Project Category 'B1'

DRAFT ENVIRONMENT IMPACT ASSESSMENT
&
ENVIRONMENT MANAGEMENT PLAN
FOR
SHIVPURA RED OCHRE MINE
(M.L. No. 07/2018), AREA 3.9859 Ha.
Near village Shivpura, Tehsil Chotti Sadri, District Pratapgarh, Rajasthan
Lease valid upto: Fresh Mine
Proposed Production: ROM 2,99,995 TPA & Red Ochre 2,33,455 TPA
Project Cost : 0.40 Crore
FOR ENVIRONMENT CLEARANCE
(Monitoring Period from October, 2019 to December, 2019)

Project Proponent
M/s Quality Minerals
Partner - Shri Nehul Partidar S/o Shri Pushkar Patidar
R/o 9 A, Arihant Vihar, near Power House, 100 feet road, Kankroli,
District Rajsamand, Rajasthan Phone No.: +91 9414012490
Email id: singhbp1983@gmail.com

APEX MINTECH CONSULTANTS
(NABET - Accredited Consultants S. No. 9)
owning NABL accredited & Recognized by MoEF&CC, GOI Laboratory
Address: 3, Dhebar Colony, Near I.T.I., Pratapnagar
Udaipur, Rajasthan
Mobile No. +91 93525 05728, +91 98291 61803
Email Id: apex.mintech@gmail.com, apex.mintech.udr@gmail.com, rd_saxena@yahoo.co.in

July 2020

Undertaking

I, M/s. Quality Minerals,Project Proponent of Shivpura Red Ochre Mine, give the undertaking that the Environmental Impact Assessment and Environmental Management Plan of Shivpura Red Ochre Mine M.L. No. 07/2018, having an area of 3.9859 Ha., situated near village Shivpura, Tehsil Chhoti Sadri & District Pratapgarh (Rajasthan), for proposed production ROM 2,99,995 TPA and mineral Red Ochre 2,33,445TPA, has been prepared by M/s Apex Mintech Consultants as per the Terms of Reference issued by State Level Expert Appraisal Committee, Rajasthan in 4.35th meeting of SEAC, Rajasthan on3rd, 4th, 5th, 6th, 10th, 11th and 12th February, 2020.

It is also certified that the data used in the report pertain to our mining project. Further, it is undertaken that all the commitments made in the report will be deemed to have been made by me.

For: M/s Quality Minerals

(Authorized Signatory)

Place:
Date:

Undertaking

I, R.D. Saxena, Proprietor of Apex Mintech Consultants, Udaipur, (Rajasthan), Environmental Consultants of M/s. Quality Minerals,Project Proponent of Shivpura Red Ochre Mine, give the undertaking that the Environmental Impact Assessment and Environmental Management Plan of Shivpura Red Ochre Mine M.L. No. 07/2018, having an area of 3.9859 Ha., situated near village Shivpura, Tehsil Chhoti Sadri & District Pratapgarh (Rajasthan), for proposed production ROM 2,99,995 TPA and mineral Red Ochre 2,33,445 TPAgive this undertaking to the effect that the Terms of Reference (ToR) issued by State Level Expert Appraisal Committee, Rajasthan in 4.35th meeting of SEAC, Rajasthan on3rd, 4th, 5th, 6th, 10th, 11th and 12th February, 2020at Rajasthan have been complied as per data/details provided by the project proponent and as per approved Mining Plan and the data furnished in the Draft EIA report are factually correct.

I hereby own the contents (information and data) of the Draft EIA report.

For: Apex Mintech Consultants

(R. D. Saxena)

(Proprietor)

Place: Udaipur
Date:

List of Contents

List of Contents

List of Contents

List of Contents

List of Contents

List of Contents

List of Contents

List of Contents

List of Contents

List of Contents

List of Contents

List of Contents

List of Tables

List of Tables

List of Tables

List of Tables

List of Maps

List of Figures

List of Photographs

LIST OF ANNEXURES

S. No.	TITLE	Annexure No.
1	A copy of Terms of Reference	1
2	A copy of LOI	2
3	A copy of lease map & Demarcation report for 3.9859 ha.	3
4	A copy of Approval letter of mining plan with progressive mine closure plan (Cover Page)	4
5	A Copy of Khasra Map & Details	5
6	A Copy of Certificate 500 m.	6
7	A Copy of NOC Forest Department	7
8	A Copy of Aravali Certificate	8
9	A Copy of Monitoring Report Water	9
10	A Copy of Monitoring Report Air	10
11	A Copy of Monitoring Report Noise	11
12	A Copy of Monitoring Report Soil	12
13	QCI-NABET certificate	13

(कार्यकारी सारांश)

पर्यावरणीय प्रभाव एवं मूल्यांकन

एवं

पर्यावरणीय प्रबन्धन योजना

शिवपुरा रेड ऑकर खान

प्रस्तावित उत्पादन क्षमता ROM 2,99,995 TPA & रेड ओकर 23,3445 टन प्रतिवर्ष

(खनन क्षेत्रफल 3.9859 हैक्टेयर)

(एम.एल.नं. 07/2018)

निकट ग्राम–शिवपुरा, तहसील–छोटीसादड़ी,

जिला–प्रतापगढ़ (राजस्थान)

:: प्रस्तावक ::

मेसर्स क्वालिटी मिनरल्स

पार्टनर– श्री नेहुल पाटिदार

9–ए, अरिहन्त विहार, पावर हाउस के पास, 100 फीट रोड़, कांकरोली,

जिला राजसमन्द (राजस्थान)

फोन नं.: + 9414012490

ईमेल आईडी: singhbp1983@gmail.com

:: सलाहकार ::

मेसर्स एपेक्स मिनटेक कन्सलटेन्ट्स

(एन.ए.बी.ई.टी.–मान्यता प्राप्त सलाहकार क्रम.सं.9)

एन.ए.बी.एल. द्वारा मान्यता प्राप्त एवं एम.ओ.एफ.सी.सी. भारत सरकार द्वारा स्वीकृत प्रयोगशाला

पता: 3, ढेबर कोलोनी, आई.टी.आई. के पास प्रतापनगर,

उदयपुर–313001(राजस्थान)

फोन नं.:+913525-05728, +98291-61803

ईमेल आईडी: apex.mintech@gmail.com,apex.mintech@gmail.com,
rd_saxena@yahoo.co.in

1. परिचयः

रिपोर्ट का उद्देश्य शिवपुरा रेड ऑकर खदान, लीज का क्षेत्रफल 3.9859 हैक्टेयर, एम.एल.न. 07/2018 प्रस्तावित उत्पादन क्षमता रेड ROM 2,99,995 TPA & ऑकर के लिए 233445 मैट्रिक टन प्रति वर्ष जो कि निकट ग्राम शिवपुरा खुर्द, तहसील छोटीसादड़ी एवं जिला प्रतापगढ़ (राज.) में स्थित है।

यह खदान मिनरल रेड ऑकर राजस्थान सरकार द्वारा निदेशक खान एवं भूविज्ञान विभाग द्वारा निकट ग्राम–शिवपुरा, तहसील–छोटी सादड़ी, जिला–प्रतापगढ़ (राज.) की खातेदारी भूमि खसरा संख्या 349/2361 एवं 355/2364 पर मैसर्स–क्वालिटी मिनरल्स के पक्ष में मंषा पत्र जारी कर खनन क्षेत्र रेड ऑकर के लिए स्वीकृति प्रदान की जिसका पत्र क्रमांक DMG/प्रताप/सी.सी.1/प.1 (1) 7/2018/4498 दिनांक 21.12.2018.

खनन योजना एवं उत्तरोत्तर खदान बन्द करने की योजना राजस्थान अप्रधान खनिज रियायत 2017 के नियम 29 (1) एवं 29(5) (VI) के अन्तर्गत अधिक्षण खनिज अभियन्ता खान एवं भू विज्ञान विभाग उदयपुर वृत उदयपुर में अनुमोदन के लिए प्रस्तुत किया जिसका अनुमोदन पत्र क्रमांक अ.ख.ऊ/उदय–वृत/माइन.प्लान/प्रताप/प.19/18/10654–10658 दिनांक 20.02.2019 द्वारा अनुमोदित किया गया।

2. परियोजना प्रस्तावक की पहचानः

यह फर्म एक भागीदारी फर्म है। जिसे भागीदार श्री नेहुल पाटिदार द्वारा संचालित किया जाता है।

3. परियोजना प्रस्तावक का रजिस्ट्रर्ड पताः

मैसर्स क्वालिटी मिनरल्स, पार्टनर श्री नेहुल पाटिदार
9–ए, अरिहन्त विहार, पावद हाउस के पास, 100 फीट रोड़, कांकरोली,
जिला–राजसमन्द (राज.)
सम्पर्क नम्बरः +91-9414012490
ई–मेल : **singhbp1983@gmail.com**

4. आवेदित लीज क्षेत्र की स्थितिः

4.1 आक्षांश एवं देशान्तरः यह लीज क्षेत्र अक्षांष 24°23'05.36" N से 24°23'20.92" N, देषान्तर 76°46'51.06"E से 74°46'55.27"E के बीच स्थित है।

4.2 टोपोशीट संख्याः 45 एफ/15 है।

4.3 भूमि का प्रकारः यह खातेदारी भूमि है।

5. खनन लीज तक पहुंचने का मार्गः

5.1 रोड द्वाराः लीज क्षेत्र तक पहुंचने के लिए जिला मुख्यालय प्रतापगढ़ से है, जो 48 कि.मी. की दूरी पर स्थित है। तथा तहसील छोटी सादड़ी से 9.8 किमी. की दूरी पर है। उसके बाद शिवपुरा गांव से 0.80 किमी. की दूरी पर खनन क्षेत्र स्थित है।

5.2 रेल द्वाराः निकटतम रेलवे स्टेषन 17.66 कि.मी. की दूरी पर नीमच में है।

5.3 हवाई मार्ग द्वाराः निकटतम हवाई अड्डा 92.42 कि.मी. दूर उदयपुर में स्थित है।

6. परियोजना की लागतः परियोजना की लागत लगभग 40 लाख रुपये है।

7. स्थलाकृति :

स्थलाकृतिक रूप से, लागू क्षेत्र में समतल भूमि शामिल है। इसका उच्चतम बिन्दु 513 मी. एम. आर.एल. एवं निम्नतम बिन्दु 510 मी.एम.आर.एल. है। सर्वेक्षण के लिए पिलर "ए" को एम.एस. एल. बेंचमार्क के रूप में 513 एम.आर.एल. माना जाता है। लीज क्षेत्र में कोई वनभूमि नहीं है।

जल निकासी (जल प्रवाह):

लीज क्षेत्र में कोई प्रमुख जल निकाय नहीं है। खनन पट्टा क्षेत्र लगभग समतल है। इस क्षेत्र में सिर्फ बारिश के समय ही पानी आता है। और बहकर बाहर निकल जाता है।

7.1 क्षेत्रीय भूविज्ञानः

क्षेत्र में क्षेत्रीय भूवैज्ञानिक उत्तराधिकार निम्नानुसार हैः –

FORMATION	AGE
Alluvium	Recent
Latertic	Sub recent to Pleistocene
Deccan trap	Upper Cretaceous
Kaimur sandstone	Upper Vindhyan
Suket Shales	
Nimbaheda grey limestone	
Nimbaheda purple limestone	
Nimbaheda shales (Purple)	Lower Vindhyan
With conglomerate	

----------UNCONFORMITY----------

Aravali Binota shales or : Delhi system

जीरन बलुआ पत्थर :

जीरन बलुआ पत्थर उत्तर और दक्षिण की ओर कई निम्न लकीरें बनाता है और छोटी सादडी के पास जुड़कर उस गाँव और जीरन के बीच एक अनियमित पठार बनता है, जिसमें छोटे–छोटे सिलवटों के साथ डिप्स क्षैतिज होते हैं। निम्बाहेड़ा और मालन के उत्तर–पूर्व में, यह विंध्यन से पूर्व की ओर और विंध्य से पूर्व और दक्खन ट्रैप से पूर्व की ओर है। सैंडस्टोन के बीच की घाटियां काफी हद तक जाल से भरी हैं। जीरन और छोटी सादडी क्षेत्र में बलुआ पत्थर की मोटाई विंध्य प्रणाली के लगभग 100–200 फीट है, कैमूर बलुआ पत्थर के नीचे का विभाजन निचले मैदान में मिलता है। महान विंध्य क्षेत्र का पश्चिमवर्ती विस्तार कैमूर के बलुआ पत्थर के नीचे स्थित है।

कैमूर बलुआ पत्थर बिना किसी रूकावट के सुकेत शैलों में गुजरता है, और वे फिर से निम्बाहेड़ा चूना पत्थर और अंतर्निहित निम्बाहेड़ा शेल्स में आ जाते हैं। निम्बाहेड़ा शैलों के आधार पर, एक विशाल रेत का पत्थर क्षितिज है, जो विंध्यों का आधार बनाता है, जहां वे दिल्ली के अरावली बिनोटा शेल्स या संभव दिल्ली के जीरन बलुआ पत्थर पर स्थित होते है।

7.2 स्थानीय भूविज्ञानः

पट्टा के क्षेत्र का भू–विज्ञान सतह पर और खदान में काम करने वाले जोखिम के आधार पर अध्ययन किया गया है।

पट्टा क्षेत्र के मुख्य स्थल ईकाई का वर्तमान स्थल इस प्रकार है।

मृदा आवरण

रेड़ ऑकर

मृदा आवरण

लीज एरिया एम.एल. क्षेत्र के उत्तरी भाग में खनिज क्षेत्र में कोई मिट्टी का आवरण नहीं है। कृषि क्षेत्र में मिट्टी के साथ मिश्रित मिट्टी क्षेत्र के पूर्वी भाग में स्थित है। कृषि क्षेत्र में मिट्टी का आवरण 0.5 मी है, जैसा कि क्षेत्र में देखा गया है।

रेड़ ऑकर

रेड़ ऑकर परत के रूप में होता है जिसकी औसत मोटाई लगभग 10 मीटर होती है रेड़ ऑकर को लाल मिट्टी के साथ मिश्रित ग्रिट स्केरी के रूप में पाया जाता है। यह गहरे लाल रंग का, महीन दाने वाला और भुरा होता है। स्पर्श होने पर यह मिट्टी को छूती है।

7.3 खनन योग्य भण्डार, वार्षिक उत्पादन एवं खदान की आयुः

भण्डार को तीन श्रेणियों में विभाजित किया गया है, अर्थात् उपलब्धता की निश्चितता के स्तर के आधार पर सिद्ध भण्डार, संभावित भण्डार एवं संभव भण्डार। **तालिका 1**

वर्गीकरण	**यू.एन.एफ.सी. कोड**	**मात्रा मैट्रिक टन**
भू–वैज्ञानिक भण्डार		**रेड़ ऑकर**
आधार पर सिद्ध भण्डार	**121**	306433
संभावित भण्डार	**122**	1532164
संभव भण्डार	**333**	383041
	कुल योग	**2468486**

खनन योग्य भण्डारः = सिद्ध भण्डार और संभावित के कुल भूवैज्ञानिक आरक्षित

= 306433+1532164 = 1838597 मैट्रिक टन

7.4 खदान की आयुः खदान की आयु की गणना रेड़ ऑकर खनिज के आधार पर की गई है। वार्षिक लक्षित उत्पादन के आधार पर खदान का जीवन न्यूनतम रेड़ ऑकर पर होगा, जिसका विवरण नीचे दिया गया हैः **तालिका 2**

विवरण	**मात्रा मैट्रिक टन**
कुल खनन योग्य भण्डार	1838597
वार्षिक उत्पादन	233445
खदान की आयु	8 वर्ष

स्त्रोतः अनुमोदित खनन योजना पत्र क्रमांक अ.ख.ऊ./उदय–वृत/माइन.प्लान/प्रताप/प.19/18/10656दिनांक 20.02.2019.

8. खनिज का उपयोगः

रेड ऑकर – इसका उपयोग सीमेंट उद्योग, पेंट उघोग, टाइल्स और सिरेमिक उघोग, प्लास्टिक ओर रबर उद्योंगों में किया जाता है।

9. अध्ययन क्षेत्रः

अध्ययन क्षेत्र में कोर जोन एवं बफर जोन को शामिल किया गया है। खनन पट्टा क्षेत्र (कोर जोन) का क्षेत्रफल 3.9859 हैक्टेयर है। एवं खनन पट्टे क्षेत्र की परिधि से 10 किलोमीटर की दूरी के भीतर पडनें वाले क्षेत्र को बफर जोन के रुप में माना जाता है।

10. भू–उपयोगः

भारत की भूमि के उपयोग के सर्वेक्षण का पता लगाने के लिए उपग्रह चित्र और टोपोशीट 45 एल/15 के अन्तर्गत आता है। विभिन्न उपयोग के तहत भूमि के क्षेत्र का विस्तार एक सारणीबद्ध रुप में नीचे दिया गया हैः **तालिका 3**

क्रम संख्या	भूमि उपयोग विवरण	क्षेत्रफल (हैक्टेयर में)	क्षेत्रफल (प्रतिशत)
1.	**वन भूमि**		
	(a) आरक्षित वन	10.8	34.37
	(b) अनारक्षित वन	4.61	1.46
2.	**भूमि के नीचे खेती**		
	(a) सिंचित भूमि	75.45	24.01
	(b) असिंचित भूमि	72.97	23.22
3.	**खेती योग्य बंजर भूमि**	84.63	26.93
4.	**खेती के लिये अनउपलब्ध क्षेत्र**	65.69	20.91
	कुल एरिया	**314.15**	**100**

11. खनन क्षेत्र का वर्तमान भू–उपयोगः तालिका 4

क्र.सं.	विवरण	वर्तमान (हैक्टेयर में)	पांच वर्ष पश्चात्	खनन की आयु तक
1.	पिट्स	-	2.9970	3.1526
2.	अधिभार	-	0.1245	-
3.	आधारित संरचनाएं	-	0.0115	-
4.	रोड	-	-	-
5.	ग्रीन बेल्ट	-	0.1125	0.8333
6.	खनिज ढेर	-	0.0135	-
7.	पुर्नभरण क्षेत्र **	-	-	0.4242
8.	वाटर रिजर्वायर**	-	-	2.7284
9.	उपयोग में आने वाला क्षेत्र	-	3.2590	3.9859
10.	उपयोग में नही आने वाला क्षैत्र	3.9859	0.7269	-
	कुल लीज एरिया	**3.9859**	**3.9859**	**3.9859**

स्त्रोतः अनुमोदित खनन योजना पत्र क्रमांक अ.ख.ऊ./उदय–वृत/माइन.प्लान/प्रताप/प.19/18/10656 दिनांक 20.02.2019.

