

**EXECUTIVE SUMMARY**  
**OF**  
**DRAFT ENVIRONMENTAL IMPACT**  
**ASSESSMENT REPORT &**  
**ENVIRONMENTAL MANAGEMENT PLAN**  
**FOR**  
**PUBLIC HEARING**  
**OF**

**Guma II Limestone Block (ML Area- 249.03 ha)**  
**with Limestone Production Capacity 3.5 Million TPA,**  
**Top Soil 0.038 Million TPA, Over Burden 0.690 Million TPA,**  
**Sub Grade 0.320 Million TPA and Mineral Reject 0.560 Million TPA**  
**(Total Excavation 5.108 Million TPA)**  
**with installation of Crusher with Wobbler of 1500 TPH**  
**Capacity and Installation of a New Belt Conveyor**  
**(length 4.05 km) from Crusher to the Plant**

**At**

**Villages: Guma, Sarseni, Khapradih,**  
**Tehsil: Palari & Simga,**  
**District- BalodaBazar-Bhatapara (Chhattisgarh)**

**APPLICANT**



**M/s. ULTRATECH CEMENT LIMITED**

**(Unit: Rawan Cement works)**

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## INDEX

S. NO.	PARTICULAR	PAGE NO.
1.0	PROJECT DESCRIPTION	1
1.1	INTRODUCTION OF PROJECT PROPONENT	1
1.2	TYPE OF PROJECT	1
1.3	NEED FOR THE PROJECT	2
1.4	BREIF DESCRIPTION OF THE PROJECT	2
1.5	LOCATION MAP	4
1.6	MINE DESCRIPTION	5
1.6.1	MINING LEASE STATUS	5
1.6.2	MINING DETAILS	5
1.6.3	METHOD OF MINING	6
2.0	DESCRIPTION OF THE ENVIRONMENT	6
2.1	PRESENTATION OF RESULTS (AIR, NOISE, WATER & SOIL)	6
2.2	BIOLOGICAL ENVIRONMENT	6
2.3	SOCIO – ECONOMIC ENVIRONMENT	7
3.0	ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES	7
4.0	POST PROJECT ENVIRONMENTAL MONIOTIRNG PROGRAMME	9
5.0	ADDITIONAL STUDIES	9
6.0	PROJECT BENEFITS	9
7.0	ENVIRONMENT MANAGEMENT PLAN	9
7.1	AIR QUALITY MANAGEMENT	9
7.2	NOISE QUALITY MANAGEMENT	10
7.3	WASTE WATER MANAGEMENT	11
7.4	TOP SOIL AND SOLID WASTE GENERATION & MANAGEMENT	11
7.5	LAND USE PATTERN	12
7.6	GREENBELT DEVELOPMENT AND PLANTATION PROGRAM	12



## Executive Summary

### 1.0 PROJECT DESCRIPTION

#### 1.1 INTRODUCTION OF PROJECT PROPONENT

- UltraTech Cement Ltd. is the unit of Aditya Birla Group which is India's first truly multinational corporation. Global in vision, rooted in Indian values, the group is driven by performance ethic pegged on value creation for its multiple stake holders.
- The company has a consolidated capacity of 117.35 Million Tonnes Per Annum (MTPA) of grey cement. UltraTech Cement has 23 integrated plants, 1 clinkerisation plant, 27 grinding units and 7 bulk terminals. Its operations span across India, UAE, Bahrain, Bangladesh and Sri Lanka. UltraTech Cement is also India's largest exporter of cement reaching out to meet the demand in countries around the Indian Ocean and the Middle East.
- In the white cement segment, UltraTech goes to market under the brand name of Birla White. It has a white cement plant with a capacity of 0.56 MTPA and 2 WallCare putty plants with a combined capacity of 0.8 MTPA.
- With 100+ Ready Mix Concrete (RMC) plants in 35 cities, UltraTech is the largest manufacturer of concrete in India. It also has a slew of speciality concretes that meet specific needs of discerning customers.
- It is also one of the leading cement producers globally. UltraTech as a brand embodies 'strength', 'reliability' and 'innovation'. Together, these attributes inspire engineers to stretch the limits of their imagination to create homes, buildings and structures that define the new India.
- The UltraTech Cement Limited (UTCL) was incorporated in Companies Act- 1956/2013 with CIN No. L26940MH2000PLC128420. Its head quarter is in Mumbai (Maharashtra).

