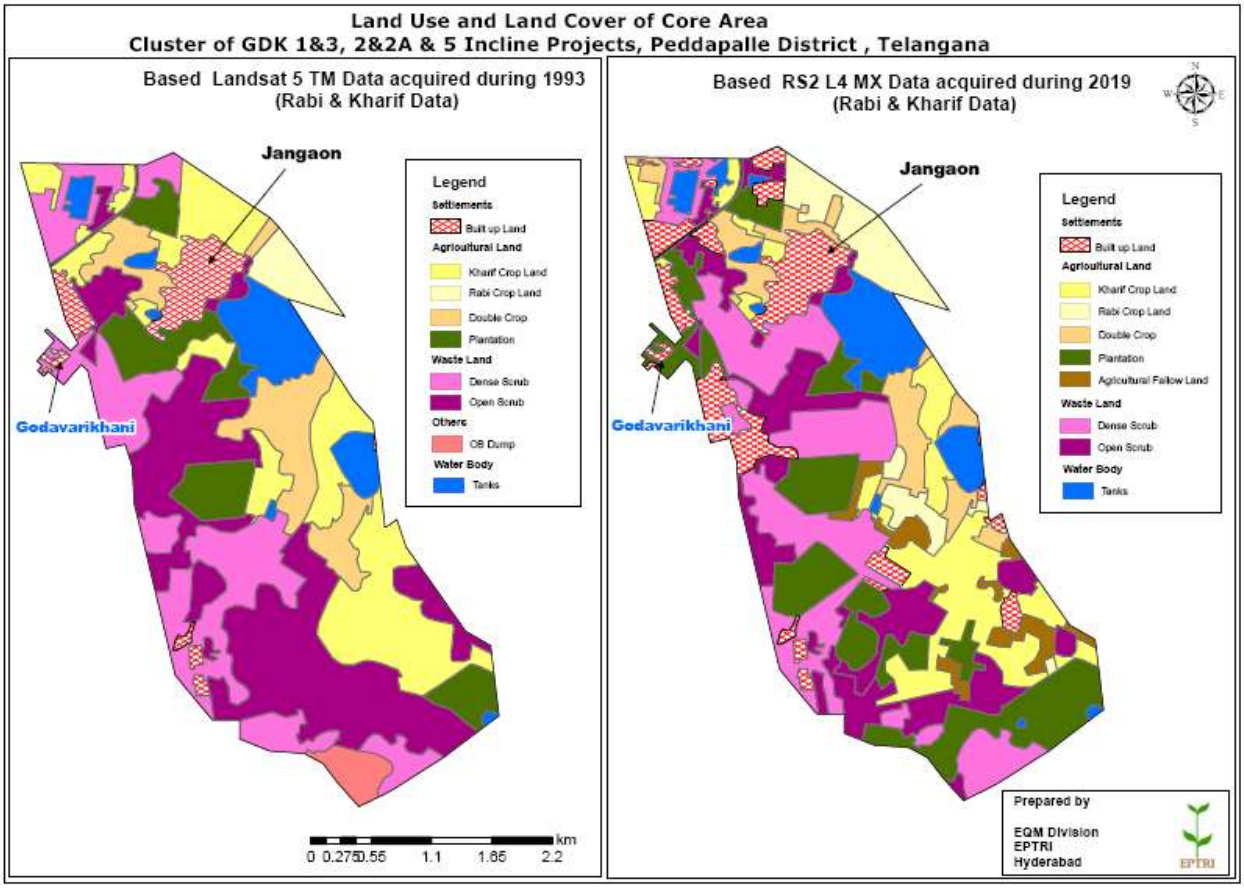


Figure No.3 Map showing LULC classification

Pre-Mining – 1993 **Present Mining – 2009**



Interpretation of Land use land cover map

The comparison of LULC classification with interpretation is given in Table No.4. The map showing the LULC classification for Rabi and Kharif season is shown in Figure No.3.

Table No.2 Landuse classification of 2019

Table No.4 Comparison of 1993 and 2019 land use classification

S.No	LULC Class Name	% of area during 1993	% of area during 2019	Difference in Area (1993-2019)
1	Built up Land	4.61	9.91	**-5.30**
2	Kharif Crop Land	21.68	15.63	**6.05**
3	Rabi Crop Land	2.21	6.46	**-4.25**
4	Double Crop	9.03	6.64	**2.39**
5	Agricultural Plantation	8.85	17.47	**-8.63**
6	Agricultural Fallow Land	0	3.10	**-3.10**
7	Dense Scrub	17.97	18.83	**-0.87**
8	Open Scrub	27.26	14.84	**12.42**
9	OB Dump	1.68	0.00	**1.68**
10	Water Body	6.71	7.12	**-0.41**

Based on the interpretation of 1993 data, in the southern part of the core area an OB dump of 22.86 ha and the same area is found to be developed with a plantation. Based on the broad interpretation of temporal data of 1993 and 2019 it is observed that:

- Builtup area increased by 5.30%
- Kharif crop reduced by 6.05%
- Rabi crop has increased by 4.25%
- Double crop reduced by 2.39%
- Agricultural plantation increased by 8.63%
- Agricultural fallow land is increased to 3.10%
- Dense scrub increased by 0.87%
- Open scrub reduced by 12.42%
- Water body increased by 0.41%

There is overall increase in agricultural lands and impact is positive.