*यह क्षेत्र कुल क्षेत्र में नही जोड़ा गया है।

12. खनन की विधिः

खनन कार्य अर्ध यंत्रीकृत ओपन कास्ट विधि द्वारा किया जाता है। आम तौर पर 6.0 मीटर उंची बेंच बनाई गयी है।

रेड ऑकर (दूसरी परत): खनिज रेड ऑकर की अधिकतम मात्रा निकालने के लिए खुला ओपन कास्ट अर्ध यंत्रीकृत तरीका शुरु किया जाएगा। रेड ऑकर के खनिज प्राकृतिक रुप से बहुत नरम होते है इसलिए इसमें किसी भी प्रकार की ब्लास्टिंग की आवश्यकता नहीं होती है, और केवल खनिज निकालने के लिए खुदाई का उपयोग किया जाता है। बेंचों की उंचाई 6.0 मीटर रखी जाएगी। खनन कार्य पट्टे के विकास और अपशिष्ट निपटान में क्षेत्र एवं रेड ऑकर खनिज पर केंद्रित होगा।

13. **बजटीय आंवटन के साथ मौजूदा एवं प्रस्तावित वृक्षारोपण का विवरणः** खनन क्षेत्र 3.9859 का 33 प्रतिशत भाग पर यानि 1.3154 हैक्टेयर पर वृक्षारोपण किया जायेगा। **तालिका 5**

वर्ष	वैधानिक बाउन्ड्री पर हरित पट्टी		लीज क्षेत्र के बाहर वृक्षारोपण (निकटवर्ती ग्राम शिवपुरा एवं छोटी सादडी)		कुल		बजट निर्धारण
	क्षेत्रफल (हैक्टयेर)	पौधों की संख्या	क्षेत्रफल (हैक्टयेर)	पौधों की संख्या	क्षेत्रफल (हैक्टयेर)	पौधों की संख्या	
प्रथम वर्ष	0.8333	830.00	0.0	0	0.83	830	2,07,500
द्वितीय वर्ष	-	-	0.30	300	0.30	300	1,50,000
तृतीय वर्ष	-	-	0.20	200	0.20	200	1,00,000
योग	**0.8333**	**830.00**	**0.50**	**500**	**1.3333**	**1330**	**4,57,500**

नोटः यह माना जाता है कि पौधो के जीवित रहने की दर लगभग 80 प्रतिशत होगी। बाद के वर्षों में 20 अतिरिक्त पौधारोपण को मुरझाए हुए पौधों को बदलने के लिए किया जाएगा।

14. पर्यावरणः

बेसलाइन डेटा के संग्रह के लिए सात नमूनों बिंदूओं को एकत्रित किया गया, एक बिंदू कोर जोन के भीतर एवं पांच बिंदु बफर जोन में जैसे छोटी सादडी, सुबी, नवाखेरी, कासबी, सान्डीखेरा, केरारिया, शिवपुरा गांव के पास चुना गया था। नमूना बिंदूओं से हवा, पानी, मिट्टी, ध्वनि स्तर, पायी जाने वाली वनस्पतियों और जीवों के नमूनों को एकत्रित कर विष्लषेण किया गया। सभी नमूनों के परिणाम अनुमेय सीमा के भीतर पाये गए।

- ✓ **वायु :** सभी अध्ययन परिणाम निर्धारित मापदण्ड के भीतर पाए गए।
- ✓ **ध्वनिः** सभी अध्ययन परिणाम निर्धारित मापदण्ड के भीतर पाए गए।
- ✓ **जलः** जल के नमूने खदान स्थल, शिवपुरा छोटी सादडी, सुबी, नवाखेरी, कासबी, सान्डीखेरा, केरारिया, शिवपुरा गांव से लिए गए एवं उपलब्ध नमूनों का विष्लेषण किया गया एवं यह पाया गया कि भूजल गुणवत्ता निर्धारित सीमा के भीतर पाई गई। इसी प्रकार केसुन्दा तालाब, गुमाना तालाब उपलब्ध नमूना भी निर्धारित सीमा के भीतर पाया गया। भूजल पीने के उद्देष्य के लिए उपयुक्त है जबकि नदी और तालाब का पानी कृषि उद्देश्य के लिए उपयुक्त है।

✓ **मिट्टीः** मिट्टी पृथ्वी की त्वचा है। यह खनिजों, जल, वायु, कार्बनिक पदार्थों और अनगिनत जीवों/रोगाणुओं का एक जटिल मिश्रण है, जो एक बार जीवित चीजो का क्षय रहता है। मृदा विश्लेषण परिणामों के आधार पर पोषक तत्व सूचकांक मूल्यों की गणना कोर क्षेत्र के साथ–साथ बफर जोन मिट्टी के नमूनों के लिए गई है। यह देखा गया है कि कोर जोन के लिए पोषण सूचकांक का मूल्य 1.25 है जो 1.63 से नीचे है और निम्न गुणवत्ता का है। बफर जोन के लिए पोषक तत्व सूचकांक 1.75 है और मध्यम श्रेणी में आता है। खनन गतिविधां का मिट्टी की गुणवत्ता पर कोई प्रतिकूल प्रभाव नहीं डालेगी।

✓ **पारिस्थितिकी और जैव विविधताः**

वनस्पति : कोर जोन और बफर जोन में जडी–बूटियो, झाडियों, पर्वतारोही, पेडों और घासों की निम्नलिखित प्रजातियां पाई गईः

कोर जोन में पाए जाने वाली वनस्पतियांः तालिका 6

S.No.	Botanical Name	Family	Common Name
Herb			
1.	*Physalis minima* L.	Solanaceae	Rasbhari
2.	*Lepidagathis trinervis* Wall. ex Nees.	Acanthaceae	Pathar-phor buti
3.	*Euphorbia hirta* L.	Euphorbiaceae	Baridhudi
Shrubs			
4.	*Jatropha curcas* L.	Euphorbiaceae	Jamal Ghota
5.	*Lantana camara* L.	Verbenaceae	Raimuniya
Climber			
6.	*Trichosanthes cucumerina* L.	Cucurbitaceae	Padwal
7.	Mukia maderaspatana (L.) Roem	Cucurbitaceae	Agumaki
Trees			
8.	*Cassia fistula* L.	Caesalpinaceae	Amaltas
9.	*Leucaena latisiliqua* (L.) Gillis	Mimosaceae	Safed babool
Grasses			
10.	*Apluda mutica* L.	Poaceae	Lapdu
11.	*Arthraxon lancifolius* (Trin.) Hochst.	Poaceae	-

बफर जोन में पाए जाने वाली वनस्पतियांः तालिका 7

S.No.	Botanical Name	Family	Common Name
Herb			
1.	*Boerhavia diffusa* L.	Nyctaginaceae	Gadha-cand
2.	*Commelina benghalensis* L.	Commelinaceae	Kaua-kaini
3.	*Crotalaria medicaginea* Lamk.	Fabaceae	-

Shrubs			
4.	*Jatropha curcas* L.	Euphorbiaceae	Jamal Ghota
5.	*Lantana camara* L.	Verbenaceae	Raimuniya
Climber			
6.	*Ipomoea nil* (L.) Roth	Convolvulaceae	Kaladana
7.	*Cryptostegia grandiflora* (Roxb.)R.Br. ex Lindl.	Asclepiadaceae	Kadva Parvar
Trees			
8.	*Leucaena latisiliqua* (L.) Gillis	Mimosaceae	Safed babool
9.	*Madhuca indica* Gmel.	Sapotaceae	Mahua
10.	**Phyllanthus emblica L.**	Euphorbiaceae	Amla
11.	*Pithocellobium dulace*(Roxb.)Benth.	Mimosaceae	Jangal Jalebi
12.	*Pongamia pinnata* (L.) Pierre	Fabaceae	Karanj
Sedges			
13.	*Cyperus rotundus* L.	Cyperaceae	Nagarmotha
14.	*Cyperus difformis* L.	Cyperaceae	Motha
Grasses			
15.	*Heteropogon contortus* (L.) P. Beauv. Ex Roem.& Schult.	Poaceae	Black Speargrass
16.	*Sporobolus diander* (Retz.) P. Beauv.	Poaceae	Khui ghas -Santali

कोर एवं बफर जोन में पाए जाने वाले पशुवर्गः

कोर जोन में पाए जाने वाले पशुवर्गः तालिका 8

S.No.	Scientific Name	Common Name	Family	Conservation Status as Per WL(P)A,1972
Birds				
1	*Pycnonotus cafer*	Red-vented Bulbul	Pycnonotidae	Sch-IV
2	*Merops orientalis*	Green Bee-eater	Meropidae	Sch. IV
Mammals				
3	*Funambulus pennant*	Five Stiped Palm Squirrel	Felidae	Sch-IV
4	*Lepus nigricollis*	Indian Hare	Leporidae	Sch-IV
Reptiles				
5	*Hemidactylus flaviviridis*	House Gecko	Gekkonidae	Sch. IV
6	Calotes versicolor	Indian Garden Lizard	Agamidae	Sch. IV

बफर जोन में पाए जाने वाले पशुवर्गः तालिका 9

S. No.	Zoological Name	Common Name	Family	Conservation Status as Per WL(P)A,1972
Birds				
1.	*Acridotheres tristis*	Common Myna	Sturnidae	Sch-IV
2.	*Alcedo atthis*	Common Kingfisher	Alcedinidae	Sch-IV
3.	*Ardeola grayii*	Pond Heron	Ardeidae	Sch-IV
Reptiles				
4.	*Calotes versicolor*	Garden Lizard	Agamidae	Sch-IV
5.	*Hemidactylus flaviviridis*	House Gecko	Gekkonidae	Sch-IV
Butterflies				
6.	*Eurema hecabe*	Common Grass Yellow	**Pieridae**	Sch-IV
7.	*Danaus chrysippus*	Plain Tiger	***Nymphalidae***	Sch-IV
8.	*Euploea core*	Common Indian Crow	Nymphalidae	Sch-IV
Amphibians				
9.	*Bufo andersoni*	Marbled Toad	Bufonidae	Sch-IV
10.	*Bufo melanostictus*	Common Indian Toad	Bufonidae	Sch-IV
Mammals				
11.	*Funambulus pennant*	Five Stiped Palm Squirrel	Felidae	Sch-IV
12.	*Hyaena hyaena*	Striped Hyaena	Hyaenidae	Sch-III

सामाजिक आर्थिक वातावरणः

- ✓ **जनसांख्यिकी :** अध्ययन क्षेत्र में करीब 70183 लोग बफर जोन में निवास करते है। कुल जनसंख्या 70183 में से 35672 (50.83%) पुरुष थे एवं 34511 (49.17%) महिलाएं थी।
- ✓ **औसत घरेलू:** अध्ययन क्षेत्र में औसत घरेले आकार 2011 के सूचनांक आकडों के अनुसार 4.68 . से 5.54 तक भिन्न होता है। प्रस्तुत डेटा इंगित करता है कि अधिकतम (5.54) औसत घरेलु आकार 0-3 किलोमीटर के दायमें में पाया गया, जबकि 7-10 किलोमीटर के दायरे में औसत घरेलु क्रमशः (4.68) पाया गया।
- ✓ **सामाजिक संरचनाः** विभिन्न धर्म समुदाय अध्ययन क्षेत्र में निवास कर रहे है। परिणाम बताते है कि कुल 70183 लोगों में से 7844 (11.18%) एस.सी जाति के थे एवं 19346 (27.56%) एस.टी. जाति के थे। बफर जोन में कुल एस.सी. एवं एस.सी. की आबादी 27189 (38.74%) थी।

- ✓ **साक्षरता स्तरः** अध्धयन क्षेत्र से यह संकेत मिलते है कि बफर जोन की कुल साक्षरता दर 60.66 प्रतिषत थी। अध्ययन क्षेत्र मे 35672पुरुषों में से 25268 (70.83%) पुरुष साक्षर थे एवं कुल 34511 महिलाओं में से 17313 (50.16%) महिलाएं साक्षर थी।
- ✓ **व्यवसायिक संरचनाः** डेटा से यह पता चलता है कि अध्ययन क्षेत्र में कुल 70183 लोगों में से 22049 (31.42%) मुख्य श्रमिक थे, जबकि 9025 (12.86%) सीमांत श्रमिक थे एवं शेष 39109 (55.72%) गैर श्रमिक थे। परिणाम बताते हैं कि 7–10 किमी के दायरे में अधिकतम मुख्य श्रमिक (15564), गैर–श्रमिक (27815) और सीमांत श्रमिक देखे गए।

15. प्रत्याषित पर्यावरण प्रभाव एवं उनके उपचारत्मक उपायः तालिका 9

क्रं. सं.	गतिविधि	आपेक्षित प्रभाव	अल्पीकरण के उपाय
भूमि पर प्रभाव			
1.	खनन गतिविधि जैसे ओवर बर्डन हटाना, खनन गडढों का निर्माण और कचरे और खनिजों का ढेर	ओवर बर्डन हटाने के कारण भूमि का अवक्षरण होगा। शीर्ष मिट्टी को होने वाले नुकसान होगा चूंकि खनन गड्ढो एवं अपरिषिष्ट डंप का गठन एवं विस्तार होगा।	मौजूदा गड्ढों का विस्तार या नए गड्ढों खोदने से पहले एवं कचरे को डालने से पहले जो भी उपर की मिट्टी निकाली जाएगी, उसका उपयोग साईट पर पौधारोपण के काम में ली जाएगी। खनन पट्टे का कुल क्षेत्रफल 3.9859 हैक्टेयर में से केवल 3.1526 हैक्टेयर क्षेत्रफल पर ही खनन के दौरान खुदाई की जाएगी। इसमें से 2.7284 हैक्टेयर क्षेत्रफल वाले हिस्से का पुर्नभरण नहीं किया गया जाएगा, एवं इसका उपयोग बारिष के पानी के भण्डारण के लिए, एक जलाशय में बदल दिया जाएगा। तथा 0.4242 हैक्टेयर का पुर्नभरण किया जायेगा।
2.	बुनियादी ढांचे का निर्माण जैसे खदान कार्यालय, एप्रोच रोड, हौलेज रोड और आश्रय स्थल आदि।	भूमि के ह्यस से प्राकृतिक सौन्दर्य प्रभावित होगा। (चूंकि एप्रोच रोड पहले से ही है, इसलिए सडक निर्माण की आवश्यकता नहीं होगी।)	खनन पट्टे का क्षेत्रफल 3.9859 हैक्टेयर है। खनन पट्टा क्षेत्र समतल है, जिसमें एक कुछ खुली पडी मिट्टी है। सडक के किनारे पर्याप्त वृक्षारोपण है और कुछ खाली जगहों है। सडकों को नम रखने के लिए, सडकों पर पानी का छिड़काव किया जाएगा एवं सडको के दोनों तरफ वृक्षारोपण से हवा में पैदा होने वाली धूल के प्रसार को कम करेगा।
3.	कचरे का ढेर	बारिष के मौसम में पष्चिम के डंप और आसपास के इलाकों से कटाव होगा। जलाषयों और कृषि क्षेत्र में गाद होगी।	अपशिष्ट डंप, माला नालियों, नालियों को निर्माण कर आस पास एक दीवार का निर्माण किया जाएगा, ताकि गाद को रोक लिया जाए एवं स्वच्छ जल ही तालाबों में निष्कासित हो। समय–समय पर माला नालियों, नालियों की साफ

