

EXECUTIVE SUMMARY
of
ENVIRONMENTAL IMPACT ASSESSMENT
&
ENVIRONMENTAL MANAGEMENT PLAN
FOR

PUBLIC CONSULTATION

As per Clause 7 (ii) EIA Notification, 2006

For Expansion of

Amalgamated Yekona I & II OC(Phase-I)

Village: Yekona, Tehsil-Warora,

District-Chandrapur, State- Maharashtra

Majri Area

Western Coalfields Limited

for

Expansion in Production Capacity from 3.85 MTPA to 4.125 MTPA
within ML Area of 1679.39 ha

EIA report prepared for total production capacity of 4.125 MTPA

as per MoEF&CC OM dated 11.04.2022 & 30.05.2022

(PREPARED AS PER STANDARD TOR)



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Prepared by

CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED

(Accredited vide letter no. NABET/EIA/25-28/RA0412 valid till 08.04.2028)

Baseline Data Generated from 01.10.2023 to 31.12.2023 by Environment Laboratory, CMPDI, RI-IV,
Nagpur, NABL certificate no. TC-7102 valid upto 27.07.2026

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Executive Summary

1.0 INTRODUCTION

Amalgamated Yekona I & II OC mine is an existing coal mine of Western Coalfields Limited. The mine is located in Yekona Village, Warora Tehsil, Chandrapur District of Maharashtra State. The mine has been granted environment clearance for production capacity of 2.75 MTPA within ML area of 1679.39 ha vide MoEF&CC ref No. J-11015/381/2015-IA-II(M) dated 01.01.2021. The project has achieved its target capacity of 2.75 MTPA in FY 2022-23 and 2023-24. The mine has potential to further increase the production capacity beyond existing capacity of 2.75 MTPA. Considering the demand for coal and feasibility of increasing production capacity in the project, the Mining Plan has been prepared for 50% target capacity enhancement i.e. from existing 2.75 MTPA to 4.125 MTPA in next three years. In first year, 20% production target will be enhanced to 3.30 MTPA, in second year, another 20% production target will be enhanced to 3.85 MTPA and in third year 10% production target will be enhanced to 4.125 MTPA. No change in project area is proposed in the approved mining plan.

The public hearing was conducted at project site, Tehsil Warora, Chandrapur District, Maharashtra on 14.06.2019 for peak production capacity of 3.44 MTPA with project area of 1701.32 ha. As the project involved the forest land and the forestry clearance of the 0.62 ha of forest land could take considerable time. A fresh mining plan with Phase-I and Phase-II was prepared and received approval of WCL Board in 2019. In Phase-I, the forest land (0.62 ha) and nearby non-forest land (21.31 ha) was excluded. Project area in Phase-I remains 1679.39 ha. Subsequently, environment clearance was granted for the Phase-I for normative production capacity of 2.75 MTPA within ML area of 1679.39 ha. The Phase-I of Project is only an interim arrangement for working without inclusion of forest land. After obtaining forestry clearance, the mine will continue as per the approved Project Report with total ML Area of 1701.32 ha. The application for Amendment in EC will be made for inclusion of forestry and non-forestry land excluded in the Phase-I. The ToR granted and Public Hearing conducted are for the entire land area of 1701.32 ha. The application for forestry clearance has been recommended by State Government on 19th March, 2024 for further approval at MoEF&CC, New Delhi.

The EIA report is prepared for increase in production capacity by 50% as per MoEF&CC OM dated 30.05.2022. The MoEF&CC office memorandum dated 30.05.2022 clarified that the revised EIA/EMP report based on standard ToRs, may be prepared for a maximum of 50% expansion of the original EC capacity for which Public Hearing has been held. However, the EC shall be granted in phases of 20%, 40% and 50% capacity expansion, based on the revised EIA/EMP report, subject to submission of Certified Compliance Reports for ECs granted at each stage. The project proponent shall not be required to prepare revised EIA/EMP report for each expansion phase.

The impact assessment is being made for increasing the production capacity from 2.75 MTPA to 4.125 MTPA. Accordingly, environment management plan is proposed. As per the approved Mining plan vide Board Resolution no. WCL/Office of CS/BM-356/2023-24/736 dated 12.10.2023, Present proposal is for expansion in production capacity from 3.85 MTPA to 4.125 MTPA (final 10% expansion) as per clause 7(ii) of EIA Notification, 2006 and MoEF&CC OM dated 11.04.2022. In the first phase the mine has increased its production capacity by 20% i.e. from 2.75 MTPA to 3.30 MTPA and in the second phase the mine has increased its production capacity by further 20% (upto 40%) i.e. from 3.30 MTPA to 3.85 MTPA. The EC application in third phase is for increase in production capacity by final 10%. The Mine has granted Environment clearance for 1st 20% expansion in production capacity from 2.75 MTPA to 3.30 MTPA (upto 20% expansion) vide EC letter no. J-11015/381/2015-IA.II(M) dated 20.02.2025 as per clause 7(ii) of EIA Notification, 2006 and MoEF&CC OM dated 11.04.2022. In the first phase the mine has increased its production capacity by 20% i.e. from 2.75 MTPA to 3.30 MTPA and achieved the production capacity of 3.30 MTPA in FY 2024-25.