Damage due to subsidence

- Subsidence prediction studies using 3D numerical modelling were carried out by Institute of Technology, Banaras Hindu University, Varanasi. The mines under Cluster are operating underground mines in which the Bord and Pillar system of mining with hydraulic sand stowing is being practiced.
- The predicted peak subsidence at the surface of GDK 1&3 Incline is 0.283 m and peak predicted horizontal tensile strain is 2.5 mm/m at the end of mining. There are no important structures on the surface of GDK 2 and 2A incline.
- The predicted peak subsidence at the surface is less than 0.20 m and peak predicted horizontal tensile strain is 2.1 mm/m at the end of mining. There are only zilla parishad road and the small seasonal nallahs on the surface of GDK 5 incline.
- The predicted peak subsidence at the surface is less than 0.20 m and peak predicted horizontal tensile strain is 2.4 mm/m at the end of mining.
- One can safely conclude that the surface structures will not be affected by surface subsidence due to underground mining of GDK 1&3 and GDK 2&2A and GDK 5 Inclines. It is not likely to have any impact on surface structures. Hence, no subsidence management plan is required for the same.

Impact on Ecology and Biodiversity due to excess Production of Coal

The following table gives the details of green belt / plantation within the ML area

S.NO		**GDK 1 &3**	**GDK 2 & 2A**	**GDK 5**
1	PLANTATION EXISTING	82.00	118.00	315.00
2	PLANTATION PROPOSED	79.06	71.81	106.88
3	GREENBELT REQ (33%)	64.53	66.65	147.15
4	GB SHORTAGE (-SHORTAGE)	17.47	51.44	167.85

From above table it is inferred that there is no shortage of plantation / green belt cover.

Monetary Value for damage on Ecology and Biodiversity

S.No	**Damage Description**	**Damage Costing**
a.	In-sufficient plantation around the Mine periphery area facing towards Colony / township	Cost for plantation with 7.5 Meter width with running length of approx. 8000 Meters (6 Ha) @ INR 500 per plantation for 1500 Plantation per Hectare = INR 45 Lacs

Impact due to Waste Management

The following items have made negative impact due to waste management activities, so corresponding damage cost is included to address the issue.

S.No	Damage Description	Qty X Damage Cost	Amount Rs in Lacs
a.	Disposal of Domestic waste generated by emloyees for 7956 days @50 grams Per Day Per Person. (Total 149588) from all three mines	**2288.70 Tonnes X 1000**	**22.02**
b.	Non-Provision of TOE DRAINS / RETAINING WALLS in periphery of pit head area (@300 SqMtr per mine head GDK 1,3,2,2A & 5)	**3000 M^3 X 75**	**2.25**

Impact due to Noise and Vibration

- The anticipated noise levels are based on the prevailing noise levels measured at the mine site. As the mining operations are carried out in underground, there will not be any significant impact on the existing noise levels.
- The only increase in noise levels could be due to coal dispatch arrangements and surface mine ventilation fan and the same will be abated by developing a green belt around the fan house and the mine site.
- Hence, there will not be any persistent impact on the surrounding environment due to noise. As the mining operations are carried out in underground, there will not be impact due to blasting and vibrations.

Existing Control Measures:

1. The main mechanical ventilators (MV Fans) are provided with evasee to dampen the noise.
2. Height of fall is minimized at all coal transfer points and internal lining of bins and chutes are done.
3. In the high noise intensity working areas / zones earmuffs or earplugs and other personal protective equipment provided to the workmen.
4. Regular noise level monitoring is being carried out for taking corrective action.
5. Extensive development of green belt and vegetation along the roads and around the offices carried out to create a barrier or screen between the source and the receiver so that the noise is absorbed and the exposure level is minimized.
6. Reducing the exposure time of the workers to the high noise levels including job rotation is being done and conducting of audiometric test as a part of PME is also being carried out for corrective actions if required.

Impact due to Flora and Fauna

- The study did not reveal reports of any schedule wildlife sighting in the core and buffer zones of UG mines. Further, the field survey team also did not find indirect evidences i.e. pug marks, squats, feathers or dead remains etc. Since no migratory route / corridors found in the core area, hence there is no effect on wildlife migration due to this mining.
- During the survey of flora and fauna in the core and buffer zone, no rare or endangered species were observed in the study area. Thus, impact on rare and endangered species of flora and fauna is not envisaged.
- Details of flora and fauna are furnished in the EIA/EMP report and also replied at Point No.23 of the ADS.

Impact due to Socio-Economic Environment

- No significant changes have been visualized in the traditional way of life and occupation of the local people in coal mining areas. The local people are rather benefited due to the provision of more infrastructure facilities provided by the management. No Rehabilitation and resettlement is involved in this mine.
- The project is expected to yield a positive impact on the socio-economic environment. It helps in sustaining the development of this area including further development of infrastructure facilities. It is evident from the past history of SCCL that it is putting on continuous efforts and instrumental in enhancing the living conditions of the mining and surrounding communities. Similarly the activities of the local population will bring in additional indirect employment opportunities and will also bring in the medical and communication facilities within their reach. The proposed expansion of mining activities in the cluster mines also can bring to them further facilities like secondary employment, increase in existing medical and communication facilities etc. A common central township is provided on noncoal bearing area with facilities like dispensary, schools, recreation clubs, well-lighted internal roads, drinking water supply, sewerage system and dustbins etc.

Occupational Health & Safety

- Medical camps are being conducted frequently for the benefit of surrounding villagers of existing mines.
- Free treatment is being extended to the Project Affected Families by admitting them as inpatients in SCCL Hospitals, in case of emergency.
- They have been provided with Health Cards to avail the medical facility at SCCL Hospitals.
- Mobile medical camps are being organized in surrounding villages of Ramagundam Area including free supply of medicines.
- List of Medical camps conducted and Distribution of Safety Items for employees is furnished in Chapter-IV of EMP.