			सफाई की जाएगी।
4.	ओवर बर्डन का ढेर	ओवर बर्डन के डपिग के दौरान उपर से जमीन स्तर तक चट्टान के कणों का फैलाव होता है। भूमि ह्रास एवं भूमि कटाव होता है।	(सक्रिय डंप) ओवर बर्डन को सक्रिय डंप क्षेत्र में उचित ढाल (33°) के साथ डंप किया जाएगा। (निष्क्रीय डंप) निष्क्रीय डंप के स्थिरीकरण के लिए कचरे के ढेर पर वृक्षारोपण किया जाएगा।
5.	खनन गड्ढो एवं कचरे के ढेर का निर्माण	पर्यावरण सौन्दर्यकरण को नुकसान	**कोर जोन के पुनर्निर्मित और पुर्नवासः** **अपशिष्ट (डंप) प्रबंधन** भूविज्ञान भंण्डार और लक्षित उत्पादन के अनुसार अनुमानित खदान का जीवन लगभग 8 वर्ष होगा, इसलिए इसके अनुसार डंप प्रबंधन योजना तैयार की जाएगी। वर्तमान में खनन क्षेत्र के भीतर कोई डंपिंग क्षेत्र नहीं है। पांच साल में ओवर बर्डन, साइड बर्डन सहित अपशिष्ट पदार्थ डम्प किया जाता है, जिसका क्षेत्रफल लगभग 0.1245 हैक्टेयर है। इसको खदान के जीवन के अन्त में पुर्नभरण के काम में लिया जायेगा। खनन के दौरान voids की रचना होगी। इस प्रकार अंततः कोई डम्प नहीं होगा एवं कचरे के डम्प द्वारा कोई भूमिक्षरण भी नहीं होगा। **खनन पिट का प्रबंधनः** कुल खनन पट्टे क्षेत्र 3.9859 हैक्टेयर मे से केवल 3.1526 हैक्टेयर पर ही खनन के दौरान खुदाई का कार्य किया जाएगा। कुल खुदाई वाले क्षेत्र में से 2.7284 हैक्टेयर क्षेत्र को बारिश के पानी संचय करने के काम में लिया जाएगा, एवं पानी के जलाशय के रूप में बदल दिया जाएगा। तथा 0.4242 हैक्टेयर क्षेत्र का पुर्नभरण किया जायेगा। खदान के जीवन के अंत में भूमि उपयोग पैटर्न निम्नानुसार होगा – 1. कुल खुदाई वाला भाग – 3.1526 हैक्टेयर। 2. पानी के जलाशय के रुप में गड्ढे – 2.7284 हैक्टेयर।

			3. पुनर्वासित भाग – 0.4242 हैक्टेयर। 4. वृक्षारोपण के तहत क्षेत्र –0.8333 हैक्टेयर। क्षेत्र का उपयोग ग्रीन बेल्ट (वैधानिक सीमा) में किया जाएगा और 0.500 हैक्टेयर क्षेत्र का उपयोग खनन लीज के बाहर गांव के स्कूल में सरकारी जमीन पर किया जायेगा।
6.	खनन गड्ढो एवं कचरे के ढेर का निर्माण	खनन गड्ढों और डंपों के गठन के कारण आदमी एवं जानवर के लिए खतरा	खनन के दौरान गड्ढों के निर्माण होने पर नियमानुसार चारों ओर उचित बाड लगाई जाएगी।
7.	खनन गतिविधीयां	कृषि भूमि एवं आस–पास की मिट्टी पर धूल कणों का जमाव	ग्रीन बेल्ट और पर्याप्त वृक्षारोपण का कार्य गांव षिवपुरा के स्कूलों में विकसित किए जाएगें। 0.8333 हैक्टेयर क्षेत्र का उपयोग ग्रीन बेल्ट (वैधानिक सीमा) में किया जाएगा और 0.500 हैक्टेयर क्षेत्र का उपयोग खनन से बाहर गांव षिवपुरा के स्कूलों में किया जायेगा।
मिट्टी पर प्रभाव			
1.	खनन गतिविधिया जिनमें गडढे का निर्माण,अपषिष्ट डंपिंग और खनन मषीनरी की आवाजाही है।	गडढे के निर्माण, अपषिष्ट डंपिंग और खनन मषीनरी की आवाजाही के दौरान शीर्ष मिट्टी खो जाने की संभावना है। अगर देखभाल नहीं की जाती है।	गडढे बनाने और अपशिष्ट डंपिंग चालु करने से पहले श्षीर्ष मिट्टी को हटा दिया जायेगा और अलग से ढेर किया जाएगा। इसी तरह खनन मशीनरी की आवाजाही के कारण शीर्ष मिट्टी के खो जाने की संभावना भी दूर हो जाएगी और ढेर हो जाएगा। इसका उपयायेग भविष्य में वृक्षारोपण के लिए किया जाएगा। अप्रयुक्त मिट्टी को अच्छी तरह से ढेर किया जाएगा और वहां पर उपयुक्त घास को उगाकर संरक्षित किया जाएगा। यह सुनिष्चित किया जाएगा कि खनन मषीनरी से निकलने वाला तेल और ग्रीस ऊपरी मिट्टी को प्रदुषित न करें।
जल पर प्रभाव			
1.	पिट का निर्माण एवं वेस्ट डम्प का निर्माण	अपषिष्ट डम्प से सतह के पानी को प्रदुषित कर सकता है। और प्राकृतिक नालियों को चोक कर सकता है। यदि खनन कके गडढे भूजल	यह सुनिश्चित किया जाएगा कि कचरे के ढेर और खनिज ढेर से खजिन के ढेर को प्राकृतिक नालों और आस–पास के कृर्षि क्षेत्रों में प्रवाहित ने हो। इस उद्देष्य के लिए नालियों की मालाएं, कैच ड्रेन एवं सिल्टेशन पोण्ड का निर्माण किया

		तालिका से नीचे है तो भूजल का क्षय हो सकता है।	जाएगा। उन्हे समय–समय पर साफ किया जायेगा। चूंकि खनन गडढो में भूजल तलिका को अवरूद्ध करने की संभावना नहीं है। इसलिए बारिश के पानी को खदान में बनाए गए प्राकृतिक नालियों में चैनलाईज किया जाएगा।
वायु पर प्रभाव			
1.	गडढों की खुदाई, कचरे का डंपिंग, रॉक हैंडलिंग और खनिज का परिवहन	धूल का निर्माण ड्रिलिंग, ब्लास्टिंग, रॉक हैंडलिंग और खजिन और कचरे के परिवहन के दौरान होगा।	पेड़ों की पर्याप्त संख्या को लीज सीमा अवरोध और लीज के भीतर सड़क के दोनों किनारे एवं अन्य उपलब्ध स्थानों पर उगाये जायेगे। नियमित पानी का छिड़काव सड़कों और अन्य धूल भरे स्थानों पर किया जाएगा। खनिज/ कचरे से भरे डंपरों / ट्रकों को तिरपाल से कवर किया जायेगा।
ध्वनि पर प्रभाव			
1.	ड्रिलिंग, ब्लास्टिंग, खनन मषीनरी का चलन आदि।	सभी खनन गतिविधियों शोर स्तर तक बढेंगी। यदि निर्धारित सीमा से अधिक शोर का स्तर बढ़ता है। तो यह मनुष्यों एंव जानवरों को प्रभावित कर सकता है।	1. नियंत्रित ब्लास्टिंग का अभ्यास किया जाएगा ताकि विस्फोट के दौरान न्यूनतम शोर और कंपन हो। 2. खनन मशीनरी का रखरखाव किया जायेगा। ट्रक एवं डंपर को ओवरलोड नही होंगें। 3. सड़कों की ढलान को नियमानुसार रखा जायेगा। 4. खनन कर्मचारियों को व्यक्तिगत सुरक्षा उपकरण जैसे ईयरमफ, मास्क इत्यदि उपलब्ध कराये जायेगे। जिससे वे अधिक ध्वनि प्रदुषण से बच सके।
जैव विविधता पर प्रभाव			
1.	गडढ़ों और अवषिष्ट डम्प का निर्माण करना एवं परिवहन वाहनों का आवागमन।	उन स्थानों पर पेड़, झाड़ियां आदि मौजूद नहीं है जहा गडढ़े का निर्माण और कचरा डंपिंग किया जाना है। व्यावहारिक रूप से जैव विविधता पर कोई प्रतिकूल प्रभाव नहीं पड़ेगा। हालांकि	खनन क्षेत्र के भीतर पर्याप्त संख्या में पेड़ उगाए जायेगें। सुरक्षित सीमा के नीचे शोर के स्तर को बनाए रखने के लिए सभी प्रयास किए जाएंगे।

		शोर के स्तर में वृद्धि के कारण कुछ जीव खनन क्षेत्र से दूर भागने की प्रवृत्ति विकसित कर सकते है।	
सामाजिक आर्थिक पहलू			
1.	खनन	खदान के चलने से इलाके पर केवल सकारात्मक प्रभाव पड़ेगा। यह नौकरी के अवसरों को बढ़ाएगा और बुनियादी सुविधाओं को बढ़ाएगा।	यद्यपि इस गणना पर कोई शमन उपायों की आवश्यकता नहीं है, यह सुनिश्चित किया जाएगा कि स्थानीय लोगों को अधिकतम रोजगार दिया जाएगा। सी.एस.आर. कार्यक्रम के तहत किए गए प्रावधानों को ठीक से लागू किया जायेगा।

16. निगरानी अनुसूचीः तालिका 10

गुण	निगरानी की आवती	निर्धारित किए जाने वाले पैरामीटर
भूमिगत जल	वर्ष में दो बार	pH, Turbidity (NTU), Conductivity at 25°C (µs/cm), Total Hardness ($CaCO_3$) (mg/L), Chlorides as Cl (mg/L), Total dissolved solids (mg/L), Sulphates as SO_4 (mg/L), Alkalinity as $CaCO_3$ (mg/L), Fluoride as F (mg/L), Nitrates as NO_3(mg/L), Magnesium as Mg (mg/L), Calcium as Ca (mg/L), Sodium as Na(mg/L), Potassium as K (mg/L), Na%, RSC, SAR.
वायु गुणवत्ता	वर्ष में दो बार	SPM, SO_2 NO_x, PM_{10} & $PM_{2.5}$
मिट्टी	वर्ष में दो बार	Soil Color, Bulk density(g/ cm^3), Water retention Capacity (%), Soil pH, Calcium as $CaCO_3$(%), Nitrate as NO_3 (%), Available Phosphorus as P(%), Available Sodium as Na(%), Available Potassium as K(%), Conductivity (µs/cm), Sulphate as SO_4(%), Organic Carbon (%) and Organic Matter (%).
ध्वनि	वर्ष में दो बार	Noise level in dB(A)

17. पर्यावरण संरक्षण के लिए बंजट आवंटनः

पर्यावरण के कुशल नियंत्रण और निगरानी और वार्षिक आवर्ती लागत के लिए निवेश का विवरण नीचे दिया गया हैः

तालिका 11

क्रं. सं.	विवरण	प्रतिवर्ष नमूनों का संग्रह	नमूनों के संग्रह की दर	कुल लागत (रुपयों में)
1	वायु पर्यावरण	2	5000	10000
2	जल पर्यावरण	2	1500	3000
3	ध्वनि पर्यावरण	2	1500	3000
4	मिट्टी पर्यावरण	2	1000	2000
			कुल राशि	**18000**

18. पर्यावरण संरक्षण के उपायों की लागतः तालिका 12

क्रम संख्या	विवरण	पूंजीगत लागत	वार्षिक लागत
1	प्रदुषण निगरानीः हवा,पानी, ध्वनि और मिटटी साल में दो बार हवाः 2*5000 जलः 2*1500 ध्वनिः 2*1000 मिटटीः 2*1500	-	18,000
2	प्रदुषण नियन्त्रणः ओवरहेड पानी के छिड़काव की सुविधा के लिए धूल के अवसाद के लिए पानी का छिड़काव	50,000	10,000
3	वृक्षारोपण लीज एरिया के अन्दर 212 x 250, बफरजोन के अन्तर्गत 440x500	2,73,000	30,000
4	वहन रखरखाव एवं पी.यू.सी. प्रमाणन	3000	5,000
5	ठोस अपशिष्ट प्रबंधन (कोई ठोस अपशिष्ट उत्पन्न नहीं किया जाएगा)	-	3,000
	ठोस कचरा प्रबन्धन– 2 बिन @ 750	-	
	गढढे और कम्पोस्ट	-	
	अपशिष्ट का परिवहन	-	
	पर्यावरण प्रबंधन पर कुल खर्च	**3,26,000**	**66,000**

19. पर्यावरण संरक्षण के उपायों की लागतः तालिका 13

क्रम संख्या	विवरण	पूंजीगत लागत	वार्षिक लागत
1	गारलैण्ड नाली का निर्माण, कैच नाली और तालाब का निर्माण करना।	69,000	30,000
2	अप्रोच रोड का रखरखाव 180 मीटर	55,000	6000
3	तार बाड़ (450 मीटर)	75000	6000
4	साइनेज और सावधानी बोर्ड	1000	-
	पर्यावरण प्रबंधन पर कुल खर्च	**2,00,000**	**42,000**

20. कोरेपरेट पर्यावरण जिम्मेदारीः

जनसंख्या की आवश्यकता का आकलन एवं पहचान की गई है, वास्तविक जरुरतों के आधार पर तैयार किए गए प्रस्तावों और पूर्ण उत्पादन स्तरों पर व्यय को तालिका के अनुसार दिखाया गया हैः **तालिका 14**

कं.सं.	विवरण	लागत (रुपयों में)
1.	पट्टा क्षेत्र के स्कूलों में छात्रों को कलम, पेंसिल, स्कूल यूनिफॉर्म, जूते और नोटबुक प्रदान करना।	30,000/-
2.	विद्यालय में पानी के फिल्टर की उपलब्धता बनाना।	30,000/-
3.	स्कूलों और आंगनवाड़ी केंद्र में पंखे, टेबल और ब्लैकबोर्ड उपलब्ध कराना।	40,000/-
4.	आसपास के स्कूलों में छात्रों के लिए खेल उपकरण प्रदान करना।	30,000/-
5.	स्कूलों की दीवारों पर पेंट करवाना।	20,000/-
	कुल राशि	**1,50,000/-**

व्यवसायी/कोरपरेट सामाजिक उतरदायित्व के निष्पादन के समय मौजूदा परिस्थितियों के आधार पर उपरोक्त के रुप में आवंटित राशि परिवर्तन की जा सकती है।

21. वैधानिक आवश्यकताओं का पूरा करने हेतु व्यय का ब्यौराः

सांविधिक आवश्यकताओं को पूरा करने के लिए व्यय के बजटीय प्रावधान नीचे दिए गए हैः तालिका 15

क्र. संख्या	विवरण	वर्षिक खर्च रूपये में
1.	कर्मचारियों को निजी सुरक्षा उपकरण हेलमेट, जूते ग्लबस, गोगल, ईयरमफ, मास्क इत्यिादी	49,500
2.	व्यावसायिक प्रषिक्षण कार्यक्रम	75,000
3.	कर्मचारियों की चिकित्सकीय जॉच प्रारम्भिक एवं नियतकालीन	75,000
	कुल राशि	**1,99,500**

22. सारांश एवं निष्कर्षः

सरकार को वित्तीय लाभ :

इस खनन गतिविधि के वित्तीय लाभ रॉयल्टी, जी. एस. टी., सी. जी. एस. टी., एस. जी. एस. टी., वाणिज्यिक कर, शुल्क, भूमि कर, आयकर और सेवा कर के संग्रह के माध्यम से राज्य सरकार एवं केन्द्र सरकारों को प्राप्त होगें।

समाज को लाभ :

इस क्षेत्र के लोगों के पास बेहतर रोजगार के अवसर प्राप्त होगें, इस तरह क्षेत्र में श्रम के बडें पैमाने पर पलायन में कमी आएगी। यह औद्योगिक गतिविधि के होने से आर्थिक स्थिति और लोगों में चिकित्सा, शैक्षणिक, सामाजिक, मनोरंजन, सांस्कृतिक, स्वास्थ्य एवं स्वच्छता, परिवहन एवं परिवहन सुविधाओं इत्यादि में वृद्वि होगी। परियोजना को प्रोत्साहन से रोजगार की संभावना को बढेगी एवं क्षेत्र में सहायक उद्योगों एवं आर्थिक आधार को बढावा मिलेगा।

निष्कर्ष :

इस प्रकार परियोजना से काफी लाभ के मद्देनजर, रेड ऑकर खनिज की प्रस्तावित खनन और उत्पादन क्षेत्र के लिए फायदेमंद है। इसलिए परियोजना को लागू करने की सलाह दी जाती है।

EXECUTIVE SUMMARY

OF

ENVIRONMENTAL IMPACT ASSESSMENT

AND

ENVIRONMENTAL MANAGEMENT PLAN

FOR

Shivpura Red Ochre Mine

Proposed Production of: ROM 2,99,995 TPA & Red Ochre 233445 M.T. per Annum

[Lease area – 3.9859 Hect.]

[M.L.No. 7/2018]

Near village – Shivpura, Tehsil Chhotisadri,
District – Pratapgarh (Raj.)

:: Applicant::

M/s Quality Minerals

Partner Shri Nehul Patidar

ADDRESS: 9-A, ARIHANT VIHAR, NEAR POWER HOUSE, 100 FT. ROAD, KANKROLI, DISTRICT- RAJSAMAND (RAJ.)

Phone No.: +919414012490

e-mail: singhbp1983@gmail.com

:: **Consultant** ::

APEX MINTECH CONSULTANTS

QCI-NABET Accredited organization An ISO-9001 & ISO-14001 certified
3, Dhebar Colony, Near I.T.I., S.B.I. Bank Street, Pratapnagar Udaipur – 313001 (Rajasthan)
Mobile No. 09352505728, 09829161803,
e-mail: rd_saxena@yahoo.co.in & apex.mintech@gmail.com

1. Introduction:

The purpose of the report is to get Environmental Clearance for Shivpura Red Ochre Mine (M.L. No. 7/2018) having an area of 3.9859 Ha., for production of ROM 2,99,995 TPA & Red Ochre 233445M.T. per annum situated Near Village –Shivpura, Tehsil Chhotisadri, District- Pratapgarh (Raj.)