Further, the Mine has been granted Environment clearance for 2nd 20% expansion i.e. increase in production capacity from 3.30 MTPA to 3.85 MTPA (upto 40% expansion) vide EC letter no. J-11015/381/2015-IA.II(M) dated 15.11.2025 as per clause 7(ii) of EIA Notification, 2006 and MoEF&CC OM dated 11.04.2022. In the second phase the mine has increased its production capacity by further 20% i.e. from 3.30 MTPA to 3.85 MTPA and achieved the production capacity of 3.85 MTPA in FY 2025-26. Further, Amendment of existing EC of 3.85 MTPA was granted by MoEF&CC vide letter no. J-11015/381/2015-IA.II(M) dated 21.05.2026 for time line extension of commissioning of Railway Siding upto March 2027

Now, as per clause 7(ii) of EIA Notification, 2006 and MoEF&CC OM dated 11.04.2022, application for final 10% (3rd phase expansion) of 50% expansion of base EC capacity(2.75 MTPA) can be applied with Public Consultation (written comments) and Certified Compliance report of existing EC from IRO, MOEFCC based on which the proposal for EC Expansion from final 10% i.e. 3.85 MTPA to 4.125 MTPA will be appraised by EAC (Coal), MoEFCC.

The consent to operate has been granted by Maharashtra Pollution Control Board vide CTO dated 18.07.2023 with validity upto 31.03.2025 for production capacity of 2.75 MTPA. The consent to operate has been granted by Maharashtra Pollution Control Board for production capacity of 3.30 MTPA vide CTO dated 05.03.2025 and further CTO was granted for existing production capacity of 3.85 MTPA vide CTO dtd 01.03.2026 with validity upto 31.03.2027.

The application for environment clearance under clause 7 (ii) of EIA Notification, 2006 may kindly be considered based on this EIA/EMP report for expansion in production capacity in third phase (10% expansion) from 3.85 MTPA to 4.125 MTPA within existing EC area of 1679.39 ha.

1.1 LOCATION

Amalgamated Yekona I & II Open Cast Coal Mine is located in the Warora Tehsil of Chandrapur District of Maharashtra. Marda Village is located in core of the project and it is proposed to be rehabilitated. The Chandrapur district township is located at the distance of about 25 km from the project.

Location Details:

Latitudes: 20°13'39"N to 20°16'15"N

Longitude : 78°55'22"E to 78°58'21"E

The block is covered in the Survey of India Toposheet No.- 55 L/15 and 55 L/16.

1.2 COMMUNICATION

The mine is located about 4 km west of Warora Town in Chandrapur district, Maharashtra. Marda Village is located in core of the project and it is proposed to be rehabilitated. The Chandrapur district township is located at the distance of about 52 kms from the project. Nagpur - Chandrapur road is about 7 km to the East of the mine. The mine can be approached by a fair-weather road from Warora via Wanoja. This road passes through the eastern part of the mine and joins Nagpur Chandrapur road at Warora. Nagpur and Chandrapur townships are located at a distance of 110 kms

and 52 km from the mine respectively. Delhi Madras Grand Trunk railway line passes from the East of the block. The nearest railway station is Warora, situated at 7 km distance in south east side of the block.

1.3 TOPOGRAPHY & DRAINAGE

The project area exhibits a gently undulating topography with the general slope towards west and south west. The altitude of the area ranges from 187 m to 203.72 m from Mean Sea Level. The drainage in the area is controlled by the Wardha River which is flowing southerly and also demarcates the western limit of the block. One seasonal nallah flowing towards west passes north of the block and meets Wardha River. H.F.L. of Wardha River in the block area is about 198 m.

1.4 CLIMATE & RAINFALL

The area is characterised by subtropical climate. Blowing dry wind makes the climate scorching almost throughout the summer. The maximum temperature remains more than 42° C. At times, it may reach to 48° C. Monsoon advances in the month of June (Normal date of onset of monsoon in Vidarbha region is 10th June). Maximum rainfall occurs during July and August months. December is the coldest month. Minimum temperatures hovers around 12° C. and at times even dip below that level. The daily mean temperature starts rising from the month of February. Average annual rainfall is about 1200 mm.

2.0 GEO-MINING PARAMETERS

The geo-mining characteristics of the proposed quarry are as follows:-

Geo- Mining Parameters

Sr.No.	Particulars	Yekona-I OC	Yekona-II OC	Total
1.	Area of the Quarry			
a)	On floor (ha)	183.56	238.64	422.20
b)	On surface(ha)	305.56	334.70	640.26
2.	Depth (m) [upto floor of Bottom section]			
a)	Initial	30	25	
b)	Final	160	150	
3.	Gradient of Seam	1 in 4.3 to 1 in 12.1	1 in 4.6 to 1 in 7.8	1 in 4.3 to 1 in 12.1
4.	Average Strike length(m)			
a)	On surface	1700	3800	
b)	On floor	1400	3200	
5.	Average Width (m) [diprise]			
a)	On surface	1500	600	
b)	On floor	1900	870	
6.	Thickness of Coal section / Parting			
a)	Top section	4.35	6.42	

b)	Parting	2.90	2.70	
c)	Bottom section	3.83	3.74	
7.	Total Mineable Reserves(Mt)			
a)	As per approved PR	25.04	32.81	57.85
b)	Balance as per approved Mining Plan (01.04.2019)	25.04	32.10	57.14
c)	Balance as per proposed Revised Mining Plan (01.04.2023)	22.16	26.89	49.05
8.	Total Overburden (Mm3)			
a)	As per approved PR	225.71	226.78	452.49
b)	Balance as per approved Mining Plan (01.04.2019)	225.71	222.01	447.72
c)	Balance as per proposed Revised Mining Plan (01.04.2023)	182.29	192.57	374.86
9.	Average stripping ratio (m3/t)			
a)	As per approved PR	9.01	6.91	7.82
b)	Balance as preapproved Mining Plan (01.04.2019)	9.01	6.92	7.84
c)	Balance as per proposed Revised Mining Plan (1.4.2023)	8.23	7.16	7.64
10.	No. of Workable Sections	2	2	2
11.	Annual Target Capacity (Mt)	1.875	2.25	4.125
12.	Life of Mine (As on 01.04.2023)	13	13	13
13.	Weighted average GCV of Coal (kCal/kg) as per approved PR	4714 (G-9)	5053 (G-8)	4920 (G-8)