Remediation Plan

REMEDIATION PLAN AND COST					
Environment Component	**Remediation measures for environmental damage**	**Total**	**2020 – 21**	**2021 – 22**	**2022 - 23**
Air, & Noise Environment and Ecology	1. Providing water sprinklers along the coal transportation road, CC roads as requested in public hearing	15,00,000	5,00,000	5,00,000	**5,00,000**
	2. Monitoring of ambient air quality in nearby 4 villages within buffer zone towards downwind direction	7,50,000	2,50,000	2,50,000	2,50,000
	3. Avenue Plantation in nearby villages	7,50,000	2,50,000	2,50,000	2,50,000
	Total (A)	**30,00,000**	**10,00,000**	**10,00,000**	**10,00,000**
Water Environment	1. Rainwater harvesting pit shall be constructed in nearby 4 villages at INR 5 Lacs per unit.	20,00,000	**10,00,000**	5,00,000	5,00,000
	2. Water Supply to nearby villagers by installing RO plants in nearby 4 villages at INR 3 Lacs per unit.	12,00,000	4,00,000	4,00,000	4,00,000
	3. Maintenance of RO plant for 2 years	60,000	--	30,000	30,000
	4. Beautification of ponds, wells etc. in nearby villages	8,00,000	4,00,000	2,00,000	2,00,000
	Total (B)	**40,60,000**	**18,00,000**	**11,30,000**	**11,30,000**
Waste Management	1. Distribution of 10 Nos Waste Collection bins of capacity 500 Litres to be kept in common areas in nearby 4 villages each at INR 9500 per unit	3,80,000	1,50,000	1,50,000	80,000
	2. Providing 6 Nos colour coded bins in nearby 2 schools, 2 hospitals at INR 5000 per unit	1,20,000	40,000	40,000	40,000
	Total (C)	**5,00,000**	**1,90,000**	**1,90,000**	**1,20,000**
Socio-Economic	1. Employment generation for local population through skill development in nearby 4 Villages	20,00,000	10,00,000	5,00,000	5,00,000
	Total (D)	**20,00,000**	**10,00,000**	**5,00,000**	**5,00,000**
Grand Total (A) + (B) + (C) + (D) + (E)		**95,60,000**	**39,90,000**	**28,20,000**	**27,50,000**

Natural & Community Resource Augmentation

Natural Resource Augmentation plan specific to the region along with action plan with a budget of Rs. 1,12,50,000 (Rs. 112.50 Lakhs)is given in below table**.**

Environmental components	Natural Resource Augmentation	TOTAL (Rs.)	2020 - 21 (Rs.)	2021 - 22 (Rs.)	2022 - 23 (Rs.)
Water Environment	1. Providing roof top rain water harvesting pits for 100 households in nearby 4 Villages each	20,00,000	10,00,000	5,00,000	5,00,000
	2. Provide Drip irrigation facility to farmers in nearby 4 villages	8,00,000	4,00,000	2,00,000	2,00,000
	3. De-silting of tanks in nearby 4 villages	8,00,000	4,00,000	2,00,000	2,00,000
	4. channelizing of excess mine water to nearby water tanks for ground water augmentation	20,00,000	10,00,000	5,00,000	5,00,000
Energy Conservation	1. Distribution of energy efficient LEB bulbs to 250 Households in nearby 4 villages each, at INR 150 Each	1,50,000	50,000	50,000	50,000
	2. Installation of 5 Nos Solar based street lights in nearby 4 villages each at INR 2 Lacs.	40,00,000	20,00,000	10,00,000	10,00,000
Land & Ecological Environment	1. Renovation of community wells along with animal water troughs in nearby villages.	8,00,000	2,00,000	2,00,000	4,000,00
	2. Training on land usage and crop pattern to the nearby village farmers to improve the crop yield.	11,00,000	3,00,000	3,00,000	5,00,000
	TOTAL	1,12,50,000	53,50,000	29,50,000	29,50,000

Community Resource Development (augmentation) Plan

The community resources development plan specific to the region along with action plan with a budget of Rs. 69,00,000 (Rs. 69.0 Lakhs) is given in below table.

Sl. No.	Community Resource Development	Total (Rs.)	2020 – 21 (Rs.)	2021 – 22 (Rs.)	2022 – 23 (Rs.)
1.	To build 5 common toilets in 4 villages in discussions with the village panchayats . Cost of each Toilet at INR 50,000	10,00,000	5,00,000	2,50,000	2,50,000
2.	Facilitation of computer facility centre in 4 schools in 4 villages	4,00,000	2,00,000	1,00,000	1,00,000
3.	Renovation of Government School building in nearby 2 villages	4,00,000	2,00,000	1,00,000	1,00,000
4.	To Support village level sports activities / library in nearby 4 villages	8,00,000	4,00,000	2,00,000	2,00,000
5.	Employment generation for local populace through Vocational training, training for military and police services etc, in nearby 4 Villages	8,00,000	4,00,000	2,00,000	2,00,000
6.	Conducting periodic medical check-up camps for general health in nearby 4 Village	8,00,000	4,00,000	2,00,000	2,00,000
7.	Creating awareness on hygiene and sanitation among Children & women in nearby 4 villages by conducting programs via NGO / Self Help Groups.	16,00,000	4,00,000	4,00,000	4,00,000
8.	Attention in improvement of local infrastructure for agriculture purpose (Repair of irrigation canal, Bund around agriculture land, etc)	15,00,000	5,00,000	5,00,000	5,00,000
	Total	**69,00,000**	**30,00,000**	**19,50,000**	**19,50,000**