Subsequently, a Letter of Intent has been issued by the Directorate of Mines & Geology Khanij Bhawan Udaipur (Raj.) vide its letter No. DMG/ Pratap/ CCI/F.1(1)7/2018/4498, Dated 21.12.2018 for grant of mining lease over an area of 3.9859 Ha. within (Khasra Nos. 349/2361, 355/2364) M.L. No. 7/2018 for the minerals Red Ochre in favour of M/s Quality Minerals, 9-A, Arihant Vihar, Near Power House, 100 feet Road, Kankroli, District- Rajsamand (Raj.).

The Mining Plan with Progressive Mine Closure Plan has been approved under Rule 29 of Rajasthan Minor Mineral concession Rules 2017, by The Supdt. Mining Engineer Udaipur vide his letter no. SME/ Ud-Cir/ M. Plan/ Pratap/ F-19/18/10656, Dated 20.02.2019.

2. Identification of the Project Proponent:

The firm is a Partnership Firm Manage by Shri Nehul Patidar.

3. Registered Address of the Project Proponent:

M/s Quality Minerals Partner Shri Nehul Patidar

9-A, Arihant Vihar, Near Power House, 100 feet Road, Kankroli

District- Rajsamand (Raj.)

Contact No. +91-9414012490

E-mail:-singhbp1983@gmail.com

4. Location of the Lease Area:

4.1 Latitudes & Longitudes: The lease hold area is located between Latitude 24°23’05.36” N to 24°23’20.92” N, Longitude 74°46’51.06”E to 74°46’55.27”E.

4.2 GT Sheet No: 45 L/15.

4.3 Land Status: Private land.

5. Connectivity to Mining lease area:

5.1 By Road:

The accessibility of the area is by road from the District Head Quarter Pratapgarh to Mine site is situated at a distance of 48.00 Km. and Tehsil Chhotisadri at a distance of 9.8 Km. and after that mine site is at a distance of 0.80 Km. from the Shivpura village.

5.2 By Railways:

The nearest railway station is Neemuch at a distance of 17.66 Km.

5.3 By Air:

Udaipur is the nearest air port at a distance of 92.42 Km. from the Mine site.

6. Cost of Project: The estimated capital cost of the project is Rs. 40 Lakh.

7. Topography:

Topographically, the applied area comprises flat land. The altitude of the area is 510-513mRL. For the survey Pillar "A" is considered 513mRL above MSL as Benchmark. There is no forestland in the lease area.

Drainage:

The average rain fall in this area is poor but during the rainy season some water streams do flow through the applied lease area. These streams are temporary in nature.

7.1 Regional Geology: Regional geological succession in the area is as follows:-

FORMATION	AGE
Alluvium	Recent
Latertic	Sub recent to Pleistocene
Deccan trap	Upper Cretaceous
Kaimur sandstone	Upper Vindhyan
Suket Shales	
Nimbaheda grey limestone	
Nimbaheda purple limestone	
Nimbaheda shales (Purple) With conglomerate	Lower Vindhyan

----------**UNCONFORMITY**----------

Aravali Binota shales or : Delhi system

Jiran Sandstone :

Jiran sandstone forms several low ridges running north and south and joining near Choti Sadri to form an irregular plateau lying between that village and jiran, in which dips are horizontal with minor folds. Northeast of Nimbaheda and Malan, it is over lapped by the Vindhyan and to the east by the Vindhyan and to the east by Deccan trap. The valleys between the Sandstone are largely filled with trap. The

thickness of sandstone exposed in the Jiran and Choti Sadri area is about 100-200 feet of the Vindhyan system, the division below kaimur sandstone is met with in the lower ground. Westward prolongation of the great Vindhyan area is peculiar in that, below the Kaimur sandstone, there is great thickness of sttata which from with the Kaimur an unbroken succession.

Kaimur sandstone passes down into the suket shales without discordance, and they again into Nimbuheda Limestone and the underlying Nimbheda shales. At the base of Nimbheda shales, there is a conglomeratic sandstone horizon, which makes the base of the Vindhyans, where they rest unconformably on the Aravalli Binota shales or Jiran sandstone of possible Delhi age.

7.2 Local Geology:

Reconnaissance of geological aspect was done in the area and following geological sequence has been observed,

Soil cover

Red Ochre

SOIL COVER

There is no soil cover in the mineralized zone in the northern part of the applied ML area. Soil mixed with scree lies in the eastern part of the area in the agricultural fields.

The agriculture fields have soil cover of 0.5m, as observed in the area.

RED OCHRE

Red Ochre occurs in the form of bed having an average thickness of around 10m Red ochre is found in the form of grit scree mixed with red soil. It is dark red in colour, fine grained and friable. It soil's the fingers when touched.

7.3 Geological and Mineable Reserves:

The reserves have been divided into 3 categories, namely proved, probable & possible on the basis of level of certainty of availability. The bulk density has been taken as 2.7 Tonnes / Cum.

Details of Geological and Mineable Reserves Table 1

Category	Nature of Reserve as per UNFC	Total geological Mineral in Tonnes
Provide	121	340481
Probable	122	1702404
Possible	333	425601
	Total	**2468486**

Source: *Approved Mining Plan Letter No.* SME/UD-Cir/Mine Plan/ Pratap/F-19/18/10656 Dated 20.02.2019.

Mineable Reserves = Total Reserves of Proved +Probable = 306433+1532164= 1838597 Tonnes

7.4 Anticipated Life of the Mine:

On the basis of the annual targeted production, the life of the mine would be about 8 years. The details are given below:

Life of the Mine: Table 2

Particulars	Quantity in Tonnes
Total Mineable reserves	1838597
Annual production rate	233445
Life of the mine	8 year's

Source: *Approved Mining Plan Letter No.* SME/UD-Cir/Mine Plan/ Pratap/F-19/18/10656 Dated 20.02.2019.

8. Use of Mineral:

Red Ochre- It is used in Cement Paints industries, Tiles & Ceramic Industries, Plastic & Rubber Industries.

9. Study Area:

The study area comprises of both the core & buffer zone.

The core zone is mining lease area of 3.9859 Ha., An area falling within 10 km. radial distance from periphery of the mining lease area is treated as "Buffer Zone".

10. Land Use:

For ascertain the land use pertain survey of India the satellite image and toposheet 45L/15 were taken in account. The detail of the area of the land under various use are given below in a tabular form. **Table 3**

S. No.	Particulars of Land use	Area in Sq. Km.	Area (%)
1.	Forest Land		
	(a) Reserved Forest	10.8	34.37
	(b) Open Forest	4.61	1.46
2.	Land Under Cultivation		
	(a) Irrigated land	75.45	24.01
	(b) Un irrigated land	72.97	23.22
3.	Cultivable waste land	84.63	26.93
4.	Area not available for cultivation	65.69	20.91
Total Area		**314.15**	**100**

11. Present Land Use Pattern of Core Zone: Table 4

S. No.	Description	Area put to use at start of plan (in Ha.)	Area after 5 years (in Ha.)	End of the Mine Life
1.	Mining	-	2.9970	3.1526
2.	O.B. and waste dump	-	0.1245	-
3.	Infrastructure	-	0.0115	-
4.	Road	-	-	-
5.	Green belt	-	0.1125	0.8333
6.	Mineral stack	-	0.0135	-
7.	Mineral Reject	-	-	0.4242
8.	Water reservoir*	-	-	2.7284
9.	Used area	-	3.2590	3.9859
10.	Unused area	3.9859	0.7269	-
	Total lease area	**3.9859**	**3.9859**	**3.9859**

12. Method of Mining

Mining is done by Semi mechanized open cast method. Normally 6m high benches are formed. Mining of Red Ochre is generally done is removed by excavator/JCB. The mineral & Overburden is soft & easily mineable so no Drilling & Blasting is required. The mining method will be opencast mechanized. The benches shall be taken 6 m height. Haul road & Bench to Bench ramp shall be done by excavator in the tipper. This will help in better utilization of the resources and systematic development of the mine. The mineral is soft in nature & directly dig gable so no drilling & blasting is required.

13. Details of Existing and proposed Plantation with Budgetary Allocation: Table 5

Year	Green Belt on Statutory Boundary		Outside the lease area (Near Village Shivpura and Chhotti Sadri)		Total		Budget allocation
	Area (Ha.)	No. of plants	Area (Ha.)	No. of plants	Area (Ha.)	No. of plants	
1st	0.8333	830.00	0.0	0	0.83	830	2,07,500
2nd	-	-	0.30	300	0.30	300	1,50,000
3rd	-	-	0.20	200	0.20	200	1,00,000
Total	**0.8333**	**830.00**	**0.50**	**500**	**1.3333**	**1330**	**4,57,500**

Note: It is presumed that the rate of survival would be about 80%.During the subsequent years 20% additional plantation will be done to replace the withered saplings.

14. Environment

For collection of base line data Eight sampling points were selected one within the core zone and Seven at the villages Chhoti Sadri, Subi, Nawakheri, Kasbi, Sandikhera, Karariya, Shivpura within the buffer zone. The samples of air, soil, water, noise level, flora and fauna were collected from the sampling points and got analyzed. All the results were found within the permissible limits.

- ✓ **Air:** All the study results were found within prescribed parameters.
- ✓ **Noise:** All the study results were found within prescribed parameters.
- ✓ **Water:** The quality of ground water available at villages Mine site, Chhoti Sadri, Subi, Nawakheri, Kasbi, Sandikhera, Karariya, Shivpura was found to be within the prescribed limits. Similarly the water of Kesunda Pond, Gomana Pond was also found to be within the prescribed limit. The ground water is suitable for drinking purpose whereas the river and pond water is suitable for agriculture purpose.
- ✓ **Soil:** Soil is the "skin of the earth". It is a complex mixture of minerals, water, air, organic matters and countless organisms/ microbes, the decaying remains of once living things.

On the basis of soil analysis results; the nutrient index values have been calculated for the core zone as well as the buffer zone soil samples.

It is seen that the value of core zone soil sample is 2.0 which is within the range value of 1.67-2.33 thus the soil is of medium quality.

Similarly, it is seen that the value of buffer zone soil sample is 2.2 which is within the range value of 1.67-2.33. Thus it is of medium quality of soil.

- ✓ **Ecology & Bio Diversity:**

Flora: The following species of herbs, shrubs, climber, trees & grassed were found in the Core zone and the Buffer zone:

List of plants found in the core zone of the project area: Table 6

S.No.	Botanical Name	Family	Common Name
Herb			
1.	*Physalis minima* L.	Solanaceae	Rasbhari

2.	*Lepidagathis trinervis* Wall. ex Nees.	Acanthaceae	Pathar-phor buti
3.	*Euphorbia hirta* L.	Euphorbiaceae	Baridhudi
Shrubs			
4.	*Jatropha curcas* L.	Euphorbiaceae	Jamal Ghota
5.	*Lantana camara* L.	Verbenaceae	Raimuniya
Climber			
6.	*Trichosanthes cucumerina* L.	Cucurbitaceae	Padwal
7.	Mukia maderaspatana (L.) Roem	Cucurbitaceae	Agumaki
Trees			
8.	*Cassia fistula* L.	Caesalpinaceae	Amaltas
9.	*Leucaena latisiliqua* (L.) Gillis	Mimosaceae	Safed babool
Grasses			
10.	*Apluda mutica* L.	Poaceae	Lapdu
11.	*Arthraxon lancifolius* (Trin.) Hochst.	Poaceae	-

List of Plant found in the buffer zone of the project are Table 7

S.No.	Botanical Name	Family	Common Name
Herb			
1.	*Boerhavia diffusa* L.	Nyctaginaceae	Gadha-cand
2.	*Commelina benghalensis* L.	Commelinaceae	Kaua-kaini
3.	*Crotalaria medicaginea* Lamk.	Fabaceae	-
Shrubs			
4.	*Jatropha curcas* L.	Euphorbiaceae	Jamal Ghota
5.	*Lantana camara* L.	Verbenaceae	Raimuniya
Climber			
6.	*Ipomoea nil* (L.) Roth	Convolvulaceae	Kaladana
7.	*Cryptostegia grandiflora* (Roxb.)R.Br. ex Lindl.	Asclepiadaceae	Kadva Parvar
Trees			
8.	*Leucaena latisiliqua* (L.) Gillis	Mimosaceae	Safed babool
9.	*Madhuca indica* Gmel.	Sapotaceae	Mahua
10.	**Phyllanthus emblica L.**	Euphorbiaceae	Amla
11.	*Pithocellobium dulace*(Roxb.)Benth.	Mimosaceae	Jangal Jalebi

12.	*Pongamia pinnata* (L.) Pierre	Fabaceae	Karanj
Sedges			
13.	*Cyperus rotundus* L.	Cyperaceae	Nagarmotha
14.	*Cyperus difformis* L.	Cyperaceae	Motha
Grasses			
15.	*Heteropogon contortus* (L.) P. Beauv. Ex Roem.& Schult.	Poaceae	Black Speargrass
16.	*Sporobolus diander* (Retz.) P. Beauv.	Poaceae	Khui ghas -Santali

Fauna:

The following species of Mammals, Birds, Butterflies, were found in the Study area.

Details of Fauna Observed in Core Zone :Table 8

S. No.	Scientific Name	Common Name	Family	Conservation Status as Per WL(P)A,1972
Birds				
1	*Pycnonotus cafer*	Red-vented Bulbul	Pycnonotidae	Sch-IV
2	*Merops orientalis*	Green Bee-eater	Meropidae	Sch. IV
Mammals				
3	*Funambulus pennant*	Five Stiped Palm Squirrel	Felidae	Sch-IV
4	*Lepus nigricollis*	Indian Hare	Leporidae	Sch-IV
Reptiles				
5	*Hemidactylus flaviviridis*	House Gecko	Gekkonidae	Sch. IV
6	Calotes versicolor	Indian Garden Lizard	Agamidae	Sch. IV

Details of Fauna Observed in Buffer Zone :Table 9

S. No.	Zoological Name	Common Name	Family	Conservation Status as Per WL(P)A,1972
Birds				
1.	*Acridotheres tristis*	Common Myna	Sturnidae	Sch-IV
2.	*Alcedo atthis*	Common Kingfisher	Alcedinidae	Sch-IV
3.	*Ardeola grayii*	Pond Heron	Ardeidae	Sch-IV
Reptiles				
4.	*Calotes versicolor*	Garden Lizard	Agamidae	Sch-IV
5.	*Hemidactylus flaviviridis*	House Gecko	Gekkonidae	Sch-IV
Butterflies				

6.	*Eurema hecabe*	Common Grass Yellow	**Pieridae**	Sch-IV
7.	*Danaus chrysippus*	Plain Tiger	***Nymphalidae***	Sch-IV
8.	*Euploea core*	Common Indian Crow	Nymphalidae	Sch-IV
Amphibians				
9.	*Bufo andersoni*	Marbled Toad	Bufonidae	Sch-IV
10.	*Bufo melanostictus*	Common Indian Toad	Bufonidae	Sch-IV
Mammals				
11.	*Funambulus pennant*	Five Stiped Palm Squirrel	Felidae	Sch-IV
12.	*Hyaena hyaena*	Striped Hyaena	Hyaenidae	Sch-III

✓ **Socio Economic Environment:**

a. Demography: The study area consisted of 70183 persons inhabited within the Buffer zone. The data incorporated in Table-H1clearly shows that out of total 70183 people, 35672 (50.83%) people were males and 34511 (49.17%) were females.

b. Average Household: The average household size in study area (buffer zone) varies from 4.68 to 5.54, as per provisional data of 2011. The data presented indicates that maximum (5.54) average household size was occurred in 0-3 km radius and minimum (4.68) average household size in 7-10 km radius.

c. Social Structure: Various religious communities are living in the study area. Table-3.38 shows that out of total 70183 people, 7844 (11.18%) were belonged to SC caste and 19346 (27.56%) were belonged to ST caste in the study area. Total SC & ST population was 27189 (38.74%) in the buffer zone.

d. Literacy Level: The study indicated that total literacy rate of people was 60.66 per cent the study area. Out of total 35672 males, 25268 (70.83%) males were literate and out of total 34511 females, 17313 (50.16%) females were literate, in the study area.

e. Occupational Structure: The data shows that out of total 70183 people in the study area, 22049 (31.42%) were main workers, whereas, 9025 (12.86%) were marginal workers and remaining 39109 (55.72%) were non-workers.

The results show that maximum main workers (15564), non-workers (27815) and marginal workers were observed in 7-10 km radius.

15. Anticipated Environment Impact & Mitigation Measures: Table 9

S. No.	Activities	Likely Impact	Mitigation measure
Impact on Land			
1.	Mining Activities like overburden removal, formation of mining pits, dumping of waste and storage of mineral	Land degradation due to pitting and waste dumping loss of topsoil.	Before expanding the existing pits or forming new pits and dumping of waste, the top soil available there will be removed separately and stacked for plantation in future. Out of the total lease area of 3.9859 ha., only an area of 3.1526 ha. will be excavated during mining. And 2.7284 Ha. will be converted into water reservoir for the use of local people and 0.4242 Ha. will be backfill of reclamation.
2.	Construction of infrastructure like mine office, approach road, haulage road, and rest shelter etc.	Aesthetic beauty of the land will be affected.	Adequate plantation will be done along the roads and water will be sprinkled at the dusty places.
3	Deposition of wash-off	During rainy season the wash-off from dump and other places may get deposited into ponds and agricultural fields	Garland drains, catch drains and settling ponds will be constructed around the waste dump and the periphery of pits. The garland drains, catch drains and the settling ponds will be desilted from time to time.