Type and Method of Mining Operations

The Amalgamated Yekona-I & II Expansion OC mine has two seam sections viz. Composite Top Section and Composite Bottom Section with combined thickness of about 8m to 10 m. The thickness of Top OB varies from 25 m to 200 m and the total combined thickness of partings between the 2 workable sections varies from 1m to 4m. Opencast method of mining is preferred choice over underground method of mining in proposed block due to the occurrence of thick seams, higher percentage of recovery and possibility to plan a mine of large target capacity to the tune of 4.125 Mt/annum.

In opencast mining, following technologies are prevalent in Indian Coal / Lignite mines:

1. Bucket Wheel Excavator Mining
2. Dragline Mining
3. Shovel Dumper Mining
4. Surface Miner with Pay loader and Dumper/ Truck Mining
5. A combination of above mining methods

In Amalgamated Yekona-I & II Expansion OC mine, Bucket Wheel Excavator Mining is not applicable due to low annual target and heavily faulted area and faults of varying throw and directions especially in Yekona-I sub-block. The possibility of deployment of Dragline is also not feasible due to lesser dip rise width and multiple number of faults. Moreover, the Dragline Mining makes the whole system very rigid in quantities and layout.

Surface Miner technology is successfully introduced in some mines of WC Land in many mines of CIL for coal extraction. This technology avoids drilling, blasting, crushing of coal and related environmental hazards. There is scope for improvement in quality of ROM coal by removing thin bands during extraction of coal by surface miner. Ideally, coal exposure of about 400m length and 50m is required for optimum performance of surface miner. Hence, deployment of surface miner has been recommended for coal extraction in Quarry-II of the mine due to flatter gradient and favourable geology. However, Shovel Dumper combination is proposed in Quarry-I of the project due to multiple faults and unfavourable geological conditions.

Shovel Dumper System is very flexible and convenient method of opencast mining and can deal with varying geo-mining conditions and multi section workings. It also offers flexibility for easy transition to any other technology or equipment configuration. The technology is well adopted in several opencast mines of CIL and skilled manpower is available for this method of mining. Hence, Shovel Dumper System of mining has been proposed in Quarry – I & Quarry – II of Amalgamated Yekona-I & II Expansion OC mine for Top OB and Parting OB removal.

3.0 DESCRIPTION OF ENVIRONMENT AND ANTICIPATED IMPACT

Baseline data of air, water, noise, soil is being generated during October 2023 to December 2023 to understand the existing environmental parameters. The Flora & Fauna Study was conducted in February-March, 2024 and Socio-Economic study was conducted in May, 2024.

3.1 MICROMETEOROLOGY

Factors like ambient temperature, humidity, rainfall, atmospheric pressure, etc. are known as secondary meteorological parameters as these factors control the dispersion of the pollutants indirectly by affecting the primary factors. Meteorological data collected at meteorological station representing the study area during the study period (1st October 2023 to 31st December 2023) reveals the following status:

Wind Speed/ Direction

Generally, moderate to stronger winds prevailed throughout the season. Winds were moderate particularly during the morning hours. During the afternoon hours the winds were stronger. Wind speed readings were ranging from ≤ 0.5 m/sec to 6.2 m/sec. The seasonal average wind speed was observed to be 1.90 m/sec. The wind pattern of the study period is presented below:

The analysis of wind pattern during the season showed that the predominant wind directions was North East. The calm conditions prevailed 2.54%.

Temperature

Daily average temperature values ranged between 18.5°C to 28.0°C. The seasonal average temperature value during this period was found to be 24.08°C. The instant minimum temperature ranged from 12.6°C to 35.1°C

Relative Humidity

The daily average relative humidity values were in the range of 27.2 to 88.4%. The seasonal average humidity value was found to be 56.26%. The instant relative humidity ranged from 19.8% to 96.9% during the season.

Cloud Cover

Mostly partially cloud or clear sky was observed during the study period.

Rainfall

Total 16 mm rainfall was recorded during the study period. The average rainfall during the season was found to be 0.53 mm.

3.2 EXECUTIVE SUMMARY OF AAQM

Baseline ambient air quality has been generated at twelve locations from Oct'23 to Dec'23. The summary of ambient air quality baseline status is given below:

Particulate Matter (PM₁₀), $\mu\text{g}/\text{m}^3$					
Location Name	Maximum	Minimum	Average	98 Percentile	GSR 826 (E)
Yekona Manager Office	158	121	139	157	300
Yekona Village	84	60	71.1	84	100
Wanoja Village	79	60	70.0	79	100
Yensa Village	85	58	70.5	85	100
Wandhali Village	82	51	72.2	82	100
Kanad Village	80	55	67.6	79	100
Warora Town	96	81	88.8	96	100
Shembal Village	85	65	75.0	84	100
Dongargaon Village	83	60	71.7	82	100
Naydev Village	92	79	84.8	92	100
Nandepera Village	82	59	72.4	82	100
Goraj Village	78	59	68.4	77	100