ECONOMIC BENEFITS ACCRUED DUE TO VIOLATION

PART A- EMP COST OF THE PROJECT

Sl. No.	Description	Item	Recurring cost for 5 years (Rs. in Crores)	Capital cost (Rs. in Crores)
1	Air Quality Management & Monitoring	Base line data collection & Provision of environmental monitoring equipment	1.12	0.39
2	Water Quality Management & Monitoring and soil erosion	Pipe line arrangements for Water spraying along belts and bunkers to arrest dust.	7.64	0.15
		Filter bed construction		0.60
		Rain water harvesting pits for ground water recharge and its maintenance		0.30
		Black topping of road from GDK-5 inc to CHP		1.65
3	Greenbelt development	Development & Maintenance of plantation inside mine areas	1.45	--
4	Subsidence Management	Subsidence study by IT BHU	1.65	0.15
5	Environment data generation and EMP preparation, etc.	Public Consolation for Environment related issues within mine lease area	--	0.22
TOTAL			**11.86**	**3.46**

SCCL had made necessary provisions for Continous Environmental monitoring program , hence No EMP Cost was saved during the violation period of 26 years

PART B- PROFIT ACCRUED DURING VIOLATION PERIOD

From the above table it is evident that the all the three mines are under loss from 1993-94 onwards and also could not achieved any profit even after excess production in some of the years. The total loss on account of excess production achieved is Rs 61.14 Crores.

Economic Benefit Derived Due to excess production achieved in violation period																
Year	GDK1&3 Incline					GDK2&2A Incline					GDK 5 Incline					Total Loss Rs in Lakhs
	GDK 1&3	Excess	Total Loss	Per Tonne Loss	Loss on Excess production	GDK 2&2A	Excess	Total Loss	Per Tonne Loss	Loss on Excess production	GDK 5	Excess	Total Loss	Per Tonne Loss	Loss on Excess production	
	LT		Loss Rs. In Lakhs	Rs	Rs in Lakhs	LT		Loss Rs. In Lakhs	Rs	Rs in Lakhs	LT		Loss Rs. In Lakhs	Rs	Rs in Lakhs	
2018-19	2.36					2.94					2.90					
2017-18	2.10					3.12					3.10					
2016-17	2.28					2.92					3.03					
2015-16	2.55					3.38					3.82	0.22	5597	1465	322	
2014-15	2.87					3.39					4.43	0.83	5683	1283	1065	
2013-14	2.90					3.64					4.75	1.15	4438	934	1075	
2012-13	2.72					4.67	0.17	6488.00	1388.56	239.48	4.95	1.35	2931	592	799	
2011-12	2.64					4.52	0.02	5778.00	1278.83	23.25	4.37	0.77	2234	511	394	
2010-11	3.42					5.50	1.00	2409.92	438.48	436.76	4.85	1.25	60	12	16	
2009-10	3.07					4.51	0.01	3139.14	695.57	9.09	5.01	1.41	893	178	251	
2008-09	2.98					3.67					4.78	1.18	1137	238	281	
2007-08	2.71					3.68					4.43	0.83	301	68	56	
2006-07	1.62					3.07					3.63	0.03	1531	422	13	
2005-06	3.04					3.06					5.12	1.52	556	109	165	
2004-05	3.38					3.25					4.62	1.02	867	188	191	
2003-04	3.00					3.10					4.78	1.18	552	116	136	
2002-03	3.43					3.27					4.43	0.83	301	68	56	
2001-02	3.75	0.31	435.13	116.03	35.97	3.95					4.05	0.45	366	90	41	
2000-01	4.06	0.62	1426.78	351.42	217.88	4.27					3.31					
1999-00	3.67	0.23	988.11	269.24	61.93	3.86					3.08					
1998-99	3.71	0.27	776.44	209.28	56.51	4.15					2.90					
1997-98	3.51	0.07	786.69	224.13	15.69	3.86					3.01					
1996-97	3.79	0.35	1063.78	280.68	98.24	4.27					3.00					
1995-96	3.49	0.05	854.74	244.91	12.25	3.84					2.67					
1994-95	3.93	0.49	237.09	60.33	29.56	4.86	0.36	215.74	44.39	15.98	3.24					
1993-94	**3.44**				**528.02**	**4.50**				**724.56**	**3.60**				**4861**	**6114**
Actual Production	**80.41**					**99.25**					**101.86**	**281.52**				
Capacity	**89.44**					**117.00**					**93.60**	**300.04**				

Budget for remediation plan, natural resource augmentation plan and community resource augmentation plan

The summary of amounts which will be spent for Remediation Plan, Natural Resource Augmentation Plan and Community Resource Augmentation Plan is given below

S. No.	Description	Estimated cost (Rs. in Lakhs)
1	Remediation Plan	95.60
2	Natural Resources Augmentation Plan	112.50
3	Community Resources Augmentation Plan	69.00
Total		**277.10**

26. **Details as per Annexure XI as mentioned in the agenda shall be submitted for the violation period.**

Details as per Annexure-XI

Baseline Data:

1) Air
   a) Construction: No data is available as Godavarikhani No.1&3 Inclines, Godavarikhani No.2&2A Inclines & Godavarikhani No.5 Inclines are operating underground mines since 1959, 1960 and 1961 respectively.