4.	Waste dump formation	In the course of dumping waste material at the dumping site, the dust will get air borne and boulders from the dump will roll down.	**Active Dump** : The slope of the dump will not increase $33^{0.}$ It will be properly terraced. The dumpers will dump from minimum height. **Inactive Dump:** The inactive dump will be stabilized by planting suitable grasses, shrubs etc.
5.	Formation of Mining pits and waste dumps	Esthetic beauty will be adversely affected.	Reclamation and rehabilitation of the core zone Management of waste dump Keeping the available geological reserves and the targeted production in view, the estimated life of the mine is 8 years. The waste dump management will be done keeping this fact in view. **Management of Mining pits:** During first 5 year plan period the over burden dump will occupy in area of 0.1245 ha. Out of the total lease area of 3.9859 ha., only an area of 3.1526 ha. will be excavated in the course of mining. Out of the said excavated area of 3.1526 ha., only an area of 2.7284 ha will be used for storing rain

			water. It will be converted in to water reservoir. And 0.4242 hect. will be backfill area. At the end of the life of the mine the land use pattern of the mining area will be as under : 1. Total excavated portion – 3.1526 ha. 2. Area in the form of pond – 2.7284 Ha. 3. Rehabilitated portion -0.4242 Ha. 4. Area under plantation – 0.8333 Ha. Plantation will be done over the 0.8333 Ha. will be statutory lease boundary and additional area of 0.5000 Ha. out of the lease area on at village schools.
6.	Formation of mining pits and waste dumps.	The mining pits and the waste dumps may pose a danger to humans and animals.	In the course of mining proper fencing will be erected as per rules.
7.	Mining Activities	The deposition of dust particles on agricultural field and the surrounding land.	Green belt will be developed and adequate Plantation will be done along the road sides. Green belt will be developed over 0.8333 ha. of area lying within the statutory boundary barrier.

			In addition plantation will be overdone over an area 0.500 ha. along village schools and other available places.
Impact on Top Soil			
1.	Mining Activities including pit formation waste dumping and movement of mining machinery	In the course of pit formation, waste dumping and movement of mining machinery, the top soil is likely to be lost, if no care is taken	Before forming the pits and starting waste dumping, the top soil will be removed and stacked separately. Similarly the top soil likely to be lost due to the movement of mining machinery will also be removed and stacked. It will be used for plantation in future. The unused soil will be stacked properly and conserved by growing suitable grasses over there. It will be ensured that the oil and grease leaking out of the mining machinery does not pollute the top soil.
Impact on Water			
1.	Pit Formation and waste dump formation	The wash off from waste dumps may pollute the surface water body and choke the natural drains If the mining pits go below the ground water table, depletion of ground water may take place.	It will be, ensured that the wash off from the waste dump and mineral stack doesn't flow into the natural drains and nearby agriculture fields. For this purpose garland drains, Catch drains and siltation ponds will be constructed. They will be desilted from time to

			time. Since the mining pits are not likely to intersect the ground water table, there will be no adverse impact on the ground water. The rain water will be channelized into the water sumps constructed at the mine.
Impact on Air			
1.	Excavation of pits, dumping of waste, rock handling and transportation of mineral,	Dust formation will take place in the course of drilling, blasting, rock handling and transportation of mineral and waste.	Adequate number of trees will be grown over the boundary barrier and the other available places like road sides etc. within the lease hold. Regular water sprinkling will be done over the haulage roads and other dusty places. The dumpers/trucks loaded with mineral/waste will be covered with tarpaulins.
Impact on Noise level			
1.	Drilling, Blasting, Running of mining machinery etc.	All the mining activities will add to the noise level. If the noise level increases beyond the prescribed limit, it may affect the humans an animals.	1. Controlled blasting will be practiced so that minimum noise and vibration is caused during blasting. 2. The mining machinery will be maintained in a tip top condition. The trucks and dumpers will not be over loaded. 3. The gradient of haulage roads

			will be maintained as per rules. 4. The persons required to work at the noisy places will be provided with ear muff/plugs. The cabins of the excavators will be acoustically designed.
Impact on Biodiversity			
1.	Formation of pits and waste dumps and Movement of transport vehicles.	Trees, shrubs etc are not present at the places where pit formation and waste dumping is to be done; practically there will be no adverse impact on biodiversity. However due to increase in noise level some fauna may develop a tendency of running away from the mining area.	Adequate number of trees will be grown within the lease hold. All efforts will be made to maintain the noise level below the safe limit.
Impact on Socioeconomic aspect			
1.	Mining as a whole	The running of the mine will have only positive impact on the locality. It will increase job opportunities and enhance infrastructure facilities	Although no mitigation measures are required on this count, it will be ensured that maximum employment is given to the local people. The provisions made under CSR programme will be properly implemented

16. Monitoring Schedule:

Programme of Environmental Monitoring Table 10

Attribute	Frequency of Monitoring	Parameters to be determined
Ground water	Twice in a year	pH, Turbidity (NTU), Conductivity at 25°C (µs/cm), Total Hardness ($CaCO_3$) (mg/L), Chlorides as Cl (mg/L), Total dissolved solids (mg/L), Sulphates as SO_4 (mg/L), Alkalinity as $CaCO_3$ (mg/L), Fluoride as F (mg/L), Nitrates as NO_3(mg/L), Magnesium as Mg (mg/L), Calcium as Ca (mg/L), Sodium as Na(mg/L), Potassium as K (mg/L), Na%, RSC, SAR.
Air Quality	Twice in a year	SPM, SO_2 NO_x, PM_{10} & PM $_{2.5}$
Soil	Twice in a year	Soil Color, Bulk density(g/ cm^3), Water retention Capacity (%), Soil pH, Calcium as $CaCO_3$(%), Nitrate as NO_3 (%), Available Phosphorus as P(%), Available Sodium as Na(%), Available Potassium as K(%), Conductivity (µs/cm), Sulphate as SO_4(%), Organic Carbon (%) and Organic Matter (%).
Noise	Twice in a year	Noise level in dB(A)

17. Budgetary Allocation for Environmental Protection:

The details of investment for efficient control and monitoring of environment and the annual recurring cost are given below: **Table 11**

S. No.	Detail	Collection of Samples per year	Rate of Collection of Samples	Total Cost (Rs.)
1	Air Environment	2	5000	10000
2	Water Environment	2	1500	3000
3	Noise Environment	2	1500	3000
4	Land Environment	2	1000	2000
			Total Amount	**18000**

18. Cost of Environment Protection Measures: Table 12

S. No.	Particulars	Capital Cost	Annual Cost
1.	**Pollution Monitoring**: Air, Water, Noise and Soil twice in a year Air: 2*5000 Water: 2*1500 Noise: 2*1000 Soil: 2*15000s	-	18,000
2.	**Pollution control:** Water sprinkling for dust depression for overhead water sprinkling facility	50,000	10,000
3.	Plantation 212 x 250 inside, 440x500 outside	2,73,000	30,000
4.	Vehicle Maintenance + PUC Certification	3000	5,000
5.	**Solid Waste Management (no solid waste will be generated)**	-	3,000
	Bins 2 Nos Rs @ 750 each	-	
	Pit and Composed	-	
	Transport of Waste	-	
	Total	**3,26,000**	**66,000**

Cost of Environment Protection Measures: Table 13

S. No.	Particulars	Capital Cost (Rs.)	Annual Cost (Rs.)
1.	Construction of garland drain, catch drain and settling ponds	69,000	30,000
2.	Maintenance of approach road 180meter	55,000	6000
3.	Wire Fence (450 meter)	75000	6000
4.	Signage & Caution Board	1000	-
	Total	**2,00,000**	**42,000**

21. Cooperate Environment Responsibility:

The need of the population has been assessed and identified and based on actual needs the proposals prepared and expenditure at full production levels will be as shown in table below:

Table 14

S. No.	Proposed activity	Annual recurring expenses in Rs.
1.	Providing pen, pencils, school uniforms, shoes and notebooks to students in the schools nearby lease area.	30,000/-
2.	Making the availability of water filter in the school	30,000/-
3.	Making available of fans, tables and blackboards in schools and Anganwadi centre.	40,000/-
4.	Providing sports equipments for students in nearby schools.	30,000/-
5.	Get the paint on the walls of the schools	20,000/-
	Total	**1,50,000/-**

22. Expenditure to Meet Statutory Requirements:

The budgetary provisions for incurring expenditure to meet the statutory requirements are given below:

Details of Expenditure to meet Statutory Requirements: Table 15

S. No	Particulars	Annual expenditure in Rs.
1.	Personal protective equipment to Personnel (like helmets, shoes, gloves, goggle, ear muffs, masks etc.)	49,500
2.	Vocational Training Programs	75,000
3.	Occupational Medical examination (initial and periodical) of employees.	75,000
Total		**1,99,500**

23. Summary & Conclusion:

a. Financial Benefits to the Government: The financial benefits of this mining activity will accrue both to the State and Central Governments by way of collection of royalty, GST, CGST, SGST, commercial taxes, levies, duties, land tax, income tax and service tax etc.

b. **Benefits to the Society**: The populace of the region will have better employment opportunities thereby reducing the large scale migration of labour from the region. Due to this industrial activity, economic status will improve and populace will have improved medical, educational, social, entertainment, cultural, health and sanitation facilities, communication and transport facilities. The project will encourage ancillary industries in the region thereby increasing the employment potential and economic base.

c. **Conclusions:** Thus, in view of considerable benefits from the project, the proposed mining of Red Ochre mineral is advantageous to the region/ nation. It is therefore advisable to implement the project.

Chapter -1

Introduction

1.1 Purpose of the Report

The purpose of the report is to get Environmental Clearance for Shivpura Red Ochre Mine, (M.L. No. 07/2018) having an area of 3.9859Ha., situated near village Shivpura, Tehsil Chhoti Sadri& District Pratapgarh(Rajasthan) for proposed production ROM 2,99,995 TPA and mineral Red Ochre 2,33,445 TPA.

As per the Environment Impact Assessment (EIA) Notification S.O. 1533(E) dated 14th September 2006 and its subsequent amendments, the proposed expansion project falls under Category 1(a)B1. The EIA Report is required to get Environmental Clearance (EC) for the project from State Environment Impact Assessment Authority, Rajasthan.

Application for prior environmental clearance for the above mentioned proposal was submitted to the SEIAA, Rajasthan on 05.09.2019 for determination of Terms of Reference (ToR) for the preparation of EIA/EMP Report. The meeting was held in 4.35th meeting of SEAC, Rajasthan on 3rd, 4th, 5th, 6th, 10th, 11th and 12th February, 2020 at agenda No.70 for determining the Terms of Reference (ToR). Thereafter SEAC, Rajasthan issued Terms of Reference vide its letter No. SEIAA/SEAC-Raj/Sectt/Project /Cat. 1(a) B1 (16655)/2019-20/11968 dated 27.02.2020.

This EIA Report is prepared to address the environmental impacts of the proposed project and propose mitigation measures for the same, based on the TOR conditions received from SEAC, Rajasthan. A copy of the Terms of Reference is enclosed as Annexure-I. The present EIA Report is prepared on the basis of EIA NotificationS.O. 1533(E) dated 14th September 2006 and its subsequent amendments.

In order to assess the environmental sustainability of the project, studies have been carried out covering various environmental attributes, which may be affected by the mining operations.

The Project Proponent has availed the services of Apex Mintech Consultants, Udaipur for the purpose. The field studies for environmental attributes have been carried out winter season during the period October, 2019 to December, 2019, as per the guideline issued by the MoEF&CC, New Delhi.

1.2 Identification of Project & Project Proponent

1.2.1 Identification of the Project

This is amining project for mineral of Red Ochre situated near village Shivpura, TehsilChhoti Sadri&DistrictPratapgarh, Rajasthan. This area is prominent for Red Ochre mining. The quality of Red Ochre is of high quality which is rarely found in the region. The project proponent is taking all safe guard to protect environment in the mining area.

1.2.1.1 Use of Mineral

These minerals are mostly utilized in various forms in various industries like, Cement, Paints, Rubber, Glasses, Plastic industries, foundries, Lacquers colours.

1.2.1.2 Chemical and physical analysis of Red Ochre

Chemical and physical properties of Red Ochre are as follows:

Table 1.1: Chemical Properties of Red Ochre

Chemical properties	Result in %
SiO_2(%)	21.42
Fe_2O_3 (%)	36.13
AL_2O_3(%)	26.20
CaO	1.12
Na_2O	-
K_2O	-
MgO	0.20
LOI	13.56
TiO_2	-

1.2.2 Identification of Project Proponent

Project Proponent is M/s Quality Minerals, which is a Partnership firm.

1.2.2.1 Registered Address of Project Proponent

M/s Quality Minerals

Partner- Shri Nehul Patidar S/o Shri Pushkar Patidar

R/o 9A, Arihant Vihar, Near Power House, 100 feet Road, Kankroli

District Rajsamand, Rajasthan

Contact No. +9414012490

E-mail: singhbp1983@gmail.com

1.3 Brief Description of the Project

Initially, the Letter of Intent was granted in favour of M/s Quality Minerals for mineral Red Ochre M.L.No. 07/2018 over an area of 3.9859 Ha., R/o 9A, Arihant Vihar, Near Power

House, 100 feet Road, Kankroli (Raj.), Tehsil Chhoti Sadri, District Pratapgarh. The state Government has issued Letter of Intent (LOI), vide Letter No. Ni Kha. Bhu/ Pratap/CC-I/F-1 (1)7/2018/4498 dated 21.12.2018 by Directorate of Mines and Geology Department Udaipur (Raj.).

Mining Plan with progressive mine closure plan was approved by Suptdg. Mining Engineer, Udaipur Circle, Udaipur, Vide his letter No. SME/UD-Cir/Mine Plan/ Pratap/F-19/18/10654-58 dated 20.02.2019.

1.3.1 Nature of the Project

The proposed project is for for mineral production ROM 2,99,995 TPA and mineral Red Ochre 2,33,445 TPA from ShivpuraRed Ochre Mine, M.L. No. 07/2018, having an area of 3.9859 Ha., situated near village Shivpura, TehsilChhoti Sadri& District Pratapgarh, Rajasthan. The proposed project comes under category B of the EIA Notification S.O. 1533 (E) dated 14th September 2006 and its subsequent amendment. Area of mining lease is 3.9859 Ha., and area of another mining lease area is 4.2031 Ha., within cluster of 500 meters, since the total cluster area is 8.189 Ha., which is more than 5.00 Hectare and less than 100 Hectare, the proposed mine expansion project falls under project type No. 1(a) B1 as per schedule II of the Notification and its subsequent amendments.

1.3.2 Size of the Project

The area of mining lease is 3.9859 Ha., which is privateland situated near village Shivpura, TehsilChhoti Sadri&DistrictPratapgarh,Rajasthan in the favour of M/s Quality Minerals.

1.3.3 Project Cost:

The estimated cost of project is about Rs 0.40 Crore.

1.3.4 Location of the Project

Location details of this mining project are as follows (with location map) given below:

District& State	:	Pratapgarh, Rajasthan
Tehsil	:	Chhoti Sadri
Near Village	:	Shivpura

1.3.5 Connectivity to Mining Lease

Mining lease is well connected by Road, Railways and Air, which can be approached by the following manner:

Table 1.2: Details of connectivity to mining lease area

Particulars	Description	Distance
By Road	District Headquarter Pratapgarh to Shivpura village	48 Kms.
By Railway	Nearest Railway Station situated at Neemuch in NE direction	17.66 Kms.
By Air	Nearest Airport situated at Maharana Pratap Airport, Dabok, Udaipur	92.42 Kms.

1.4 Importance to the Region & Country

The project is for mining of Red Ochre mineral. Red Ochre is an important many industries its demand and various uses are increasing rapidly in our country and abroad. It is mainly used in various forms in various industries like Cement, Paints, Rubber, Glasses, Plastic industries, Foundries, Lacquers Colures etc.

1.5 Scope of the study – details of regulatory scoping carried out (As per Terms of Reference)

The project falls under Category 'B1'as per EIA NotificationS.O. 1533(E) dated 14th September 2006 and its subsequent amendments. Therefore, necessary Environmental Clearance will be required from SEIAA, Rajasthan.The necessary Standard Terms of Reference was issued by the State Level Expert Appraisal Committee;Rajasthan vide its letter No. SEIAA/SEAC-Raj/Sectt/Project /Cat. 1(a) B1 (16655)/2019-20/11968 dated 27.02.2020 for proposed production of 2,33,445TPA of Red Ochre mineral.

The study area comprises of both the core & buffer zone.

The core zone is mining lease area of 3.9859Ha., An area falling within 10 km radial distance from periphery of the mining lease area is treated as "Buffer Zone".

In line with the TOR prescribed by Expert Appraisal Committee of SEAC, Rajasthan, the study area will comprise 10 km zone around theShivpura mining lease from lease periphery and the data contained in the EIA with respect to mining operations such as conceptual pit limits, waste generation etc.