Particulate Matter (PM_{2.5}), µg/m³					
Location Name	Maximum	Minimum	Average	98 Percentile	GSR 826 (E)
Yekona Manager Office	81	55	69.5	80	Not Specified
Yekona Village	52	38	44.4	51.5	60
Wanoja Village	55	42	48.0	54	60
Yensa Village	49	30	38.7	49	60
Wandhali Village	46	28	36.9	46	60
Kanad Village	47	25	36.5	47	60
Warora Town	59	38	50.0	59	60
Shembal Village	48	31	40.5	48	60
Dongargaon Village	43	29	34.7	42	60
Naydev Village	53	34	43.0	52	60
Nandepera Village	47	30	37.0	46	60
Goraj Village	55	32	44.2	55	60

Particulate Matter (SO₂), µg/m³					
Location Name	Maximum	Minimum	Average	98 Percentile	GSR 826 (E)
Yakona Manager Office	33	21	26.9	33	120
Yekona Village	31	19	25.0	30.5	80
Wanoja Village	27	18	23.0	27	80
Yensa Village	31	16	24.0	30	80
Wandhali Village	28	16	23.0	28	80
Kanad Village	27	16	22.5	27	80
Warora Town	35	25	30.3	35	80
Shembal Village	23	16	19.7	23	80
Dongargaon Village	24	14	18.7	24	80
Naydev Village	24	15	19.3	24	80
Nandepera Village	26	15	21.0	26	80
Goraj Village	24	14	18.3	24	80

Particulate Matter (SO₂), µg/m³					
Location Name	Maximum	Minimum	Average	98 Percentile	GSR 826 (E)
Yakona Manager Office	39	26	33.9	39	120
Yekona Village	32	20	25.4	31.5	80
Wanoja Village	31	18	26.1	31	80
Yensa Village	36	19	28.1	35	80
Wandhali Village	33	20	27.5	32	80
Kanad Village	33	29	27.1	33	80
Warora Town	38	19	34.3	38	80

Shembal Village	31	18	24.3	31	80
Dongargaon Village	30	17	24.3	30	80
Naydev Village	28	18	23.0	28	80
Nandepera Village	31	16	25.4	31	80
Goraj Village	28	20	23.0	28	80

Observation

- 1) All the values are found to be within permissible limit.
- 2) The PM₁₀ values are found to be highest in core zone due to mining activities. However, there impact is found to be limited within the core zone area. As air quality within the nearby villages i.e. Wanoja and Yekona is found low in comparison to core zone.
- 3) Within the buffer zone, highest particulate matter is observed in Warora town. This is the only urban area located within the study area. The high values can be attribute to the transportation within the city. The roads within the city are congested hence could have been contributing to the increase in particulate matter.
- 4) The Naydev village is located in upwind direction of the project. But with respect to the thermal power plants of MIDC region, the village is in downwind. Due to proximity to the thermal power plants, the PM₁₀ values are found to be above 90 µg/m³.
- 5) In rest of the village of buffer zone, the 98th percentile value of PM₁₀ is found to be varying from 77 µg/m³ to 85 µg/m³.

3.3 WATER QUALITY

The water quality characterization has been conducted by collecting water samples from drinking water, surface water and mine water discharge for the proposed project during Post-Monsoon season i.e. October'23 to December'23. The water quality analysis has been conducted in the NABL accredited laboratory of CMPDI, RI-IV, Nagpur. The various purposes of the water environment monitoring are as follows:

- To assess the water quality characteristics for critical parameters;
- To facilitate predication of impact on water quality by project activities.
- To identify the contaminant of concern for water related threat on its uses.
- To evaluate the impacts on agricultural productivity, habitat conditions, recreational resources and aesthetic value in the vicinity;

Details of sampling location are given below:

Sampling Locations for Industrial Effluent

To assess the quality of waste water discharge, water samples were collected from the following locations:

Sr. No.	Name of Sampling Locations	Frequency	Location Code
1	Mine Water Discharge, Yekona OC mine	Thrice in a season	BMYYOWMD
2	ETP Discharge	Thrice in a season	BMYYOWETP

Sampling Locations for Surface Water

To assess the quality of surface water, water samples were collected from the following locations:

Sr. No.	Name of Sampling Locations	Frequency	Location Code
1.	Upstream of Wardha River River w.r.t. Yekona OC	Thrice in a season	BMYYOSW1
2.	Downstream of Wardha River w.r.t. Yekona OC	Thrice in a season	BMYYOSW2
3.	Upstream of Daiwal River River w.r.t. Yekona OC	Thrice in a season	BMYYOSW3
4.	Downstream of Daiwal River w.r.t. Yekona OC	Thrice in a season	BMYYOSW4

Ground water Sampling Locations

To assess the quality of drinking water/ground water around the project area, the water samples were collected from the following locations around the project area:

Sr. No.	Name of Sampling Locations	Frequency	Location Code
1.	Ground Water from Yekona Village	Thrice in a season	BMYYOGW1
2.	Ground Water from Charur Khati Village	Thrice in a season	BMYYOGW2
3.	Ground Water from Hivar Village	Thrice in a season	BMYYOGW3
4.	Ground Water from Marda Village	Thrice in a season	BMYYOGW4
5.	Ground Water from Dongargaon Village	Thrice in a season	BMYYOGW5
6.	Ground Water from Shembal Village	Thrice in a season	BMYYOGW6

Drinking water Sampling Locations

To assess the quality of drinking water around the project area, the water samples were collected from the following locations around the project area:

Sr. No.	Name of Sampling Locations	Frequency	Location Code
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1.	Drinking Water from Warora Town	Thrice in a season	BM YODW1
2.	Drinking Water from Wanoja Village	Thrice in a season	BM YODW2

3.4 HYDROGEOLOGICAL QUALITY

The average water levels fluctuations measured from the area in and around in year 2023 and 2025 for Yekona OC are given below.