Criteria Pollutants	Maximum value	Minimum value	98 percentile value	Prescribed Standard
	µg /m3	µg /m3	µg /m3	µg /m3
PM_{10}	-	-	-	-
$PM_{2.5}$	-	-	-	-
SO2	-	-	-	-
NOX	-	-	-	-
	-	-	-	-

   b) Operation: The mines in this cluster are in operation since 1959. Baseline data was collected during summer season of 2019 from March – May and the results are given below:
   Core

Criteria Pollutants	Maximum value	Minimum value	98 percentile value	Prescribed Standard
	µg /m3	µg /m3	µg /m3	µg /m3
PM_{10}	221.6	180.2	219.4	300
$PM_{2.5}$	68.4	52.4	68.2	NS
SO_2	18.0	9.6	17.5	120
NO_X	28.1	14.2	26.8	120

Buffer

Criteria Pollutants	Maximum value	Minimum value	98 percentile value	Prescribed Standard
	µg /m3	µg /m3	µg /m3	µg /m3
PM_{10}	90.0	40.0	86.8	100
$PM_{2.5}$	54.7	21.8	54.5	60
SO_2	22.2	9.1	21.7	80
NO_X	24.7	11.5	24.2	80

Criteria Pollutants: (PM10, PM2.5, SO2, NOX, other parameters specific to sector)
Unit: (Micro gram per meter cube, Nano gram per meter cube, milli gram per Meter cube. etc.)

2) Details of Ground / surface Water:

Criteria of Pollutants as per standards	Pre- Construction	Post Construction	Post Operations		Remarks
			Max	Min	
Surface water					
pH	NA	NA	8.2	7.5	Surface water samples have DO values ranging from 5.8mg/L to 6.7 mg/L, indicating category B of CPCB water quality criteria. BOD was found to be slightly above.
DO mg/l	NA	NA	6.7	5.8	
BOD mg/l	NA	NA	6	3	
COD mg/l	NA	NA	30	20	
Ground water					
pH	NA	NA	7.7	7.0	6.5-8.5
TDS mg/l	NA	NA	1650	440	500-2000
TSS mg/l	NA	NA	0	0	0
Heavy Metals mg/l	NA	NA	0	0	0
Chlorides mg/l	NA	NA	382	62	250-1000
Fluorides mg/l	NA	NA	1.24	0.36	1-1.5

Water Consumption:

Criteria of Pollutants as per standards	Constructions	Operation	Remarks (NOC/No NOC)
STP water in KLD	--	--	--
Ground water / Borewell in KLD	--	7844 KLD (GDK No-1&3: 1140 KLD GDK No-2&2: 2169 KLD GDK No-5: 4535 KLD)	NOC obtained from SGWD
Surface water as per GEC 2015 in KLD	--	--	--
Fresh Water (Domestic)	--	--	--
No.of RWH pits required.	--	120.00 (each with storage capacity of 10.125 cubic meters) were constructed in the buffer area. The storage capacity of all above structures amounts to 0.001215 Hectare meters)	--
No. of RWH Pits less provided	Nil	Nil	--
GW Intersection (level)	Nil	Mine: GDK 1&3 / GDK 2&2A / GDK 5 Depth in m: 8.33 / 9.04 / 9.04 RL: 841.07 / 848.17 / 848.46	--

3) Noise:

Location	Parameter	**in dB (A)**	**Limits in dB (A)**
Industrial	Leq Day	69	75
	Leq Night	56.4	70
Residential	Leq Day	50.7	55
	Leq Night	43.5	45

4) Ecology/ Bio- Diversity/LU/LC:

a) LULC Impact in Ha: No considerable impact was observed on the Land use and land cover pattern for these underground mines. Out of 1356.85 ha of the project area only 843.40 ha is acquired by SCCL and plantation was done in 515.00 ha.(61 %) And there is no appreciable change observed in LULC.
Comparison pre/post construction/operation: NA
Less Agri land - Total Agriculture land in the project area : 478.06 ha
Less Grazing Land - Total Grazing land in the project area : 460.76 ha
Less Forest Land - No forest land available

b) GB: No of trees planted - 515.00 ha (10,32,575 No's)
No. of tree less planted - Nil
Plantation required - 515.00 ha
No. of trees less planted- Nil

Building: 1 per m^2/Mining: Along Boundary, dumps, safety zones, rivers/nallahs@ industry 1500/ha & minimum of 33% of total area.

c) Soil:
Top Soil (m^3): Not applicable as this is an Underground mine.
Qty less used: NA

d) WLC plan
Approved / Not approved: Not applicable as no forest land is involved and No schedule -1 species are found in the in the project area.
Details/ Budget of Approved: Not applicable

5) Solid Waste Management :

a. The solid waste was generated during tunneling, shaft sinking, etc.
b. The separation of Shale/stones etc. at CHP
c. The solid waste produced during drivage of tunnels and debris so produced from inter-seam drifts was utilized for underground track ballasting, leveling of the uneven floors and strengthening of surface bank head.

As these mines are being operated since 1959, no appreciable quantity of solid waste is anticipated further.

Qty Generated : Negligible quantity was generated which was used in the underground mines for track ballasting.

SWM Rules 2016- Complied / Not Complied: Being complied.

a) OB/ Waste Management : Not applicable as this is an Underground mine.

Details as per Form-2

Parameters	Units	Required	Provided	Less Provided
Garland Drains	Mtrs	NA	NA	NA
Toe Drains	Mtrs	NA	NA	NA
Toe Walls	Mtrs	NA	NA	NA
Check Dams	No's	NA	NA	NA
Settling Tanks/ponds	No's	NA	NA	NA
Plantations	ha	515.00	515.00	0.0

For Rare Minerals/CRZ related- details from Form-2- Adequate.
For mining of coal/non coal/ rare minerals- Form-2- is adequate for assessing the impact apart from the above.

6) Energy saving measures:
   a) Requirement of ECBC of colony with in project area.
   b) Other Energy saving measures

The following energy measures have been taken in the SCCL colonies out the project area.