#### 1.2 TYPE OF PROJECT

- UTCL is proposing Guma II Limestone block (ML Area 249.03 ha) in Villages: Guma, Sarseni, Khapradih, Tehsil: Palari & Simga, District- BalodaBazar-Bhatapara (Chhattisgarh) with Limestone Production Capacity 3.5 Million TPA, Top Soil 0.038 Million TPA, Over Burden 0.690 Million TPA, Sub Grade 0.320 Million TPA and Mineral Reject 0.560 Million TPA (Total Excavation 5.108 Million TPA) with installation of Crusher with Wobbler of 1500 TPH Capacity and Installation of a New Belt Conveyor (length 4.05 km) from crusher to the existing Rawan Cement Plant. It will also supply limestone to the Company's Hirmi Cement Plant besides Rawan Plant for meeting raw materials requirement of existing units and proposed expansion.
- As per EIA Notification dated 14<sup>th</sup> September, 2006 as amended from time to time, the project falls under Category "A", Project or Activity 1 (a) (3) for Mining of Mineral and Project Activity 2(b) (3) for Mineral Beneficiation (Crusher with Wobbler).

### 1.3 NEED FOR THE PROJECT

- M/s. UltraTech Cement Ltd. (Unit: Rawan Cement Works) has existing Integrated Cement Plant with Clinker (6.5 Million TPA), Cement (3.3 Million TPA), WHRS (16 MW) & CPP (80 MW) located at Village: Rawan, Tehsil: Simga, District: BalodaBazar-Bhatapara (Chhattisgarh); the plant was commissioned in the year 1995. Environmental Clearance for the existing Integrated Cement Plant was obtained from MoEFCC, New Delhi vide letter no. J-11011/262/2009-IA (II) dated 17.03. 2011.
- Now, UTCL has proposed an expansion in existing Integrated Cement Plant with following capacities: Clinkerisation (6.5 to 10.0 Million TPA), Cement manufacturing (3.3 to 7.0 Million TPA), WHRS (16 to 36 MW) & CPP (80 MW). ToRs have been issued by MoEFCC vide their letter No J-11011/262/2009-IA.II (I) dated 09.11.2018.
- In order to meet the limestone requirement of the above mentioned integrated cement plant, UTCL is proposing Guma II Limestone block (ML Area 249.03 ha) with Limestone Production Capacity 3.5 Million TPA, Top Soil 0.038 Million TPA, Over Burden 0.690 Million TPA, Sub Grade 0.320 Million TPA and Mineral Reject 0.560 Million TPA (Total Excavation 5.108 Million TPA) with installation of Crusher with Wobbler of 1500 TPH Capacity and Installation of a New Belt Conveyor (length 4.05 km) from Crusher to the plant at Villages: Guma, Sarseni, Khapradih, Tehsil: Palari & Simga, District- BalodaBazar-Bhatapara (Chhattisgarh).
- Limestone produced from this Mine will be used for captive UTCL Cement Plant (Rawan Cement Works as well as Hirni Cement Works).
- The Ministry of Mines, Government of India, New Delhi has provided estimates of generation of revenue from the Project. It is estimated that in 50 years, which is the period of mining lease, about Rs. 8450 Crores revenue would be generated including an additional contribution of Rs. 7389 Crores through auction. Apart from the generation of revenue, the project will prove to be beneficial in terms of socio-economic development of the area. The project activities will increase average income level, employment opportunities, flow of revenue in the area of ultimately result in better standard of living of the local people and also earnings to the State exchequer.

### 1.4 BRIEF DESCRIPTION OF THE PROJECT

**Table – 1**  
**Brief Description of the Project**

S. No.	Particulars	Details
A.	Nature of project	Proposed Limestone Mining Project
B.	Size of project	
1.	ML Area	249.03 Ha
2.	Proposal	Total Excavation: 5.108 Million TPA Limestone Production Capacity: 3.5 Million TPA, Top Soil: 0.038 Million TPA, Over Burden: 0.690 Million TPA, Sub Grade: 0.320 Million TPA and

Guma II Limestone Block (ML Area- 249.03 ha) with Limestone Production Capacity 3.5 Million TPA, Top Soil 0.038 Million TPA, Over Burden 0.690 Million TPA, Sub Grade 0.320 Million TPA and Mineral Reject 0.560 Million TPA (Total Excavation 5.108 Million TPA) with installation of Crusher with Wobbler of 1500 TPH Capacity and Installation of a New Belt Conveyor (length 4.05 km) from Crusher to the Plant  
At Villages: Guma, Sarseni, Khapradih, Tehsil: Palari & Simga, District- BalodaBazar-Bhatapara (Chhattisgarh)