Ground Water Levels

Pre Monsoon Period 2023	Core Zone	6.90m bgl to 8.30m bgl
	Buffer zone (area between 2 to 10 km radius)	3.90m bgl to 9.40m bgl
Post Monsoon Period 2023	Core Zone	2.20m bgl to 3.50m bgl
	Buffer zone	2.00m bgl to 4.75m bgl
Pre Monsoon Period 2025	Core Zone	5.30m bgl to 6.10m bgl
	Buffer zone (area between 2 to 10 km radius)	3.85m bgl to 7.40m bgl
Post Monsoon Period 2025	Core Zone	2.10m bgl to 2.90m bgl
	Buffer zone	1.60m bgl to 4.85m bgl

3.5 NOISE LEVELS

To study the existing scenario, noise levels are measured at twelve locations during day (6 AM to 10 PM) and night time (10 PM to 6 AM). An Integrated Sound Level Meter was used for sound level data collection on fortnightly basis from October'23 to December'23.

All noise levels values are found to be within the prescribed limits.

3.6 LAND USE

Present Land use of the land required for Yekona OC mine is given below:

Present Land Use of the Land Required for Yekona OC

Sr.No.	Land Use	Within ML Area (Ha)	Outside ML Area (Ha)	Total
1.	Agricultural land	1573.09	48.00	1621.09
2.	Forest land	--	--	--
3.	Waste land/Govt. land	58.30	-	58.30
4.	Grazing land	--	--	--
5.	Surface water bodies	--	--	--
6.	Settlements	--	--	--
7.	Others (specify)	--	--	--
	Total	1631.39	48.0	1679.39

Note: No forest land is involved in project

The land use of the project during mining is as follows:

Land Use Pattern

Sr. No.	Land use category	01.04.2023	3rd Year	5th Year	10th Year	End of Mine Life (13th Year)	Post Mining
		(1 st year)					
1	Backfilled Area above GL	0	0	0	110	385.26	385.26
	(Reclaimed with plantation)	0	0	0	0	123.28	308.21
2	Excavated Area (Not reclaimed) / Void	143.81	279.51	372.00	530.26	255.00	255.00
3	External OB dump	166.26	328.57	372.96	377.96	377.96	377.96
	(Reclaimed with plantation)		26.00	37.30	75.59	179.09	298.48
4	Embankment	44.37	44.37	44.37	44.37	44.37	44.37
	(Brought under plantation)		2.00	5.00	5.00	5.00	5.00
4	Roads	30.00	30.00	30.00	30.00	30.00	30.00
	(avenue plantation)					5.00	5.00
7	Built up area	148.00	148.00	148.00	148.00	148.00	148.00
	(Brought under plantation)					70.00	70.00
8	Undisturbed / Rationalization Area	1146.95	848.94	712.06	438.80	438.80	438.80
	(Plantation)	10.00	32.00	50.00	100.00	142.50	142.50
	Total	1679.39	1679.39	1679.39	1679.39	1679.39	1679.39
	Total (Plantation)	10.00	60.00	92.30	180.59	524.87	829.19

The land use at the end of the mine would be as follows:-

Land Use at the End of the Mine

Sr.No.	Post Mining Landuse	Land use(ha)				
		Plantation	Water Body	Public Use	Undisturbed	Total
1.	External OB Dump	298.48			79.480	377.96
2.	Excavation	308.21	255.00		77.050	640.26
3.	Embankment	5.00		15.00	24.37	44.37

4.	Roads	5.00		25.000		30.00
5.	Builtup area	70.00		78.000		148.00
6.	Nalla and Canal Diversion		58.35			58.35
7.	Undisturbed Area (including green belt)*	142.50*			237.95	380.45
	Total	829.19	313.35	118.00	418.85	1679.39

3.7 SOCIO ECONOMIC

Marda falls in project area of Phase-I. It is proposed to be rehabilitated and resettled. Positive impacts on socio-economic environment are expected due to creation of direct and indirect employment opportunities and development of infrastructure such as roads, schools, hospitals etc.

4.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

To have a close watch on the environmental condition and implementation of various measures suggested, a multi- disciplinary approach is essential.

4.1 Air Quality

Prediction of fugitive dust level in the surrounding is carried out (for 24 hours average) with the help of computerized AERMOD software (AERMOD 16216r by USEPA), based on Gaussian Plume equation. The resultant values are within limits as per CPCB rules.

Air Pollution Control Measures

In order to mitigate the adverse impacts on ambient air, the following main control measures have been proposed and will be implemented during the actual operation of the mine.

- a) Water sprinkling on road, stockpiles by mobile tankers.
- b) Black topping of road.
- c) Covering of trucks carrying coal & avoiding overloading of trucks.
- d) Development of adequate green belt all along the coal transportation road on both sides will be done.
- e) Blasting will be done between shifts or during the rest interval when the minimum number of persons are present around the blast area. In order to quickly disperse the dust generated in blasting operations, blasting will be avoided when there is wind. Blasting will be avoided in the mornings and during cloudy situations.

- f) Optimize travel distances through appropriate site layout and design.
- g) Vehicular emission of particulates, SO₂, NO_x, hydrocarbons can be minimized by proper training and maintenance of vehicles and other oil - operated equipment.
- h) Regular monitoring of ambient air quality as per CPCB rules for Coal Mines.