	DESCRIPTION	**INSTALLED QTY**	**YEARLY SAVINGS**	**TOTAL**
WATER HEATERS [star rated]	Water heater 25 ltr cap.	150	2920	**438000**
AIR CONDITIONERS [star rated]	1.5 t(split)	50	3650	**182500**
	2.0 t(split)	40	5475	**219000**
CEILING FANS [star rated]	48''ceiling fan	2100	219	**459900**
Capacitor Banks	80 KVAR	4	157680	**630720**
	240 KVAR	1	473040	**473040**
	480 KVAR	1	946080	**946080**
	960 KVAR	1	1892160	**1892160**
LED LIGHTS	16W LED	215	70.08	**15067**
	18W LED	436	78.84	**34374**
	30 W LED	400	131.4	**52560**
	80 W LED	12	350.4	**4205**
	120W LED	10	525.6	**5256**
	150W LED	25	657	**16425**
			TOTAL	**53,69,287**

7) RH/OHS/Disaster Management/ SMP: Risk Management Plan has been dealt in the EMP.
   a) Requirement- Industry Specific
   b) Deficiency- details / Compliance plan.

8) Socio Economics Benefits (CSR)

CSR expenditure

From 01.04.2003 Up to 31.03.2015	11.47 Cr
2016	1.43 Cr
2017	1.12 Cr
2018	2.55 Cr
Total	16.57 Cr

9) Economic Benefits Accrual:

a) Saving in EMP cost/ years under violation.

SCCL had made necessary provisions for Continuous Environmental monitoring program, hence No EMP Cost was saved during the violation period of 26 years

Sl. No.	**Description**	**Item**	**EMP Recurring cost of last 5 years** (Rs. in Crores)	**EMP Capital cost of last 5 years** (Rs. in Crores)
1	Air Quality Management & Monitoring	Base line data collection & Provision of environmental monitoring equipment	1.12	0.39
2	Water Quality Management & Monitoring and soil erosion	Pipe line arrangements for Water spraying along belts and bunkers to arrest dust.	7.64	0.15
		Filter bed construction		0.60
		Rain water harvesting pits for ground water recharge and its maintenance		0.30
		Black topping of road from GDK-5 inc to CHP		1.65
3	Greenbelt development	Development & Maintenance of plantation inside mine areas	1.45	--
4	Subsidence Management	Subsidence study by IT BHU	1.65	0.15
5	Environment data generation and EMP preparation, etc.	Public Consolation for Environment related issues within mine lease area	--	0.22
TOTAL			**11.86**	**3.46**

b) Net profit earned- .

Economic Benefit Derived Due to excess production: All the three mines in this cluster are in losses. Details of the excess production along with cost details are given below:

Economic Benefit Derived Due to excess production achieved in violation period																
Year	GDK1&3 Incline					GDK2&2A Incline					GDK 5 Incline					Total Loss Rs in Lakhs
	GDK 1&3	Excess	Total Loss	Per Tonne Loss	Loss on Excess production	GDK 2&2A	Excess	Total Loss	Per Tonne Loss	Loss on Excess production	GDK 5	Excess	Total Loss	Per Tonne Loss	Loss on Excess production	
	LT		Loss Rs. in Lakhs	Rs	Rs in Lakhs	LT		Loss Rs. In Lakhs	Rs	Rs in Lakhs	LT		Loss Rs. In Lakhs	Rs	Rs in Lakhs	
2018-19	2.36					2.94					2.90					
2017-18	2.10					3.12					3.10					
2016-17	2.28					2.92					3.03					
2015-16	2.55					3.38					3.82	0.22	5597	1465	322	
2014-15	2.87					3.39					4.43	0.83	5683	1283	1065	
2013-14	2.90					3.64					4.75	1.15	4438	934	1075	
2012-13	2.72					4.67	0.17	6488.00	1388.56	239.48	4.95	1.35	2931	592	799	
2011-12	2.64					4.52	0.02	5778.00	1278.83	23.25	4.37	0.77	2234	511	394	
2010-11	3.42					5.50	1.00	2409.92	438.48	436.76	4.85	1.25	60	12	16	
2009-10	3.07					4.51	0.01	3139.14	695.57	9.09	5.01	1.41	893	178	251	
2008-09	2.98					3.67					4.78	1.18	1137	238	281	
2007-08	2.71					3.68					4.43	0.83	301	68	56	
2006-07	1.62					3.07					3.63	0.03	1531	422	13	
2005-06	3.04					3.06					5.12	1.52	556	109	165	
2004-05	3.38					3.25					4.62	1.02	867	188	191	
2003-04	3.00					3.10					4.78	1.18	552	116	136	
2002-03	3.43					3.27					4.43	0.83	301	68	56	
2001-02	3.75	0.31	435.13	116.03	35.97	3.95					4.05	0.45	366	90	41	
2000-01	4.06	0.62	1426.78	351.42	217.88	4.27					3.31					
1999-00	3.67	0.23	988.11	269.24	61.93	3.86					3.08					
1998-99	3.71	0.27	776.44	209.28	56.51	4.15					2.90					
1997-98	3.51	0.07	786.69	224.13	15.69	3.86					3.01					
1996-97	3.79	0.35	1063.78	280.68	98.24	4.27					3.00					
1995-96	3.49	0.05	854.74	244.91	12.25	3.84					2.67					
1994-95	3.93	0.49	237.09	60.33	29.56	4.86	0.36	215.74	44.39	15.98	3.24					
1993-94	**3.44**				**528.02**	**4.50**				**724.56**	**3.60**				**4861**	**6114**
Actual Production	**80.41**					**99.25**					**101.86**	**281.52**				
Capacity	**89.44**					**117.00**					**93.60**	**300.04**				

- GDK 1&3 mine achieved the production of 8.041 MT (80.41 LT) against the capacity of 8.944 MT (89.44 LT). The total economic benefit accrued due to violation is around **Rs. -5.2802 Cr**.
- GDK 2&2A mine achieved the production of 9.925 MT (99.25 LT) against the capacity of 11.70 MT (117.0 LT). The total economic benefit accrued due to violation is around **Rs. -7.2456 Cr**.
- GDK 5 mine achieved the production of 10.186 MT (101.86 LT) against the capacity of 9.36 MT (93.60 LT). The total economic benefit accrued due to violation is around **Rs. -48.61.Cr**.