- The scope of study broadly includes:
- To conduct literature review and to collect data relevant to the study area;
- Establishing the baseline environmental aspects in and around the project area;
- Identifying various existing pollution loads;

- Predicting incremental levels of pollutants in the study area due to the proposed expansion in mining operations;
- Evaluation of the predicted impacts on various environmental attributes in the study area by using scientifically developed and widely accepted environmental impact assessment methodologies;
- To prepare an Environment Management Plan (EMP), outlining the measures for improving the environmental quality in view of proposed enhanced mining & allied activities for environmentally sustainable development; and
- Identifying critical environmental attributes that are required to be monitored in the post-project scenario.

1.5.1 The Scope of Study Broadly Includes

i. Collection of data relevant to the study area and literature review.
ii. Compilation of baseline data generated of various environmental attributes.
iii. Identification of various existing pollution loads due to various activities.
iv. Evaluation of the impacts on various environmental attributes in the study area by using scientifically developed and widely accepted environmental impact assessment methodologies.

1.5.2 Methodology of the Study

Reconnaissance survey was conducted by Apex Mintech Consultants, Udaipur and members of Apex Enviro Lab, Udaipur (NABL approved Laboratory a subsidiary of Apex Mintech Consultants) along with officials of M/s Quality Minerals and sampling locations for baseline data collection were identified.

- The predominant wind directions in the study area were recorded by data available from India Meteorological Department (IMD) at Maharana Pratap Airport, Dabok, Udaipur.
- Topography, location of surface water bodies like ponds, canals and rivers.
- Location of villages/towns/sensitive areas.
- Accessibility, power availability and security of monitoring equipment, pollution pocket in the area.
- Areas which represent baseline conditions.
- Collection and analysis of baseline data for various environmental attributers.

Detailed field studies have been conducted during post monsoon (October, 2019 to December, 2019) covering a period of three months to determine the existing conditions of various environmental attributes. The monitoring details are outlined in Table No. 3.1.

1.5.3 Structure of Report

The overall contents of the EIA report follow the list of contents and guidelines prescribed by the Ministry of Environment, Forest and Climate Change, Government of India, New Delhi. The report consists of twelve chapters and the contents are briefly described in this section.

Chapter-1:

The chapter gives an introduction to the report. It describes its purpose and the information regarding the project and the project proponent. It also describes brief description of nature, size, location of the project and its importance to the region & country.

Chapter-2:

The chapter gives a description of type of project, its need, location (including map showing general, specific location, project boundary & project site layout), size or magnitude of operation (including associated activities required by or for the project), proposed schedule for approval and its implementation, technology and process description, project description including drawings showing project layout, components of project etc. It also describes the description of mitigation measures incorporated into the project to meet environmental standards, environmental operating conditions, or other EIA requirement and assessment of new & untested technology for the risk of technological failure.

Chapter-3:

The chapter gives a description of the study area, its period, components & methodology. It also described environment, including soil, water, noise level, air, land, ecology and sociology (both baseline data and secondary data). The quality of the soil has been depicted by drawing isopleths. Similarly, isopleths of quality water also have been drawn. For assessing the AAQ 6 monitoring stations were selected. A study of the Flora and fauna lying within the core zone and buffer zone was carried out. For the purpose of considering the sociological aspects the information was gathered from the census report related to villages.

Chapter-4:

The chapter deals with investigated environmental impacts due to project location, possible accidents, project design, project construction, regular operations, final decommissioning or rehabilitation of a completed project. Chapter also deals with measures for minimizing

&offsetting adverse impacts identified and the anticipated environmental impact of mining and mitigation measures. On the basis of the base line data collected in the course of monitoring/study the likely impact of mining on the environment was assessed and mitigation measures suggested.

Chapter -5:

The chapter deals with the possibility of selecting alternative sites for mining and alternative method of mining.

Chapter -6:

The chapter deals with the plan of environmental management, including monitoring program, constitution of the Environment Monitoring Cell (EMC) with their responsibility, monitoring schedule and budgetary allocation for executing the management plan.

Chapter-7:

The chapter deals with the outcome of the Public Hearing conducted at the mine and the commitments made by the project proponent including the time bound action plan and the budgetary provisions. It also deals with various types of risks involved at the project, safety and occupational health hazards and the amenities and facilities proposed to be provided to the employees. Is also described the social impact assessment and Reclaimation& Rehabitation action plans.

Chapter-8:

The chapter deals with the benefits likely to accrue to the society as a result of coming up of the project and the action proposed to be taken by the PP under CER. It also deals covered improvement of physical and social infrastructure, employment potential and other tangible benefits due to proposed mining project.

Chapter-9:

The chapter deals with environmental cost benefits analysis report.

Chapter-10:

The chapter deals with the hierarchy at the project, the environmental policy adopted by the management and the mechanism of reporting of non-compliance of statutory provisions related to the environment.

Chapter-11:

The chapter summarizes the likely impact of the project on the environment and proposed mitigation measures. It also draws the conclusion on the efficacy of the project.

Chapter-12:

Disclosure of Consultants Engaged: The detailed profile of the consultants along with their capabilities and experience are highlighted in this chapter.

Finally, it has been concluded that the project is feasible and would greatly contribute to the development of the region in the long run. After taking the mitigation measures, all the likely adverse impact of mining on the environment will be fully contained.

***

Chapter -2

Project Description

2.1 Type of Project

ShivpuraRed Ochre Mine falls under "Category B", as such this project fall under B1category as per EIA Notification S.O.(E) 1533 dated 14th September 2006 its Amendment. It is mandatory to obtain Environmental Clearance for the mining lease from the State Level Environment Impact Assessment Authority, Rajasthan.

2.2 Need for the Project

This is a mineral Red Ochre mining project due to enhance demand in the cement factories. The project proponent wants to produce 2,33,445 TPA of Red Ochre. The project already has sufficient of mining machinery which can achieve this production, there are sufficient reserve of mineral Red Ochre in the area. Mineral Red Ochre is proved and due to new the project proponent will get enhance benefit and Government will get revenue and the local people will get employment.

2.3 Location (map show general location specific location, project boundary, project site lay out)

2.3.1 General Locations (Infrastructure Facilities)

All the basic infrastructure facility is available in the study area. The details are given below:

Table 2.1: Details of Available Infrastructure Facilities in the Area

Infrastructure Facility	Location	Distance (in Km.)
Police Station	Chhoti Sadri	9.80
PHC/CHC	Chhoti Sadri	9.80
Mobile Phone Connectivity	Mine	Available
Post Office	Shivpura	0.80
Nearest Habitat	Shivpura	0.80

2.3.2 Demography of Study Area

Total Population : **70**,183

Male : **35**,672

Female : **34**,511

2.3.3 Project Boundary/Latitudes and Longitudes of Mine Site

The lease hold area is located between Latitude 24°23'05.36"N to 24°23'21.69"N, Longitude 74°46'51.06"E to 74°47'55.27"E.

Table 2.2: Geographical position of the Boundary Pillars

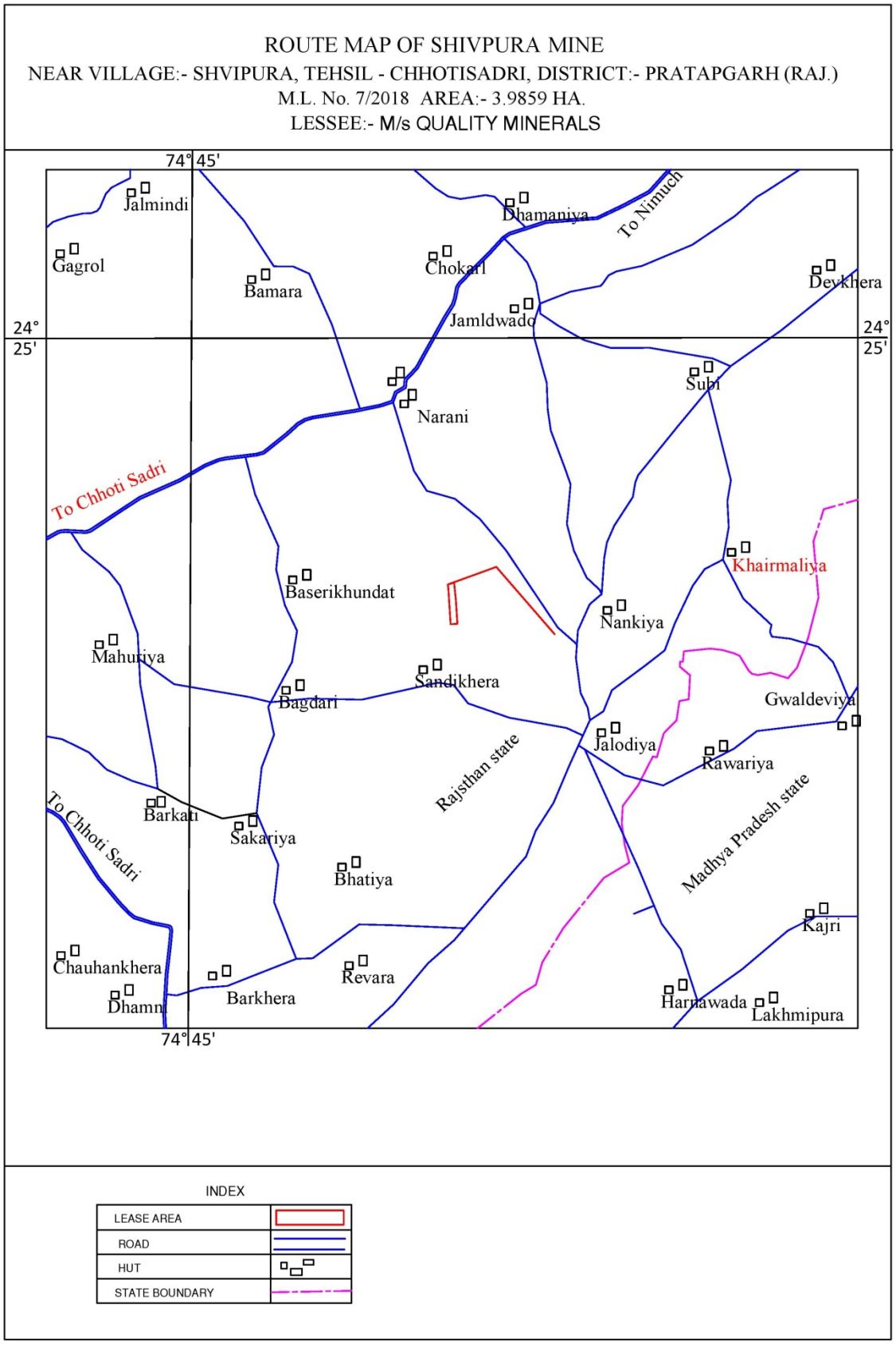
Pillars	Latitude (N)	Longitude (E)
A	24°23'20.92"N	74°46'51.06"E
B	24°23'19.63"N	74°46'51.28"E
C	24°23'05.36"N	74°46'52.33"E
D	24°23'05.54"N	74°46'55.27"E
E	24°23'14.95"N	74°46'54.58"E
F	24°23'21.69"N	74°46'53.76"E

2.3.4 G.T. Sheet No

Mining lease situated in G.T. No. 45L/15.

2.3.5 Land Status

Mining lease area is Private land.



Photograph 2.1: Showing the Location of the Mining Lease Area

Photograph 2.2: Google Image showing the Location of the Mining Lease Area with Geomorphological features

Details of Latitudes and Longitudes are given in Table-2.2

2.4 Size or Magnitude of operation (including associated activities required by or for the project)

The size and magnitude of mining operations are as given below:

Table 2.3: Details of Size or Magnitude of Operation

S. No.	Particulars	Details
i.	Type of mine	Manual opencast
ii.	Mine lease area	3.9859 Hectare
iii.	Acquired land area	Pvt. Land
iv.	Sealable Reserve	1838597 Tonnes
v.	Annual production	233445 Tonnes
vi.	Ultimate depth of pit at the end of five years	488 mRL
vii.	Ultimate depth of pit at the end of mine life	488 mRL
viii.	Ultimate pit slope	45^{o}
ix.	Working bench slope	Vertical to 75^{o}
x.	Bench height	6.0 m.
xi.	Man power	33
xii.	Average no. working days per year for mining operations	300
xiii.	No. of working shifts per day	1 (Day light hours)
xiv.	No. of waste dumps outside the core zone	Nil
xv.	Electrical power requirement	Nil
xvi.	Water requirement including Recycled water	4.00 KLD

Source: Approved Mining Plan vide letter no. SME/UD-Cir/Mine Plan/Pratap/F-19/18/10656, dated 20.02.2019.

The mining operations will be carried out as per above mentioned parameters, which are as per approved mining plan. There are no other associated activities with this mining project.

2.4.1 Physiography/Topography & Geology

The lease area comprises flattern land. The maximum contour of the M.L. Area is 513 mRL which lies Pillar “A” of mining lease area, where as the lowest contour of the area is 510 mRL.

2.4.1.1 Regional Geology

Regional geological succession in the area is as follows:

FORMATION	AGE
Alluvium	Recent
Latertic	Sub recent to Pleistocene
Deccan trap	Upper Cretaceous
Kaimur sandstone	Upper Vindhyan
Suket Shales	
Nimbaheda grey limestone	
Nimbaheda purple limestone	
Nimbaheda shales (Purple)	Lower Vindhyan
With conglomerate	

----------**UNCONFORMITY**----------

Aravali Binota shales or : Delhi system

Jiran Sandstone :

Jiran sandstone forms several low ridges running north and south and joining near Choti Sadri to form an irregular plateau lying between that village and jiran, in which dips are horizontal with minor folds. Northeast of Nimbaheda and Malan, it is over lapped by the Vindhyan and to the east by the Vindhyan and to the east by Deccan trap. The valleys between the Sandstone are largely filled with trap. The thickness of sandstone exposed in the Jiran and Choti Sadri area is about 100-200 feet of the Vindhyan system, the division below kaimur sandstone is met with in the lower ground. Westward prolongation of the great Vindhyan area is peculiar in that, below the Kaimur sandstone, there is great thickness of sttata which from with the Kaimur an unbroken succession.

Kaimur sandstone passes down into the suket shales without discordance, and they again into Nimbuheda Limestone and the underlying Nimbheda shales. At the base of Nimbheda shales, there is a conglomeratic sandstone horizon, which makes the base of the Vindhyans, where they rest unconformably on the Aravalli Binota shales or Jiran sandstone of possible Delhi age.

The Nimbaheda limestone crops out extensively, forming rough rocky county with slabs projecting a foot above the surface, but the suket shales and nimbheda are hardly seen except in beds of streams.

Along the south of Kaimur scrap, here about 400feet high, Deccan traps comes close up to its base.

Deccan traps come in with large exposure of laterite around Neemuch and black cotton soil covering most of the rest of the trap surface. It is probable that the trap originally extended northward to the Kaimur scarp, and westward to the Bari Sadri hills, and even overflowed the latter, for a line of relict trap outlier extends for some miles west from the western edge to Bansi. This line and number of similar survivors' northeast of Bari Sadri hills between Bari Sadri and Choti Sadri marks one of the principal watersheds of India.

The flow exposed has no amygdaloidal upper surface, nor cavities elsewhere. It shows no difference in texture wherever seen and is one homogenous bed. It is fine grained, dense, black basalt with small megacsopic knots brown palagorites, which decomposes easily, giving a pitted weathered surface. Occurrences of laterite derived from the buff and lavender Sawa shales or from shales interbedded with Bhagwanpura limestone lie along a line about 5smiles in length, north from Sawa, their outcrops are isolated in alluvium and their stratigraphical origin is uncertain. The most northernly is half a mile north of Barara. It is a patch of laterite, a bright red ochresous variety. Alluvium covering in the area is almost thin, specially on the sand stone plateau, where from large sprads of bara rocks it is practically absent. Usually it is a light loam, moresandy over the tracts of Bundelkhand gneiss and sandstone, more clayey upon the shales and phyllites. Limestone area is usually bare and rocky. On the Deccan trap, black cotton soil is prevalent.

2.4.1.2 Local Geology

Reconnaissance of geological aspect was done in the area and following geological sequence has been observed,

Soil &Red Ochre.

SOIL COVER

There is no soil cover in the mineralized zone in the northern part of the applied ML area. Soil mixed with scree lies in the eastern part of the area in the agricultural fields. The agriculture fields have soil cover of 0.5m, as observed in the area.

RED OCHRE

Red Ochre occurs in the form of bed having an average thickness of around 10m Red ochre is found in the form of grit scree mixed with red soil. It is dark red in colour, fine grained and friable. It soil's the fingers when touched.

2.4.2 Geological and Mineable Reserves

The reserves have been divided into 3 categories, namely proved, probable & possible on the basis of level of certainty of availability of mineral. The bulk density has been taken as 2.7 Tonnes/Cu.m.

Table 2.4:Details of Geological and Mineable Reserves

Category	Nature of Reserve as per UNFC	Total geological Mineral in Tonnes	Recoverable Red Ochre in Tonnes
Provide	121	340481	306433
Probable	122	1702404	1532164
Possible	333	425601	383041
	Total	**2468486**	**2221638**

Source: Approved Mining Plan vide letter no. SME/UD-Cir/Mine Plan/Pratap/F-19/18/10656, dated 20.02.2019.

Mineable Reserves = Total Reserves of Proved +Probable = 306433+1532164= 1838597 Tonnes.

2.4.2.1 Anticipated Life of the Mine

On the basis of the annual targeted production, the life of the mine would be about 8 years.