Executive Summary

S. No.	Particulars	Details
		Mineral Reject: 0.560 Million TPA Installation of Crusher with Wobbler: 1500 TPH Capacity Installation of a New Belt Conveyor from Crusher to the Plant: Length 4.05 km
<b>C</b>	<b>Project Location</b>	
1.	Villages	Guma, Sarseni, Khapradih
2.	Tehsil	Palari and Simga
3.	District	BalodaBazar-Bhatapara
4.	State	Chhattisgarh
5.	Coordinates	Latitude: 21°34'50.98807" N to 21°36'07.75979"N Longitude: 82°02'35.10228" E to 82°03'37.91742"E
6.	Toposheet No.	Core Zone: 64K/2(F44Q2) Buffer Zone: 64G/14 (F44P14), 64K/2 (F44Q2), 64K/3 (F44Q3)
<b>D</b>	<b>Environmental Setting Details (with approx. aerial distance &amp; direction from the mining lease boundary)</b>	
1.	Nearest Highway	SH-10 (~9.5 km in NNE direction)
2.	Nearest Railway Station	Bhatapara Railway Station (~ 17.5 km in NW direction)
3.	Nearest Airport	Swami Vivekananda Airport, Raipur (~55 km in SW direction)
4.	National Park, Wild Life Sanctuaries, Biosphere Reserves, Wildlife corridors, Tiger/Elephant Reserves etc. within 10 km radius study area	There is no National Park, Wild Life Sanctuaries, Biosphere Reserves, Tiger Reserves, and Wildlife Corridors etc. within 10 km radius of study area.
5.	Reserve/Protected Forest within 10 km radius study area	Dhabadih RF (~4.0 km in NE direction)
6.	Water Bodies within 10 km radius of the mine site	Following seasonal water bodies exist in study Area: ➤ Mahanadi Canal (Adjacent in East direction) ➤ Chitawar Nala (~0.5 km in East direction) ➤ Khorsi Nala (~4.0 km in South direction) ➤ Jhorki Nala (~4.5 km in SSE direction) ➤ Ameri Diversion Canal (~7.5 km in West direction) ➤ Banjari Nala (~5.0 km in WNW direction) ➤ Kukardih Talav (~6.5 km in NE direction) ➤ Risda Canal (~7.0 km in NE direction) ➤ Tengna Nala (~7.0 km in ESE direction) ➤ Kauwa Nala (~9.0 km in ESE direction)
7.	Seismic Zone	Zone – II as per IS: 1893 (Part-I): 2002
<b>D</b>	<b>Cost Details</b>	
1.	Project Cost	Rs. 180 Crore/-
2.	Cost of EMP	Capital cost – Rs. 3.0 Crore/- Recurring cost – Rs. 0.5 Crore/Annum

Source: Site Visit & Pre-feasibility Report

Guma II Limestone Block (ML Area- 249.03 ha) with Limestone Production Capacity 3.5 Million TPA, Top Soil 0.038 Million TPA, Over Burden 0.690 Million TPA, Sub Grade 0.320 Million TPA and Mineral Reject 0.560 Million TPA (Total Excavation 5.108 Million TPA) with installation of Crusher with Wobbler of 1500 TPH Capacity and Installation of a New Belt Conveyor (length 4.05 km) from Crusher to the Plant  
 At Villages: Guma, Sarseni, Khapradih, Tehsil: Palari & Simga, District- BalodaBazar-Bhatapara (Chhattisgarh)