Additional Pollution Control Measures Proposed vis a vis Existing Control Measures:

The details of existing control measures along with proposed control measures with capital provisions is tabulated below.

Table 1 Mitigation Measures

Particular/Location	Existing Mitigation Measures upto June 2024	Mitigation Measures provided during FY 24-25 and FY 25-26	Actual expenditure during FY 24-25 & FY 25-26 activities (in Lakhs)
Mobile Water Sprinklers along Haul road, Coal stockyard, Weigh bridge, Coal transportation road	Presently 06 Nos. of Mobile Water Tankers are provided for dust suppression	Additional 4 nos of mobile water sprinklers are proposed to be provided	Through Revenue Budget
Fixed Water Sprinklers along Haul road, Coal stockyard, Weigh bridge, Coal transportation road	36 Nos of Fixed Sprinklers Provided	33 nos of Additional Fixed Sprinklers along CTR	39.43
Road Sweeping Machine	To be provided	Road sweeping machine for removal of dust from coal transportation route under operation	33.00
Fogging Machine	05 nos of fogging machines are already provided	05 nos of additional fogging machines are procured for suppression of dust	33.05
Greenbelt	1,20,000 nos of trees has been planted with as part	75,000 nos of tree planted	146.00

	of greenbelt and reclamation.		Through Revenue Budget
Wind Barried at Railway Siding	-	The railway siding is proposed to be commissioned by March 2027.	Work in progress (700 mtrs on both sides and 6 mtr height)
Tyre Wash System at Mine Exit		Installed and in operation	34.77
Continuous Ambient Air Quality Monitoring Station	1 nos of CAAQMS has been already provided	-	Already Installed
			286.25

S. No.	Particular	Additional Mitigative measures Proposed (₹ in Lakhs)
1	New Automatic Tyre Wash System at Railway Siding	49.46
2	16 nos. Water Sprinklers at Railway Siding	84.39
3	Wind Barrier at Railway Siding	389.19
4	Additional CAAQMS	70.00
5	Roof Top rain water harvesting	05.00
6	Greenbelt (NEXT 2 YRS)	206.84
	Total	804.88

Plantation to Check Air Pollution

Plantation will be under taken in the mine area as mitigative measure against air pollution, noise pollution and to increase the aesthetic value. The plantation will be developed at suitable places like overburden dump, along the road sides, unused land etc. to arrest dust generated due to various mining operations viz. quarrying, coal and OB transportation, OB dumping, CHP operation. A total of 2500 plants/ha are proposed as plantation density.

It can be observed that out of 1679.39 ha land, 829.19 ha is proposed as plantation in post mining scenario, which is 49.3 % of the total project area. Experimentally, it has

been observed that some plant species have good efficiency in removing particulate matter. Central Pollution Control Board has recommended few plant species, which are very efficient for dust control.

4.2 WATER QUALITY

Anticipated Impact

The major impact of mines is on natural groundwater table. Lowering of water table may result in reduced groundwater availability. Extraction of different minerals is known to lead to water pollution due to heavy metal, acid discharges and increased suspended solids. However, effect of coal mining due to existing mine as well as other nearby mines on water is mainly observed as increase in suspended solids.

Salient controls measure to be taken to reduce water pollution are as follows:

Industrial Effluent

The waste-water from workshop, which normally remain laden with oil and grease, suspended and dissolved solids etc. are to be treated in the Effluent Treatment Plant (ETP). Clear water coming out from the treatment plant will be taken into the closed water circuit and recycled for its reuse. All parameter of ETP waste discharge will be monitored regularly as per Env. (Protection) Amendment Rule, 2000.

Mine Water

Most of the suspended particles will be settled in the sump located in the quarry and the supernatant water is pumped out to the sedimentation tank present on surface. This water is to be passed through sedimentation pond on surface, before being discharged in to natural drain or agricultural field.

Surface Run-off

Adequate numbers of vegetation will be grown on the top surface and slopes of the dumps in order to arrest the erosion of soil and it will also reduce surface run-off, which helps averting siltation of natural water courses.