Table 2.5: Life of the Mine

Particulars	Quantity in Tonnes
Total Mineable reserves	1838597
Annual production rate	233445
Life of the mine	8 year's

Source: Approved Mining Plan vide letter no. SME/UD-Cir/Mine Plan/Pratap/F-19/18/10656, dated 20.02.2019.

2.5 Proposed schedule for approval and implementation

(i) Act, Rules & Regulation applicable in mines

There are several Act, Rules & Regulations applicable in mining for obtaining mining lease, for operating the mine, and after closure of the mine. That some important Act & Rules are as under: -

(ii) For getting mining lease

1. Mineral Concession Rule, 1960 under their Rules various provision regarding grant, provision of Progressive Mine Closure Plan etc. exist.
2. Environment Protection Act (under which environment clearance is obtained).

3. Consent to establish & Consent to operate under Air (Prevention & Control of Pollution) Act, 1981, Water (Prevention & Control of Pollution) Act, 1974.

(iii) For operating Mines

- Mines Act, 1952
- Mines Rule, 1955
- Metalliferous Mines Regulation, 1961

Under these Act, Rules & Regulations various provisions regarding provisions of safe drinking water, Occupational Health & Safety, appointment of qualified person isnecessary.

(vi) District Mineral Development Fund

Before start the mine some notices are to be submitted to Directorate of Mines Safety, Labour Department etc. and for working with heavy earth moving machinery permission under regulation 106 (2) from Director Mines Safety is required. That several returns and notices are sent to Directorate Mines Safety, Director of Mines & Geology and Labour Department.

(v) That under labour laws the following provision exist

a. Payment of Wages Act & Rules.

b. Minimum Wages Act & Rules.

c. Contribution Provision Fund Rules.

(vi) That at the time of closure of mine

The Mine Closure Plan is to submit Director of Mines & Geology.

2.6 Technology and Process Description

2.6.1 Method of Mining (Machined Opencast)

Mining of Red Ochre is generally done manually to remove the impurities associated with it. At the first stage, the overburden is removed by excavator/JCB. The mineral & Overburden is soft & easily mineable, since no drilling &blasting will be required. The mining method will be opencast mechanized. The benches shall be taken 6-meter height. Haul road &bench to Bench ramp shall be done by excavator in the tipper. This will help in better utilization of the resources and systematic development of the mine. The mineral is soft in nature & directly dig gable, since no drilling & blasting will be required.

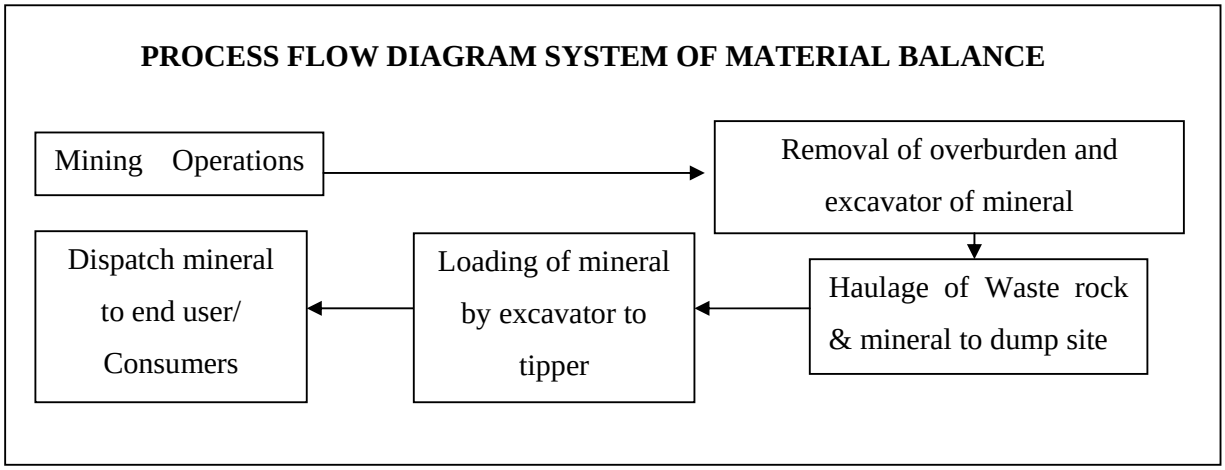


Figure 2.1: Showing flow diagram of mineral production

2.6.2 Overburden, waste rock generation and its management

During the current plan period about 1,29,691 M.T. of Mineral waste will be generated at the mine. It is proposed to dump the waste produced from this mien temporarily at the sites of non-mineralized zone and outside the UPL near Pillar "F" Height of Dump 9m area of 1245 m^2 total quantity of waste 4803 M^3& swell factor 1.2m/M^3 5764 M^2.

2.6.3 Drilling & Blasting proposed at the mine

The mineral is soft in nature excavated will be done by excavator & JCB, sincethere will be no requirement of drilling & blasting.

2.6.4 Year Wise Annual Programme of Mining for Next Five Years

The following tables shows the annual production of mineral in tonnes, and due to no solid waste generation, no proposal to removed it.

Table 2.6: Details of Year Wise Production

Year	Production of Mineral (ROM) (In Tonnes)	Saleable Red Ochre (90%) (In Tonnes)	Mineral Waste (10%) (In Tonnes)	Production of Red Ochre (In Cu.m.)
I	299995	269996	29999	11111
II	273910	246519	27391	10145
III	258411	232570	25841	9571
IV	233798	210418	23380	4548
V	230807	207722	23080	4548
Total	**1296916**	**1167225**	**129691**	**48034**

Source: *Approved Mining Plan Letter No.* SME/UD-Cir/Mine Plan/ Pratap/F-19/18/10656, dated 20.02.2019.

2.6.5 Conceptual Plan

The detail of conceptual plan is given below in Table No. 2.7.

Table 2.7: Land Use Pattern

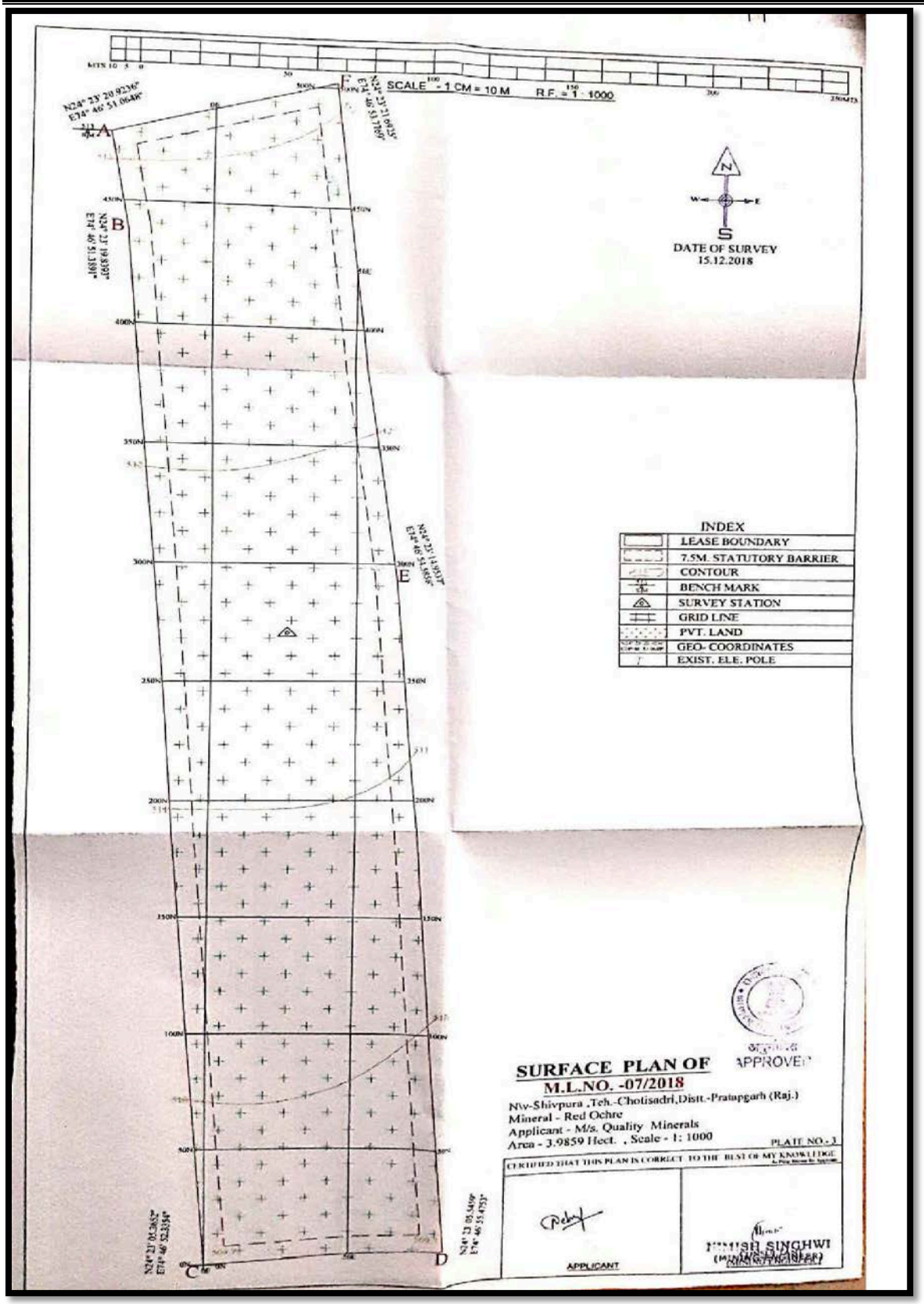
S. No.	Category	Existing Land Use Pattern	Land use After plan period	End of Life (Ha.)
1.	Pits & Quarries	-	2.9970	3.1526
2.	Top Soil Dump	-	-	-
3.	Dumps	-	0.1245	-
4.	Mineral Stack Yard	-	0.0135	-
5.	Sub Grade Stack Yard	-	-	-
6.	Infrastructure (work shop, administrative Building)	-	0.0115	-
7.	Roads	-	-	-
8.	Railway	-	-	-
9.	Green Belt	-	0.1125	0.8333
10.	Tailing Pond	-	-	-
11.	*Water Reservoir	-	-	2.7284
12.	Mineral Separation Plant	-	-	-
13.	*Backfill area	-	-	0.4242
14.	Non Utilized	3.9859	0.7269	-
	Total	**3.9859**	**3.9859**	**3.9859**

Source: Approved Mining Plan vide letter no. SME/UD-Cir/Mine Plan/Pratap/19/18/10656, dated 20.02.2019.

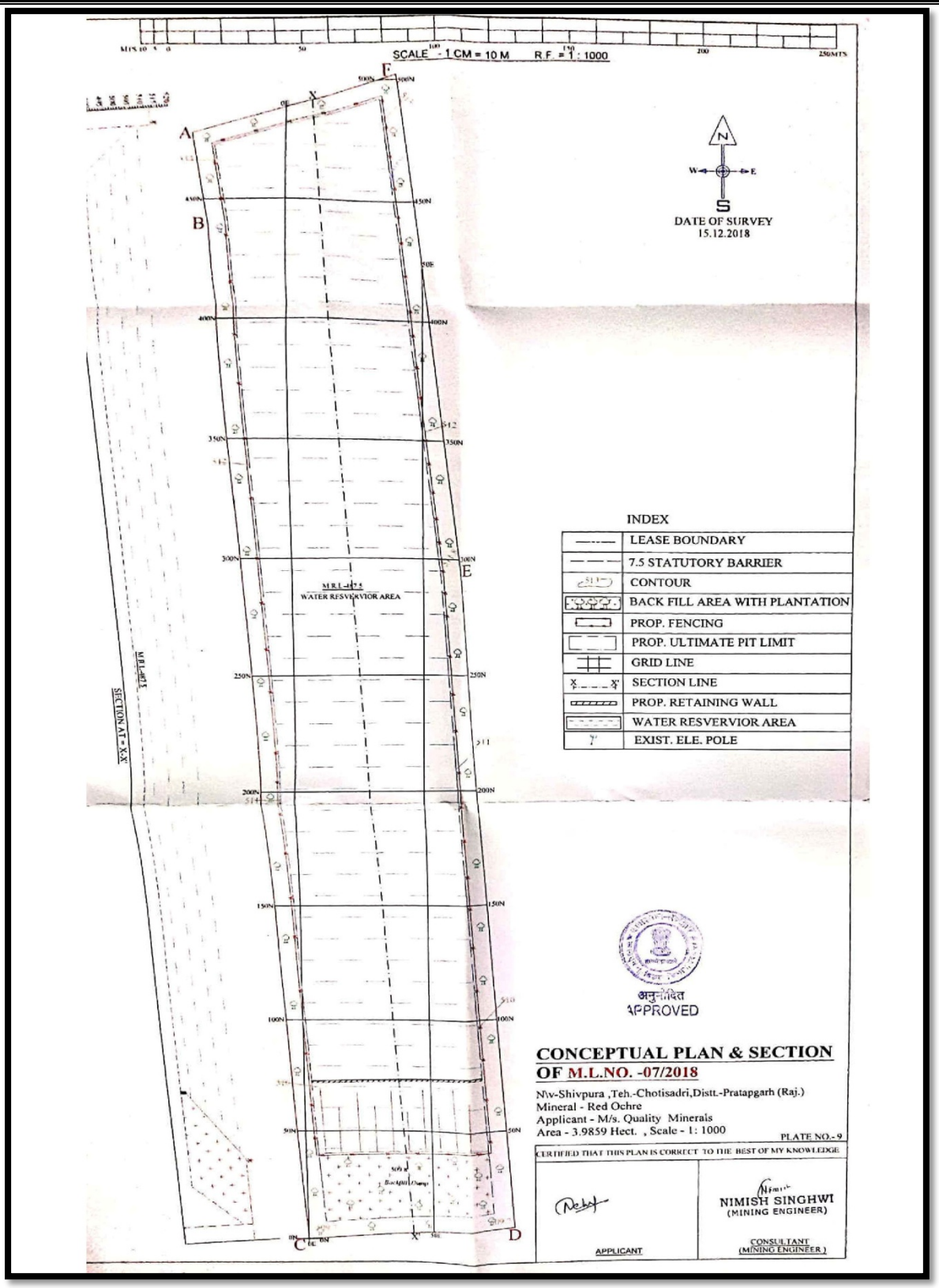
** Rows are not being calculated in the Total.*

Table 2.8: Post Mining (conceptual) Land Use Pattern of Core Zone

S. No.	Description	Inside Lease (Ha.)	Water Body	Public Use	Total Inside Lease
1.	Backfill	0.4242	-	-	0.4242
2.	Plantation	0.8333	-	-	0.8333
3.	Excavation (Voids)	-	2.7284	-	2.7284
4.	Roads	-	-	-	-
5.	Built Up Area	-	-	-	-
5.	Remaining Area	-	-	-	-
	Total	**1.2575**	**2.7284**	**-**	**3.9859**



Map No. 2.1: Surface Geological Plan & Section



MapNo. 2.2: Conceptual Plan

2.6.6 Past Production achieved

This mining project is new, hence there had been no past production had been achieved.

2.6.7 Mining Machinery/ Extent of Mechanization

The planned annual mineral Red Ochre production is 2,33,445 tonnes per annum. The average number of working days per annum will be 300. Mining will be done during day light hours only. The list of the mining machinery proposed to be used at the mine are given below:

Table 2.9: List of Machinery

S. No.	Equipments/ Machine	Nos.
i.	Hydraulic Excavator	2
ii.	Water tanker with sprinkler arrangement with tractor	1
iii.	Tippers/dumper 20 Tonner	6

Source: Approved Mining Plan vide letter no. SME/UD-Cir/Mine Plan/Pratap/19/18/10656, dated 20.02.2019.

2.6.8 Manpower Requirement

A total number of 33 persons (including supervisors and labour) to be employed at the mine. The details of mine personnel are given below:

Table 2.10: Details of Manpower

High-Skilled	Mining Engineer	1 full time	As per rule 42 of MCDR, 1988 as per rule
	Geologist	1 Part time	
	Mines Manager	1 full time	
Semi- Skilled	Mines Mate/Mines Foreman	1 full time	Per shifts
	Skilled Labours/Operators	20 full time	
	Unskilled Labours	8 full time	
Unskilled	Watchman	1 full time	

Source: Approved Mining Plan vide letter no. SME/UD-Cir/Mine Plan/Pratap/19/18/10656, dated 20.02.2019.

2.7 Plan for Conservation and Regular Monitoring of

2.7.1 Fuel Oil

High speed diesel oil will be used as fuel for powering the diesel engines coupled with excavators, tractors, tippers/trucks. These machines and their engines will be regularly maintained for optimum fuel consumption results.

The fuel oil from tankers is supplied to machines in the field while fuelling the machines, care will be taken to avoid spillage.

The working hours, output given and the fuel consumed by each machines will be entered in a system and fuel consumption per hour/ per tonnes of rock handled/output given by each machines will be computed for every day/ every week/ every month. These figures will be compared with the standards derived earlier and corrective actions will be taken, wherever needed, to bring the fuel consumption figures to optimum/ pre derived standard levels.

Daily average consumption of HSD will be below 500 litre. The HSD will be procured from the nearest HSD dispensing pumps and stored maximum 2500 litres drums and kept in warehouse near the mine office.

2.7.2 Explosives

The mineral is soft in nature excavated will be done by excavator & JCB, hence there will be no requirement of drilling & blasting. Since there will be no provision to store explosives.