Executive Summary

1.5 LOCATION MAP

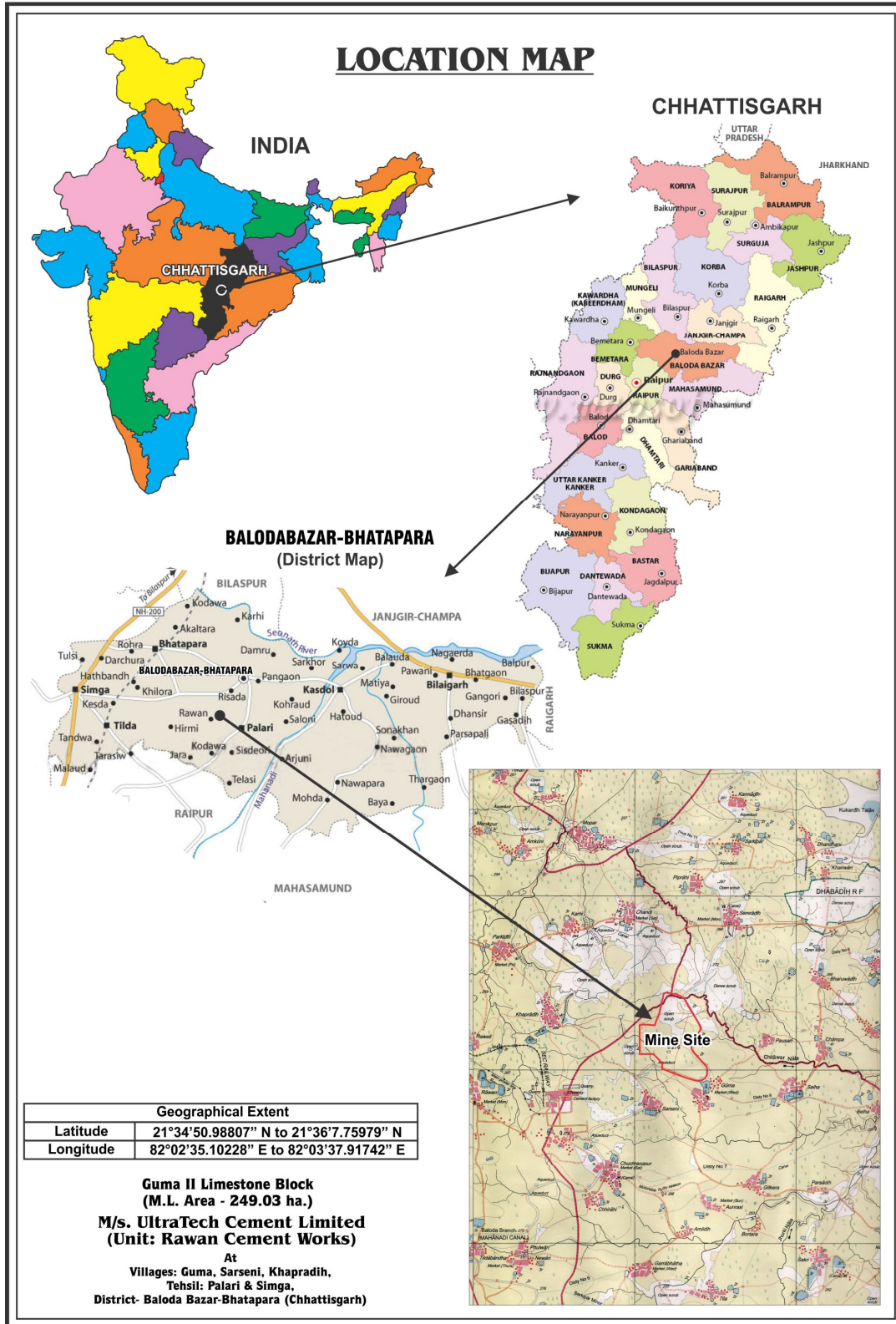


Figure-1: Location map (Showing general as well as specific location of the ML area)

## 1.6 MINE DESCRIPTION

### 1.6.1 MINING LEASE STATUS

- UTCL (Unit: Rawan Cement Works) participated in e-auction bidding of Guma II Limestone block and was declared the “Preferred Bidder” vide letter no F-3-09/2017/12 dated 31.03.2018.
- The Letter of Intent (LOI) for grant of mining lease over an area of 249.03 ha has been issued by Mineral Resources Department of Chhattisgarh vide letter no F-3-09/2017/12 dated 01.05.2018 which was further amended on 22.06.2018. Further, in accordance to Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016 there is partial amendment in the said order under Rule 58. As per the amendment in Letter of Intent, dated 01.05.2018, 6 months period is replaced by 3 years in the first line of para-4 (d) and in the second line of section-6, twenty six crores thirty seven lakhs seventy six thousand is replaced by the words twenty one crores thirty seven lakhs seventy six thousand.
- Mining Plan along with Progressive Mine Closure Plan has been approved by Indian Bureau of Mines, Raipur Chhattisgarh vide their letter no Balodabazar/Chup/khyo/MP-1167/2018- Raipur/1121, dated 11.10.2018.