The overall economic benefit accrued due to violation for cluster of GDK 1&3 incline, 2&2A and 5 incline mines is around **Rs.-61.14 Crores.**

27. **Status of credible action**

Environmental Engineer, RO, Ramagundam, TSPCB has filed a complaint about the offence under Section 19 of the E(P) Act, 1986 in the Court of Hon'ble Additional Judicial Magistrate of F.C. at Godavarikhani.

The case is under examination by the Hon'ble judge for necessary action. The documents submitted by the EE, RO is being enclosed for reference.

IN THE COURT OF THE HON'BLE I ADDL JUDL MAGISTRATE OF F.C. AT GODAVARIKHANI

C.C.NO. OF 2020

Between:-

The Environmental Engineer, Telangana State Pollution Control Board, Regional Office, Ramagundam, rep. by K. Ravidas S/o Gangasham age 46 years R/o Jyothingar, NTPC, Ramagundam Mandal of Peddapalli District.

....Complainant.

//and//

1. The Singareni Collieries Company limited (A Government Company) rep. by its Agent M. Suresh S/o Maddilati Raju age 57 years, GDK 1 & 3- GDK 2 & 2 A Incline Coal Mines projects of SCCL.
2. A. Manohar S/o Janardhan age 55 years of GDK 5 Incline Coal Mines projects of SCCL.

...Accused No. 1 and 2

Place of offence	Godavarikhani 1 & 3 (GDK1&3) Inclines, Godavarikhani No. 2 and 2 A (GDK 2 & 2A) Inclines, Godavarikhani No.5 (GDK5) Incline Projects, located near Janagam, Sundilla, Musthyala and Jallaram villages of Ramagundam Mandal of Peddapalli District.
Date, time of offence	In the year 1993-94 base line
Name of the Police Station	Godavarikhani I Town
Nature of offence	U/s 15 of Environmental (Protection) Act 1986
Name of the Witnesses	Complainant

COMPLAINT FILED UNDER SECTION 19 OF THE ENVIRONMENTAL (PROTECTION) ACT, 1986

(FOR THE OFFENCE U/S 15 OF THE ENVIRONMENT PROTECTION ACT, 1986)

May it please your Honour,

The complainant submits as under:-

1. The complainant is the Environmental Engineer working in Telangana State Pollution Control Board with his Headquarters at Jyothingar, Ramagundam, having jurisdiction over the entire area of Peddapalli District and authorized to file complaint U/s 19 of Environment (Pollution) Act, 1986 against the accused.

2. Accused is an operating underground coal mine under South Godavari Additional Mining lease. The lease was obtained vide HEH Nizam Govt. Lease on 17th October 1927 for 30 years; 1st renewal was done vide G.O.M.S.No 1485 on 29th November 1958 for 27 years, 2 months and 15 days; 2nd renewal was done vide G.O.SM.S. No. 291 on 11th June, 1986 for 30 years; 3rd renewal was done vide G.O.SM.S. No. 2 on the 12th January 2015 for 20 years i.e. from 1st January 2015 to 31 December, 2034.

Contd...2nd page.

for 20 years i.e. from 1st January 2015 to 31 December, 2034.

3. As per provisions of the EIA Notification, 1994/2006, read with subsequent OMFs/guidelines/circulars, prior environmental clearance for the project was to be obtained for carrying out underground coal mining operations and/or while renewal of the mining lease.

4. That the accused submitted an application vide Online proposal No. IA/TG/CMIN/66253/2017 dated 17/06/2017 at MOEF & CC, New Delhi for environmental clearance as per the provisions of notification vide S.O..804(E) Dated 14-03-2017 for the cluster of three operating underground coal mines namely Godavarikhani 1 & 3 (GDK1&3) Inclines, Godavarikhani 2&2 A (GDK 2 & 2A) Inclines, and Godavarikhani 5 (GDK5) Incline Projects, located near Janagam, Sundilla, Musthyala and Jallaram villages of Ramagundam Mandal of Peddapalli District. With a combined production capacity of 1.734 MTPA.

5. That the accused has to commence the work by obtaining the necessary and required permits, but the accused carried out the underground operations of coal mines without permission.

6. As per Sec. 3(3) of the Environment (Protection) Act, 1986 R/w S. 2 of Environment Impact Assessment Notification, 2006, a prior environmental clearance is to be obtained from Ministry of Environment Forest and Climate change (MoEF & CC). The accused already started operations without obtaining E.C. which amount to violation of Act.

7. Accordingly, the Senior Environmental Engineer (Unit Head III), TSPCB, Head office, Hyderabad issued memo vide No. 1/TSPCB/EC/General/2014-2015 dated 11-12-2019 to initiate credible action against the accused/ Singareni Collieries Company Ltd., under Environment (Protection) Act 1986, for the projects located in respective jurisdictions for which TORs are already issued by the MoEF&CC, Govt. of India. for remaining projects, the credible action may be taken after issue of TORs by the MoEF&CC, Govt. of India. Further directed the complainant to take credible action against the accused under the Environment (Protection) Act 1986 by filing complaint before the competent court.

8. As per the Notification vide Sl.No. 394 (E) issued by the Central Government, The Complainant is authorized to file the Complaint U/s 19 of the Environment (Protection) Act, 1986.

Contd..3rd page.