Sewage Water

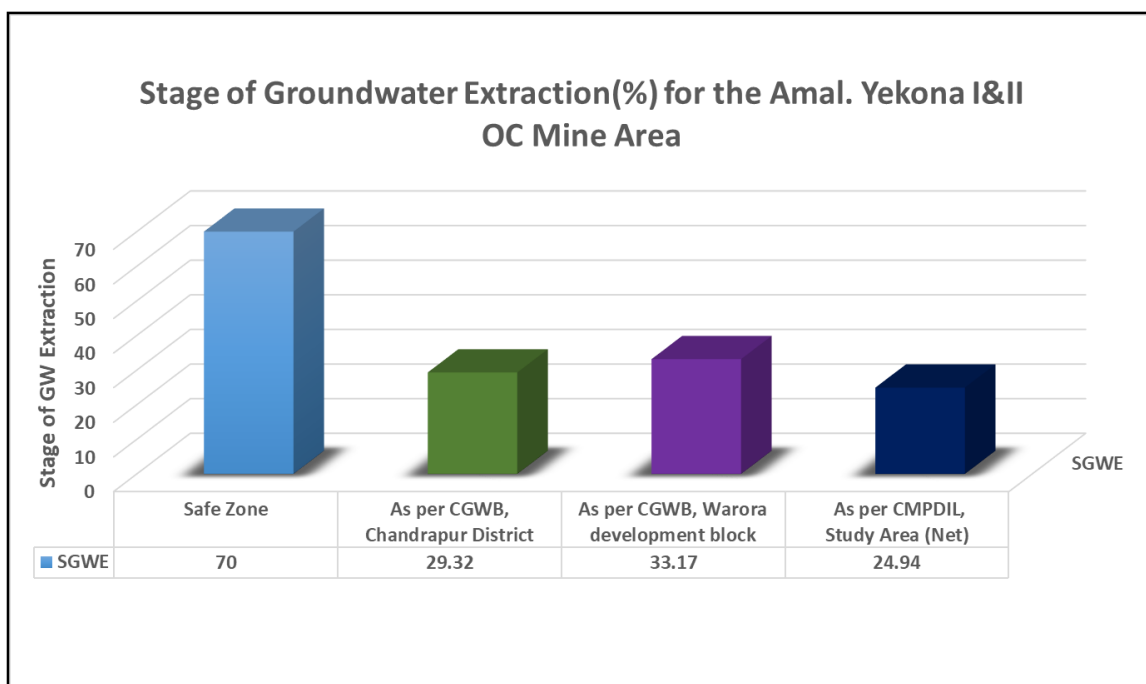
The treatment of sewage generated from the households is necessary to keep clean the nearby water bodies. The sewage discharge from township & services can have significant impact on water quality. The existing manpower of the colony utilizes integrated Colony of Majri Area for residential purpose. A STP is proposed in the township. A sewage treatment plant is installed within the mine premises. The STP is based on MBBR Technology with capacity of 5 KL.

Impact on Hydro-Geological Regime

In the opencast mines, the different aquifers overlying the working coal seam would be contributing groundwater to the mine by gravity drainage since they are exposed/removed at the mine. The anticipated groundwater inflow to the mine is to the tune of 10753m³/day (approx.). As such due to this pumping/gravity drainage, cone of depression would be formed. The shape and extent of the cone would depend on mainly hydraulic conductivity and specific yield of aquifers, mine depth & area etc.

Generally steep drawdown cone would be formed in poor potential aquifers, thereby the influence area will be limited to small distance and reverse is established in respect of aquifers with high hydraulic conductivity. Radius of influence (R) of mine has been estimated at around 393.

These have been represented in the figure below:



Stage of Ground Water Extraction in the study area.

Conservation Measures

1. The mine discharge will be utilized to meet the mine's domestic, dust suppression, fire-fighting and other industrial water needs.
2. The artificial recharge by water conservation structures in the outside mine influence areas will check water level lowering. The impact on ground water level is being minimized by artificial recharge by spreading of pumped out water, creation

and filling of ponds with mine water and construction of rainwater harvesting structure.

3. After the cessation of mining, with copious rainfall and abundant groundwater recharge, the water levels will recoup and attain normalcy. Thus, the impact of mining on groundwater system may be considered as a temporary phenomenon. The old mine workings also behave as water pools and improves the resource availability in the area.
4. The discharged mine water would be available for the local people to utilize in irrigation and domestic use. Thereby the mine water will be a resource for many of the local villagers.
5. Monitoring of water quality of mine water discharge, local river/ Nallah and domestic water (dug well/hand pumps) will be done under routine monitoring. On analyzing the field data if any area receiving the maximum impact, suitable controls measures will be adopted by the project authorities.

4.3 NOISE QUALITY

Monitoring of the noise control will be carried out on regular basis as per the Environment (Protection) Amendment Rule 2000. While planning for an effective noise attenuation measures, the concept of source, path and receiver has been considered.

4.4 IMPACT ON LAND AND LAND RECLAMATION

The following activities have been proposed for reclamation of land.

1. Backfilling of the excavated area at the time of mine closure.
2. Levelling of the backfilled area and carpeting with the topsoil.
3. Creation of garland drains in order to arrest the silt load, due to erosion, to enter into natural watercourses during surface run-off.
4. Grass, legumes and different types of plants etc. will be planted on such reclaimed land in order to make it, as far as possible, conducive to agricultural growth.
5. Technical and biological reclamation of external OB dump and rehandling at the end of mine life. The density of trees will be around 2500 plants/Ha.

The land requirement details of Yekona OC project is as shown below:

Land Use Table

Sr. No.	Particulars	Phase-I		Phase-II		Total Land Phase-I+II (ha)
		Acquired under Phase-I (ha)	To be acquired under Phase-I (ha)	Acquired under Phase-II (ha)	Forestry clearance to be obtained under Phase-II (ha)	
Inside the Mine leasehold area						
1.	Tenancy Land	1570.60	2.49	21.31	0	1594.40
2.	Govt. Land	58.30	0	0	0	58.30
3.	Forest Land	0.00	0	0	0.62	0.62
	Sub-total	1628.90	2.49	21.31	0.62	1653.32
Outside the Mine leasehold area						
1.	Tenancy Land	0	48.00*	0	0	48.00
	Sub-total	0	48.00	0	0	48.00
Total		1628.90	50.49	21.31	0.62	1701.32
		Phase-I Land total = 1679.39 ha		Phase-II Land total = 21.93 ha		1701.32
Present application for Phase-I of the Project within Land area of 1679.39 ha						

The land use in core zone is mainly agricultural land. So the major impact on land will degradation of agriculture land in the mining area.

4.5 REHABILITATION & RESETTLEMENT

R&R of Marda Village involved in this project.