### 1.6.2 MINING DETAILS

**Table – 2**  
**Mining Details**

S. No.	Particulars	Details
1.	Method of mining	Fully Mechanized Opencast Mining
2.	Total Geological Reserves	124 Million Tonnes
3.	Total Mineable reserves	100.36 Million Tonnes (Includes 5.22 million Tonnes of blocked reserves in transmission line)
4.	Proposed Life of the Mine	~33 years
5.	Bench Height	8 m
6.	Bench Width	30 m
7.	Ultimate Pit Slope	45°
8.	General Ground Level	272m AMSL
9.	Elevation Range	267 m AMSL to 278.5 m AMSL
10.	Water Table	264 to 258m AMSL (8 to 14m bgl)
11.	Ultimate Working Depth	233 m AMSL
12.	Stripping Ratio (Limestone: Waste) (Tonnes: Tonnes)	1:0.5
13.	Number of Working Days	300 days/year
14.	Number of shifts per day	2 Shifts

**Source:** Approved Mining Plan & Progressive Mine Closure Plan

### 1.6.3 METHOD OF MINING

Mining operations will be carried out by mechanized opencast mining method i.e. by combination of shovel and dumper with drilling and blasting. Bench height and bench width will be maintained at 8 m and 30 m respectively. Drilling will be carried out by crawler mounted DTH hammer drill machine. Conventional blasting will be done using ANFO, SME etc. NONEL detonating fuse will be used since multi row system of firing will be carried to reduce the ground vibration, noise, fly rock etc. due to blasting. Blasted limestone will be loaded by large size hydraulic excavators into the dumpers for onward dispatch to the crusher (for limestone) and waste dump (for waste and soil). A Crusher with wobbler of 1500 TPH capacity will be installed within the mine site. Crushed limestone will be transported from the Mine Site to Rawan Cement Plant initially by Road subsequently by covered conveyor belt and to Hirmi Cement Plant via Road.

### 2.0 DESCRIPTION OF THE ENVIRONMENT

#### 2.1 PRESENTATION OF RESULTS (AIR, NOISE, WATER & SOIL)

Baseline study of the study area was conducted during Winter Season, Dec., 2018 to Feb., 2019.

The concentrations of PM<sub>10</sub> and PM<sub>2.5</sub> for all the 9 AAQM stations were found between 48.1 to 92.8 µg/m<sup>3</sup> and 24.2 to 56.5 µg/m<sup>3</sup> respectively. The concentrations of SO<sub>2</sub> and NO<sub>2</sub> were found to be in range of range of BDL to 13.3 µg/m<sup>3</sup> and 8.9 to 27.9 µg/m<sup>3</sup> respectively. CO concentration was found to be in range of 0.41 mg/m<sup>3</sup> to 0.98 mg/m<sup>3</sup>.

Ambient noise levels were measured at 10 locations around the Mine site. Noise levels varied from 43.4 to 65.3 Leq dB (A) during day time and from 42.6 to 60.5 Leq dB(A) during night time.

The ground water analysis for all the 10 sampling stations shows that pH varied from 7.11 to 8.21, total hardness varied from 111.88 mg/l to 499.95 mg/l & total dissolved solids varied from 199 mg/l to 1015 mg/l. The water samples contain chloride 24.82 to 191.08 mg/l, SO<sub>4</sub> varies from 17.14 to 150.75 mg/l, Ca from 29.76 to 190.46 mg/l, Mg varies from 4.81 to 32.48 mg/l.

Samples collected from identified soil locations indicate pH value ranging from 6.95 to 7.49. The soil texture is silty loam and sandy loam. Organic Matter ranges from 0.63% to 1.45% in the soil samples. Nitrogen is found to be in moderate amount as it ranges from 99.58 kg/ha to 137.46 kg/ha and Phosphorous in less amount i.e. from 34.09 kg/ha to 53.20 kg/ha, whereas the Potassium is found to be ranging from 157.08 kg/ha to 252.75 kg/ha.

#### 2.2 BIOLOGICAL ENVIRONMENT

Flora: Species which are most commonly found in the study area are: *Azadirachta indica* (Neem), *Acacia nilotica* (Babool), *Butea monosperma* (Palash), *Aegle marmelos* (Bel), *Delonix regia* (Gulmohar), *Bombax ceiba* (Kapok), *Moringa pterygosperma* (Drumstick), *Bauhinia variegata* (Kachnar), *Pongamia pinnata* (Karanj), *Phoenix sylvestris* (Khajoor), *Polyalthia longifolia* (Ashok), *Tamarindus indica* (Imli), *Calotropis gigantea* (Aak), *Ocimum sanctum* (Tulsi) etc.