9. Thus, the accused is liable to prosecute U/s 15 of the Environment (Protection) Act 1986 for punishment as he failed to obtain prior Environment clearance in accordance with the Sec. 3 (3) of the Environment (Protection) Act, 1986.

PRAYER:-

It is, therefore, prayed that the Hon'ble court may be pleased to issue summons to the accused by taking cognizance against the accused for the violation of section 15 of Environment(Protection) Act 1986 and punish him according to law. For which act of justice the complainant herein shall ever pray.

The complainant

LIST OF DOCUMENTS

Sl.No.	Date of document	Parties to the document	Description of document
1.			Notification, Officers athorization for taking cognizance of offence
2.	11-12-2019	Complainant	Photostat copy issued by State Govt to issue credible action against the accused
3.	12-12-2012	-do-	Office Memorandum
4.	26-06-2019	Complainant/Accused	Terms of reference Letter issued by MOEF & CC New Delhi to the accused

Date: -02-2020

The Complainant.

Through

Seethakari Chandrashekhar,
Advocate, Godavarikhani.

IN THE COURT OF THE HON'BLE I ADDL JUDL MAGISTRATE OF F.C. AT GODAVARIKHANI

C.C.NO. OF 2020

Between:-

The Environmental Engineer, Telangana State Pollution Control Board,

....Complainant.

//and//

The Singareni Collieries Company limited & another

Accused No. 1 and 2

Complaint U/s 19 of Environmental Act

Filed on /02/2020

Filed by

(Seethakari Chandrashekhar)
Counsel for the Complainant

IN THE COURT OF THE HON'BLE I ADDL JUDL MAGISTRATE OF FIRST CLASS. AT GODAVARIKHANI

C.C.NO. OF 2020

Between:-

The Environmental Engineer, Telangana State Pollution Control Board, Regional Office, Ramagundam ....Complainant.

//and//

The Singareni Collieries Company limited & another

...Accused No. 1 and 2

SWORN AFFIDAVIT OF THE COMPLAINANT

I, K. Ravidas S/o Gangasham age 46 years Occ: Environmental engineer, Telangana State Pollution Control Board, Regional office, Ramagundam, do hereby state on oath as under:-

1. I am working as Environmental Engineer, Telangana State Pollution Control Board, Regional Office, Ramagundam and hence I am acquitted with the facts of the case.

2. That I have been authorized by the Principal Secretary to the Govt. to take credible action against the accused, As such I have filed the above complaint U/s 19 of the Environmental (Protection) Act 1986 against the accused and the contents of complaint may be read as part and parcel of the this affidavit.

3. Accused was an operating underground coal mines under South Godavari Additional Mining lease. The lease was obtained vide HEH Nizam Govt. Lease on 17th October 1927 for 30 years; 1st renewal was done vide G.O.M.S. No 1485 on 29th November 1958 for 27 years, 2 months and 15 days; 2nd renewal was done vide G.O.M.S. No. 291 on 11th June, 1986 for 30 years; 3rd renewal was done vide G.O.M.S. No. 2 on the 12th January 2015 for 20 years i.e. from 1st January 2015 to 31 December, 2034.

4. As per provisions of the EIA Notification, 1994/2006, read with subsequent OMFs/guidelines/circulars; prior environmental clearance for the project was to be obtained for carrying out underground coal mining operations and/or while renewal of the mining lease.

5. That the accused submitted an application vide Online proposal No. IA/TG/CMIN/66253/2017 dated 17/06/2017at MOEF & CC, New Delhi for environmental clearance as per the provisions of notification vide S.O.804(E) Dated 14-03-2017 for the cluster of three operating underground coal mines namely Godavarikhani 1 & 3 (GDK1&3) Incline, Godavarikhani No. 2 & 2 A (GDK 2 & 2A) Incline, Godavarikhani No.5 (GDK5) Incline Projects, located near Janagam, Sundilla, Musthyala and Jallaram villages of Ramagundam Mandal of Peddapalli District. With a combined production capacity of 1.734 MTPA.

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6. That the accused has to commence the work by obtaining the necessary and required permits, but the accused carried out the underground operations of coal mines without permission.

7. As per Sec. 3(3) of the Environment (Protection) Act, 1986 R/w S. 2 of Environment Impact Assessment Notification, 2006, a prior environmental Clearance is to be obtained from Ministry of Environment Forest and claimants change (MoEF & CC). The accused already started operations without obtaining E.C. which amount to violation of Act.

8. Accordingly the Senior Environmental Engineer (Unit Head II), TSPCB, Head office, Hyderabad issued memo vide No. 1/TSPCB/EC/General/2014-2015 dated 11-12-2019 to initiate credible action against the accused/ Singareni Collieries Company Ltd., under Environment (Protection) Act 1986, for the projects located in respective jurisdictions for which TORs are already issued by the MoEF & CC,GoI. for remaining projects, the credible action may be taken after issue of TORs by the MoEF & CC, GoI. Further directed me to take credible action against the accused under the Environment) Protection) Act 1986 by filing complaint before the competent court.

9. As per the Notification vide Sl.No. 394 (E) issued by the Central Government, and I am authorized to file the Complaint U/s 19 of the Environmental (Protection) Act, 1986.

10. Thus, the accused is liable to prosecute U/s 15 of the Environmental (Protection Act 1986 for punishment as he failed to obtain prior Environment clearance in accordance with the Sec. 3 (3) of the Environment (Protection) Act, 1986.

11. That I hereby swear that all the contents in the complaint filed by me are true and correct to the best of my knowledge and belief, If the contents are found in correct, false, I may be prosecuted as per law.

Hence affidavit.

The deponent.

Sworn and singed before me on this
day of February 2020 at NTPC.

"Identified by: "Verified by"