4.6 PROGRESSIVE MINE CLOSURE PLAN

For the Mine Closure activities, a corpus fund is created by opening an escrow account with the coal controller organization in nationalised bank. For opencast mine, an amount @ Rs 9.00 lakhs per Ha of the project area is required to be deposited in this escrow account for final mine closure after adjustment for WPI on the date of computation. This mine closure corpus is divided by the life of mine to calculate yearly mine closure contribution. This amount is deposited in the escrow account every year after escalating @ 5% per annum.

5.0 ENVIRONMENTAL MONITORING PROGRAMME

The Environmental Monitoring Programme will be carried out as per statutory requirements and detailed in the chapter – IV of the EIA report.

Additional Studies

Public Consultation: Public consultation will be arranged by Maharashtra Pollution Control Board after submission of this Draft EIA-EMP Report along with EIA Summary of the Project (Public Hearing document) based on the ToR issued by MoEF&CC.

Risk Assessment and Management: The disaster management is essential to guard against and mitigate the consequences of major accidents. Keeping in view the three basic principles i.e. prevention, preparedness (both proactive and reactive) and mitigation of effect through rescue, recovery, relief and rehabilitation; a comprehensive blueprint of disaster management plan as Mine Emergency Response Plan (MERP) has been prepared and in operation for Amalgamated Yekona I and II OC incorporating the Identification and assessment of risks and recommendation of measures to prevent damage to life and property against such risks. Details are given in Chapter –7.

Traffic study:

Traffic study has been conducted along coal transportation route, which is approximately 5.5 km. Transportation of mineral will be done 100% by road till construction of Railway Siding by March 2027. Existing PCU is 260.4 PCU/hr on Coal Transportation Route and existing level of service (LOS) is:

Road Stretch	Traffic Volume (PCU/hr)	Road Capacity (PCU/hr)	V/C Ratio	Level of Service (LOS)
Mine to Thermal Power Plant	260.4	1500	0.17	A

Road Stretch	Traffic Volume (PCU/hr)	Road Capacity (PCU/hr)	V/C Ratio	Level of Service (LOS)
Mine to Thermal Power Plant	297.4 (260.4 Existing + 37 Additional)	1500	0.198	A

Note: Capacity as per IRC-106-1990 Guide line for capacity for roads is 1500.

Conclusion: The level of service will remain excellent (A) after including additional traffic due to proposed project.

Project Benefits

The project will bridge the gap between demand & supply of power grade coal to the extent of its peak capacity. In addition, benefits of the project on social sector in the surrounding can be summarized as below: -

- Substantial employment in the project & indirect employment for business & trading, contractor, transportation, vehicle contractor, nursery development.
- WCL takes up various infrastructural development works in the surrounding area covering the needs of the local community and the various works undertaken under CSR activities.
- Development of road thereby improving the communication.
- Improvement in Power, Telephone (including Mobile) facility.
- Improvement in Health Care facility & Educational facility.
- Improvement in Market / Trade & Business.
- The social infrastructure by way of cultural mixing of people of other states with local community glorifying "UNITY IN DIVERSITY".
- WCL as a responsible corporate organization in Central India is playing a significant role in developing the region around its mines in the States of Maharashtra & Madhya Pradesh.

Environment Management Cell

WCL, has an Environment Department headed by General Manager (Environment) at its HQ. The department provides necessary support that are required for environmental management of various mining projects under the jurisdiction of the company. At area level, Area General Manager co-ordinates the activities of various disciplines in the area to render all necessary assistance at the implementing level i.e. the Project level. Nodal Officer (Environment) of the area monitors all aspects of environment on behalf of the Area General Manager. He will also take suitable steps for generation of environmental data along with CMPDI team for its analysis and interpretations.

6.0 ENVIRONMENTAL COST PROJECTION

A capital provision of Rs. 41.1908 lakhs has been made against environment protection. Rs. 6.00/t of coal has been provided to absorb environmental related cost in the project.

7.0 PROVISION FOR CSR WORK

The fund for the CSR will be allocated based on 2% of the average net profit of the Company for the three immediate preceding financial years or Rs 2.00 per Tonne of Coal Production of the previous year whichever is higher.

Environment Management Plan

The success of environmental management in an organization not only depends on deep involvement of its personnel at all levels but also on the creation of an effective implementing organizational structure.

Implementing Organization: Western Coalfields Limited, the owner of this project has a well-established organization at Corporate as well as Project level.

Corporate Level: Western Coalfields Limited, the owner of this project has an Environmental Department headed by a General Manager at its H.Q. The department provides necessary support that is required for Environmental Management of various projects and mines under the jurisdiction of the company. Further, to carryout Rehabilitation & Resettlement measures, a Land & Revenue Department has been working at WCLHQs which is also headed by a General Manager.

Project Level: The environmental activities of the Project are carried out by Environmental Cell at Project level headed by a Chief Manager assisted by Assistant Manager (Environment), under the overall control of the Area General Manager of the project.

Environmental Monitoring and Control: For effective implementation and mid-term corrective measures (if required) monitoring and control of program implementation is essential. For this purpose, a time bound action program for environmental management has been prepared.

The scope of environmental management includes plantation, surface drainage, industrial complex, water treatment plant, ambient air, Water including ground water and noise pollution monitoring and implementation of control measures etc.

8.0 CONCLUSION

The mining sequence has been planned in a way to maximise internal dumping so that least area is required for external OB dumping.

The project authorities need to follow the mitigation measures strictly as given in the EIA & EMP report. This will minimise the impact on environment.

The project for expansion of Yekona OC may be granted environmental clearance so that the project can bridge the gap between demand and supply of coal in the country and help in achieving the self-reliance on coal production within the nation.