Fauna: Species which are most commonly found in the study area are *Axix axis* (Chital), *Felis chaus* (Jungle cat), *Presbytes entellus* (Flying Fox), *Periplaneta Americana* (Cockroach), *Herpestes edwardsii* (Common Mongoose), *Funambulus pennantii* (Northern Palm Squirrel), *Mus booduga* (Indian Field Mouse), *Calotes versicolor* (Common Garden Lizard), *Ptyas mucosa* (Indian Rat Snake), *Rana tigerinus* (Indian Bull Frog), *Canis aureus* (Jackal), *Lepus nigricollis* (Indian Hare), *Anastomus oscitans* (Asian Open bill stork) etc.

### 2.3 SOCIO-ECONOMIC ENVIRONMENT

The total area for the buffer zone is 383.1194 km<sup>2</sup> & total population as per 2011 Census records is 90799 (for 10 km radius buffer zone). Scheduled Caste population of the study area (10 km) is 24%, Scheduled Tribe is 9% and others are 67%. Total no. of household in the area is 18624. The percentage of total working population is 48% (Out of which 30% are main workers and 18% are marginal workers), Remaining, 52% of the total population is considered as non-workers.

### 3.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

#### ➤ Impact on Air Environment

##### Due to Mining

The key air emissions from the mining activities (drilling, blasting, crushing, loading, haulage and transportation) are Particulate Matter, Oxides of Nitrogen (NO<sub>2</sub>) and Sulphur dioxide (SO<sub>2</sub>). Gaseous emissions will be generated from HEMM, crusher & transportation of vehicles. Use of proper mitigation measures will be taken like water sprinkling during transport activities & development of green area to control fugitive emissions. Better maintenance of equipments also helps to reduce such emissions.

#### ➤ Impact on Water Environment –

##### Surface Water

There is no perennial water body within the study area. Mahanadi Canal flows adjacent to mine site. Seasonal water bodies like Chitawar Nala, Khorsi Nala, Jhorki Nala, Banjari Nala, KukurdihTalav, Risda Canal, Tengna Nala, Kauwa Nala, Ameri Divirision Canal are located within 10kms of the study area.

At conceptual stage, 122.70 ha area will be converted into water reservoir which will serve as recharge pit.

- To control the surface run-offs, Garland drain & series of check pits will be provided at the toe of the dumps, to channelize the runoff water from dumps into the water reservoir (i.e. mined out pits) & around the active pits to restrict rainy water from entering in to the working pit.
- The proposed working will not affect any of the streamlets.

- No waste water will be generated during mining operations. Wastewater generated from office toilets will be disposed off in soak pit via septic tank. Waste water generated from workshop & from washing will be treated with Oil/ grease/ Water separator and treated water will be used for dust suppression etc.
- Therefore, there is no significant impact on the water environment due to the mining operations in limestone Mining Lease area.

#### **Ground Water**

As per groundwater monitoring, water level is 8 to 14m bgl. At the end of fifth year, mining will attain a depth upto 241 mRL. Hence, there will be possibility of getting groundwater seepage. At conceptual stage, ultimate working depth of the mining operation will be upto 233m AMSL. Water table will be intersected due to mining activities.

Prior permission will be obtained from Central Ground Water Authority for Ground water withdrawal & intersection during mining operation.

#### ➤ **Impact of Noise & Vibration –**

##### **Due to Mining Activities**

Major noise generating sources of the mining activity are drilling, blasting, crushing and HEMM movement used for transportation of limestone. The plantation and the green belt around the mining lease boundary help in reducing noise level and proper mitigation measures will be carried out.

Total Mining Lease area is 249.03 ha. There is no habitation within the lease area. However, All DGMS guidelines will be followed to reduce the impact of blasting on the nearest habitation. Controlled blasting techniques through proper blast design and explosive selection will be used to reduce the vibrations to a greater extent.

#### ➤ **Impact on Land Environment –** The land use of the lease area will be altered from agricultural and barren land to mining area including pits, temporary dumps, greenbelt, plantation zone, water reservoir etc but will not have any significant effect on the surface features of the surrounding areas.

At conceptual stage total excavated area will be 201 ha, out of which 78.30 ha will be backfilled and rest 122.70 ha will be converted into water reservoir. Greenbelt will be developed along the 7.5 m wide lease periphery on 5.40 ha. Plantation will be done on 98.63 ha (78.30 ha on backfilled area and 20.33 ha on waste dump (40m width) along with lease boundary towards canal). Greenbelt/plantation will be done @ 2500 trees/ha.

Total 22.3 ha area will remain undisturbed.

#### 4.0 POST PROJECT ENVIRONMENTAL MONITORING PROGRAMME

**Table 4**  
**Post Project Monitoring**

S. No.	DESCRIPTION	FREQUENCY OF MONITORING
1.	Meteorological Data	Hourly
2.	Ambient Air Quality monitoring	Monthly
3.	Water Quality & Level monitoring	Quarterly
4.	Noise Level Monitoring	Quarterly
5.	Vibration Monitoring	On every blast
6.	Soil Quality & Level monitoring	Quarterly
7.	Medical Checkup of employees	Yearly
8.	Socio-Economic Environment	Yearly
9.	Stack Monitoring	Monthly

#### 5.0 ADDITIONAL STUDIES

Additional Studies i.e. Hydro –Geological Study, Risk Assessment & Disaster Management Plan, Land use and land cover study, Ecology and Biodiversity, Rehabilitation and Resettlement Plan are covered with this Draft EIA/EMP Report as per the Terms of Reference granted by MoEFCC, New Delhi vide letter no. J-11015/09/2019-IA.II (M) dated 22.02.2019 in favor of M/s. UltraTech Cement Limited (Unit: Rawan Cement Works).

#### 6.0 PROJECT BENEFITS

The proposed project will help the local economy directly as well as indirectly as there is going to be huge capital expenditure for this proposed unit and it will generate substantial employment in the region. The project will also contribute to the State as well as to National exchequer by way of various taxes and duties. With the proposed development in and around the area, there will be supporting facilities/infrastructure eventually leading to the development of the area. The project will boost the overall growth of the region and in the State; the local economy will flourish due to income expenditure in the local market. Therefore, project is having great importance to the state and national economy.

Along with the contribution in employment generation and economic growth of the country project will also be helpful in the development of basic needs of the local area like education, Health & family welfare, women empowerment, Natural resource management, water conservation, infrastructure development etc.

#### 7.0 ENVIRONMENT MANAGEMENT PLAN

##### 7.1 AIR QUALITY MANAGEMENT

###### Drilling

- Drilling machines will be provided with wet drilling arrangements to prevent dust from being air borne.

### **Blasting**

- Controlled blasting will be adopted.
- Rock breaker will be deployed in place of secondary blasting.
- Water spray on blasted muck pile before dozing/loading to control dust generation.

### **Crushing**

- Use of proper protection measures i.e. use of Bag filters, Regular water spraying on Crusher hopper to arrest dust from becoming air-borne.
- Development of green belt/plantation all around in the vicinity of the conveyor, crusher and transit points to trap fugitive dust will be carried out.

### **Loading & Transportation**

- Crushed limestone will be transported to the Rawan Cement at distance of about 4 kms from the mine site by covered conveyor belt and by road initially till the conveyor belt gets in operation.
- All the mine roads from loading to destination place (crusher/dumping site) will be maintained properly with motor grader and watered regularly during the shift operation to prevent generation of dust due to the movement of dumper etc.
- Development of green belt/plantation around mine boundary, roads and other places will be carried out to control the air pollution.
- Proper maintenance of the HEMMs & transportation vehicles will be done.
- Vehicular emissions will be kept under norms.
- Personal Protective Equipment like dust masks will be provided to all employees.
- Periodic air quality monitoring will be carried out.

## **7.2**

### **NOISE MANAGEMENT**

#### **Drilling**

- Drilling will be done with sharp drill bits to achieve optimum drilling performance and to reduce noise generation at source.
- Closed AC cabins will be provided for drill operator.
- Personal protective equipments i.e. earplug at drilling, crushing & at other high noise areas will be ensured.
- Periodic noise quality will be monitored regularly.

#### **Blasting & Vibration**

- Ground vibrations will not affect the structures in the vicinity of ML Area as blasting will be done in accordance with standards prescribed by DGMS for controlled blasting.

- Explosives charge per hole and per delay will be maintained as per DGMS guidelines & will be based on outcome after scientific study of blasting.
- Blasting will be carried out by use of non-electric initiation system and the impact of noise generated due to blasting will be momentary.
- Vibrations generated by blasting will be monitored regularly.

#### **Transportation**

- Adequate silencers in HEMM will be provided to reduce generation of noise.
- Proper maintenance, oiling and greasing of machines at regular intervals will be done to reduce generation of noise.
- All HEMMs will be equipped with acoustic a/c closed cabins for operators.
- The workers employed at HEMM will be provided with protective equipment, earmuffs and earplugs as a protective measure from the high noise level generated at the mine site and wherever required.
- Development of green belt & plantation around lease boundary, roads and other places will be carried out.
- Periodical monitoring of noise level will be carried out regularly.

### **7.3 WASTE WATER MANAGEMENT**

#### **Waste Water**

- Domestic wastewater generated from mines office will be disposed off in soak pit via septic tank.
- Waste water generated from the work shop & from washing of machineries will be used in crusher for dust suppression & for plantation after oil and grease separation.

#### **Surface Run-off**

- Garland drains & series of check pits will be constructed at toe of dump.
- The rainwater falling directly into the mine pits will be stored and used for plantation & dust suppression.
- Periodical monitoring of ground water quality will be carried out.

### **7.4 TOP SOIL AND SOLID WASTE GENERATION & MANAGEMENT**

#### **Top Soil Generation & Management**

- About 0.038 Million tons of top soil will be generated per annum.
- At conceptual stage, 1.35 Million tons of top soil will be generated from mining operations will be stacked separately around the 7.5m lease periphery and then use for Green belt development. Also, it will be used for stabilization of OB dump.

### Solid Waste Generation & Management

- About 0.690 Million tones OB, 0.320 Million tones Sub grade and 0.560 Million tones Mineral Reject will be generated per annum.
- At conceptual stage total 53.07 Million tons of OB and stony waste (24.04 Million tons of OB and 29.03 Million tons of stony waste) will be generated.
- About 49.94 Million tones will be backfilled in 78.30 ha area. Remaining 3.13 Million tones waste will be dumped on 20.33 ha area. Backfilled and waste dump area will be stabilized by the plantation later. Dump will be designed at 8 m height with single terracing and slope will be maintained at 28° angle.

### 7.5 LAND USE PATTERN

- At conceptual stage total excavated area will be 201 ha, out of which 78.30 ha will be backfilled and rest 122.70 ha will be converted into water reservoir.
- Greenbelt will be developed along the 7.5 m wide lease periphery on 5.40 ha. Plantation will be done on 98.63 ha (78.30 ha on backfilled area and 20.33 ha on waste dump (40m width) along with lease boundary towards canal).
- An area of 22.3 ha will remain undisturbed.

### 7.6 GREENBELT DEVELOPMENT AND PLANTATION PROGRAM

- Greenbelt will be developed along the 7.5 m wide lease periphery covering 5.40 ha area.
- Plantation will be done on 98.63 ha (78.30 ha on backfilled area and 20.33 ha on waste dump area).
- Thus, total greenbelt/plantation will be done on 104.03 ha area.
- The trees will be planted @ 2500 saplings per ha of land.
- Native species will be planted as per the advice of Forest Department, (Chhattisgarh).
- Indigenous & fruit bearing species to be planted by UTCL will be *Azadirachta indica* (Neem), *Cassia fistula* (Amaltas), *Mangifera indica* (Mango), *Delonix regia* (Gulmohar), *Saraca asoca* (Site Ashok), *Pongamia pinnata* (Karanj), *Tectona grandis* (Teak), *Hardwickia binata* (Anjan), *Bombax ceiba* (Semal), *Sesbania grandiflora* (Hummingbird Tree/ Agati), *Erythrina variegata* (Indian Coral tree), *Grevillea robusta* (Silver Oak), *Acacia albida* (Apple Ring Acacia), *Phyllanthus emblica* (Amla), *Psidium guajava* (Guava), *Prosopis cineraria* (Khejri), *Albizia spp.* (Siris), *Syzygium cumini* (Jamun), *Citrus lemon* (Lemon), *Morus alba* (Mulberry), *Nerium indicum* (Kaner), *Cestrum nocturnum* (Night blooming Jasmine) *Bauhinia variegata* (Kachnar), *Tamarindus indica* (Imli), *Terminalia arjuna* (Arjun), *Ficus glomerata* (Gular).