2.7.3 Description of mitigation measures incorporated into the project to meet environmental standards

2.7.3.1 Details of Environmental Sensitivity

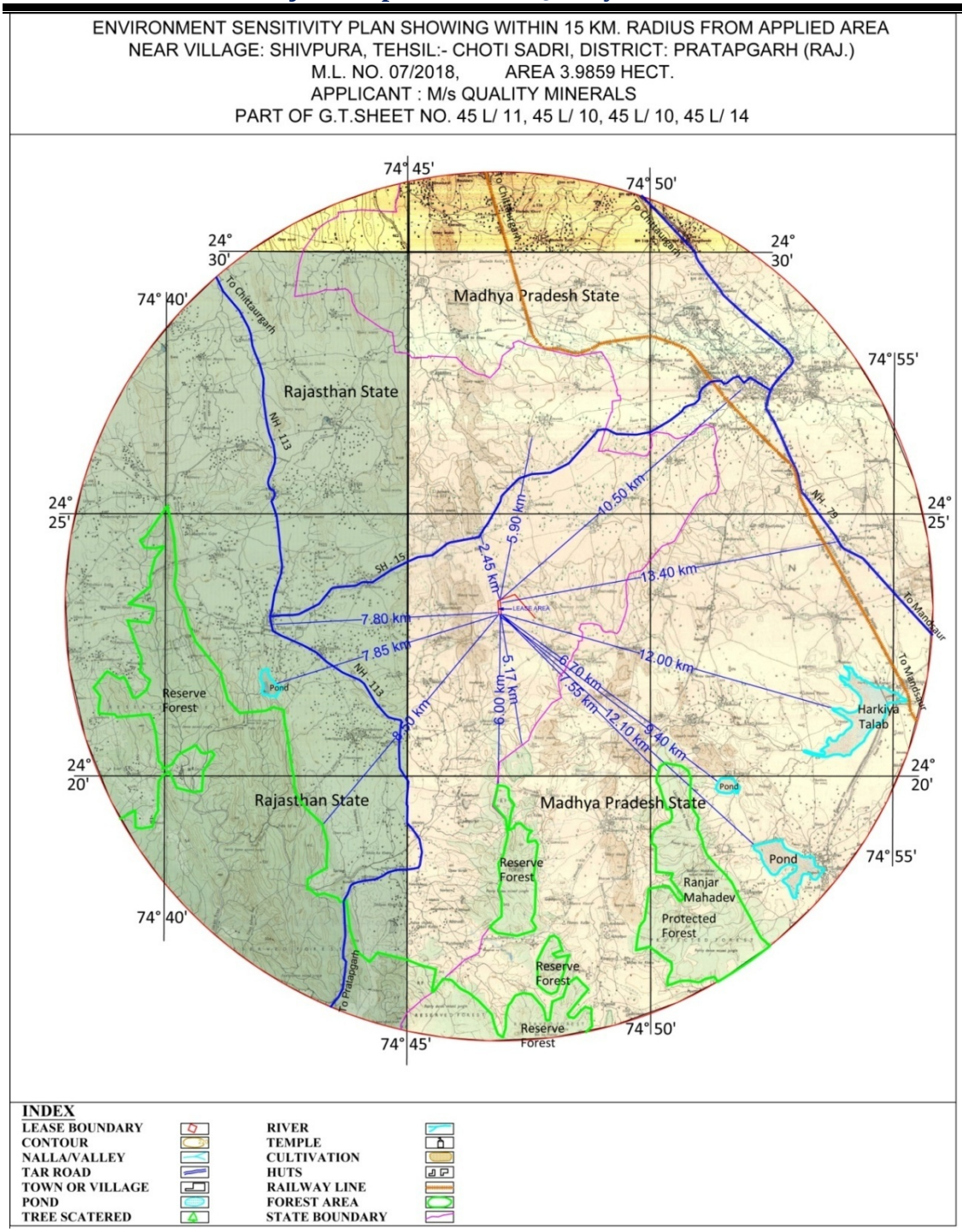
The details of environmental sensitivity in tabular form and the map (Map-2.4) are furnished below:

Table 2.11: Details of Environmental Sensitivity (within buffer zone)

S. No.	Areas	Name/ Identity	Aerial distance (within 15 km.) Proposed project location boundary
1.	Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value	**No**	***None***
2.	Areas which are important or sensitive for ecological reasons – Wetlands, water courses or other water bodies, coastal zone, biospheres, mountains, forests	**Water courses**	
		Harkiya Nalla	6.70 Km. (S.E.)
		Nalla	2.40 Km. (W.)
		water bodies	
		Sandi Khera Pond	0.80 Km. (S.W.)
		Khermaliya Pond	2.36 Km. (E.)
		Chhotisadri Pond	7.85 Km. (S.W.)
		Kesunda Pond	5.90 Km. (N.)
		Jiran Pond	12.10 Km. (S.E.)
		Gwal Pond	9.40 Km. (S.E.)
		Harkiyakhal Reservoir	12.00 Km. (S.E.)
		Forest	
		Protected forest	7.55 Km. (S.E.)
		Reserved forest	8.50 Km. (S.W.)
		Reserved forest	5.17 Km. (S.)
		Reserved forest	6.00 Km. (S.)
3.	Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over	**No**	***Not applicable***

	wintering, migration		
4.	Inland, coastal, marine or underground waters	**Water courses** Harkiya Nalla Nalla **water bodies** Sandi Khera Pond Khermaliya Pond Chhotisadri Pond Kesunda Pond Jiran Pond Gwal Pond HarkiyakhalReservoir	 6.70 Km. (S.E.) 2.40 Km. (W.) 0.80 Km. (S.W.) 2.36 Km. (E.) 7.85 Km. (S.W.) 5.90 Km. (N.) 12.10 Km. (S.E.) 9.40 Km. (S.E.) 12.00 Km. (S.E.)
5.	State, National boundaries	**No**	**NA**
6.	Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas	NH-79 (Neemuch to Mandsour) SH-15 (Neemuch to Chhoti Sadri) Wastern Railway Khandwa Ratlam Ajmer Section (Neemuch to Mandsour)	13.40 Km. (E.) 2.45 Km. (N.) 2.40 Km. (S.E.)
7.	Defense installations	**No**	***None***
8.	Densely populated or built-up area	Neemuch Chhoti Sadri	10.50Km. (N.E.) 7.80 Km. (W.)
9.	Areas occupied by sensitive man-made land uses *(hospital, schools, places of worship, community facilities)*	Neemuch Chhoti Sadri Shivpura	10.50Km. (N.E.) 7.80 Km. (W.) 0.54 Km. (N.)
10.	Area containing important, high quality or scarce	**Water courses** Harkiya Nalla	 6.70 Km. (S.E.)

	resources(*ground water resources, surface resources, forestry, agriculture, fisheries, tourism, minerals)*	Nalla **water bodies** Sandi Khera Pond Khermaliya Pond Chhotisadri Pond Kesunda Pond Jiran Pond Gwal Pond Harkiyakhal Reservoir **Forest** Protected forest Reserved forest Reserved forest Reserved forest	2.40 Km. (W.) 0.80 Km. (S.W.) 2.36 Km. (E.) 7.85 Km. (S.W.) 5.90 Km. (N.) 12.10 Km. (S.E.) 9.40 Km. (S.E.) 12.00 Km. (S.E.) 7.55 Km. (S.E.) 8.50 Km. (S.W.) 5.17 Km. (S.) 6.00 Km. (S.)
11.	Areas already subjected to pollution or environmental damage. (*those where existing legal environmental standards are exceeded)*	**No**	***Not applicable***
12.	Area susceptible to natural hazard which could cause the project to present environmental problems *(earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions)*	**No**	***Not applicable***



Map 2.3: Showing the Details of Environmental Sensitivity

Source: Geological Survey of India Toposheet No. 45L/15.

Photograph 2.3: Showing the ShivpuraRed Ochre mine site

2.8 Assessment of New & Untested technology for the risk of technological failure

2.8.1 Not applicable to this mining project.

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Chapter -3

Description of the Environment

3.1 Study area, Period, Components & Methodology

Introduction

This chapter illustrates the description of existing environmental status of study area with reference to the prominent environmental attributes. Under this chapter the details of the baseline data of the Environmental attributes within the study area.

The existing environmental sensitivity is considered to adjudge the baseline environmental conditions, which are described with respect to climate, hydro-geological aspects, atmospheric conditions, water quality, soil quality, vegetation pattern, ecology, socio-economic profiles of people, land use. The objective of this section is to define the present environmental status which would help in assessing the environmental impacts due to the expansion of mines.

3.1.1 Study Area & Monitoring Period

The study area comprises the core zone admeasuring 3.9859 Ha., (lease area) and the area lying within a distance of 10 Km around the periphery of the lease area (Buffer zone).

The baseline data collected in respect of Climate (Atmospheric conditions), Land use, Soil Quality, Hydrology, Hydro-geological aspects, Water quality (Surface and Ground water), Ecology & Biodiversity, Air quality, Noise level, Traffic density and Socio-economic aspects have been furnished in the Chapter.

The baseline data were collected during winter season the period October, 2019 to December, 2019. The secondary data was collected from Government Agencies. The details of Environmental parameters along with frequency of monitoring are given in table 3.1.

A map showing the core zone, the buffer zone, the location of various monitoring station (Air/Water/ Noise/Soil, Habitats etc.) has been furnished.

Monitoring has been carried out as per CPCB/ MoEF&CC guidelines. The analysis of the collected samples has been analyzed through NABL accredited Laboratory Namely Apex Enviro Laboratory, Udaipur.

Table 3.1: Frequency of Monitoring and Environmental Attributes

S. No.	Environmental Component	Sampling Locations	SamplingParameters	TotalSamplingPeriod	SamplingFrequency	Methodology
1.	Meteorology	One central location	Temperature Wind speed, Wind direction,Rainfall,Relative Humidity	3 Months	Hourly	The meteorological parameters were recorded using automatic micro-meteorological equipment. Review of secondary data collected from IMD station at Dabok.
2.	Ambient Air Quality	6 locations	As per NAAQS 2009	Two days per week for three months	24 hrs.	Gravimetric method for PM_{10}, (BIS 5182 Part 23 2006), As per CPCB Guidelines for $PM_{2.5}$, West & Gaeke method for SO_2 (BIS 5182 Part 2-2001) using TCM 0.01 absorbing solution, Jacob & Hochheiser modified (BIS 5182 Part 6- 2006) for NO_x using sodium arsenate absorbing solution of 0.01 N absorbing solution.
3.	Land Use	Total study area	land use for different categories	-	Once during study period based on secondary data	Through field visit and secondary information like satellite imagery data sources like National Information center.
4.	Soil	8 locations	The following Physico-chemical parameters of the core zone and buffer zone soil samples were studied.	Composite sample	Once during study period	Analysis was carried out by Apex Enviro Lab, by adopting the following methods:
			i. Color			By visual observation
			ii. pH			IS:2720(P-26)1987 RA2002
			iii. Calcium as $CaCO_3$(%)			IS:2720 (P-23)1976RA2006

S. No.	Environmental Component	Sampling Locations	SamplingParameters		TotalSamplingPeriod	SamplingFrequency	Methodology
			iv.	Water soluble Nitrate as NO_3(%)			Method Manual Soil Testing in India, Govt of India.
			v.	AvailablePhosphorus as P (%)			Method Manual Soil Testing in India, Govt of India.
			vi.	AvailableSodium as Na (%)			Method Manual Soil Testing in India, Govt of India.
			vii.	AvalablePotassium as K(%)			Method Manual Soil Testing in India, Govt of India.
			viii.	Conductivity (µmho/cm)			IS:14767:2000
			ix.	Sulphate as SO_4 (%)			IS:2720(P-27)1977
			x.	Organic Carbon (%)			IS:2720(P-XXII)1972RA2010
			xi.	Organic Matter (%)			IS:2720(P-XXII)1972RA2010
5.	Water Quality	8 ground &2 surface water quality	As per IS:10500-2012 and IS: 2296-1981		Grab sampling	Once during study period	As per Bureau of Indian standard (BIS). The parameters were analyzed at Apex Enviro Laboratory at Udaipur.
6.	Hydrogeology (Surface & ground)	Total study area	Drainage pattern, nature of streams, aquifer characteristics, recharge and discharge areas		-	-	Secondary information sources like (Geological survey of India and Central Ground Water Board)
7.	Traffic Density	-	PCU		24 h.	Once during study period	-
8.	Noise	6 locations	Leq		24 h. composite	Once during study period	Integrated on hourly basis (IS -9989-1981-RA-2001)
9.	Demography and Socio-economic	Total Study area	Demographic profile			Once in study period.	Through field visits and secondary information sources.

S. No.	Environmental Component	Sampling Locations	SamplingParameters		TotalSamplingPeriod	SamplingFrequency	Methodology
	aspects						
10.	Ecology and Biodiversity	Within 10 Km radius around the Mining Lease	Flora and Fauna The following parameters were studied:		Bio - diversity survey	Once in study period.	A study was carried out by undertaking field visit, collecting necessary data from the relevant sources and interacting with local People.
			i.	Phytosociological study			Phytosociology pioneered by Braun Blanquet (1932) and Dieter Muller-Dombois and Ellenberg (1974).
			ii.	Floristic Studies			By Flora
			iii.	Cropping Pattern			By visual observation
			iv.	Fauna			By visual observation and Published data.

3.1.2 Base Line Components

3.1.A Land Environment

Since mining is essentially an excavation of mineral the land environment is greatly affected by it, especially in the case of opencast mines, effect on the surface land.

A.1 Land Use/ Land cover studies

Land use involves the management and modification of natural environment or wilderness into built environment such as fields, pastures, and settlements. It has also been defined as "the arrangements, activities and inputs people undertake in a certain land cover type to produce, change or maintain it."

The existing land use/ land cover pattern in the study area of Buffer zone (10 km. radius) has been studied.

For the purpose of ascertaining the land use/land cover pattern of the study area (core zone and buffer zone) the census Hand Books of Pratapgarh District (Year 2011) was referred and the secondary data related to the land use/land cover was collected. The final land use/land cover pattern has been prepared after verifying the secondary data with primary data. After studying the final land use/land cover pattern the likely impact of mining of the land use/land cover was forecast.

Studies on land use aspects of eco-system play an important role in identifying sensitive issues and taking appropriate actions by maintaining 'Ecological Homeostatic' for development of the region.

A.2 Objectives

The objectives of land use studies are:

- √ To determine the existing land use pattern in the study area;
- √ To analyze the impacts on land use in the study area; and
- √ To give recommendations for optimizing the future land use pattern *vis-a-vis* existing project in the study area and its associated impacts.

A.3 Methodology

The land use pattern within 10 km radius area around the lease area has been studied by analyzing the available secondary data published in the District Census Book of Pratapgarh District. The data was collected from various sources like District Census hand book, Revenue records, state and central government offices and survey of India toposheets and also through primary field surveys.

The land use is classified into four types – viz. hills & hilly forests, area under cultivation, culturable waste land and the area not available for cultivation. The land under cultivation is further sub-divided into two types viz. irrigated and un-irrigated.

The study area has been divided into three zones viz. Zone-I, Zone-II and Zone-III respectively. The details of the zones are given in the Table 3.2.

Table 3.2: Details of Zones

Study Area	Zones Considered for the Study
0-3 km	Zone-I
3-7 km	Zone-II
7-10 km	Zone-III

A.4 Methodology Land Use in study area based on District Handbook

The study area falls in Chhoti Sadri Tehsil covering about 54 villages within buffer zone. In order to establish the land use pattern of the study area, the total geographical area of each settlement has been considered though many villages located in the peripheries of the study area have been covered partially. These geographical areas were studied to know the land use pattern and the same is given in Table no. 3.3, and the village wise land use pattern is presented as annexed.

The study area covers 31415 Hectare within the circle encompassed by 10 km. radius around the boundary of existing mine lease, which is considered as the center of the study area.

The geographical area of all settlements is taken into consideration though several villages are covered partially within the circle (at the periphery) encompassed by 10 km. radius around the existing mine site. Delineation of land uses for partially covered parts is not possible; hence the entire village area is considered for the study of land use.

Table 3.3: Land use pattern of (Secondary Data) Buffer Zone

(Area in Ha.)

Study area (radius km)	Geographical Area	Forest	Land Under Cultivation		Culturable waste land	Area not available for Cultivation
			Irrigated by Source	Un irrigated		
0-3	3263.2	0 (0.00%)	524 (16.05%)	637 (19.52%)	1293 (39.62%)	876.2 (26.85%)
3-7	9874.6	00 (0.00%)	3065 (31.03%)	2588 (26.20%)	2429.4 (26.60%)	2065.2 (20.91%)
7-10	18277.2	1455 (7.96%)	3830 (20.95%)	4095 (22.40%)	4726 (25.85%)	3831.2 (20.96%)

Source: District Primary Census Hands Books Pratapgarh District, Year 2011

- **Forestland:** The area of forest is spreading over 1455.00 Ha., and works out to about 4.63% of the land in the study area of 10 km radius from mining lease boundary.
- **Land under cultivation:** Altogether 14739.00 Ha., of land is used for cultivation mostly under the rain-fed conditions. The total land put to agriculture works out to about 46.91% of the land portion of the study area. The un-irrigated and irrigated land works out to about 23.30% and 23.61%of the land portion of the study area respectively.
- **Culturable Waste Land:** This category of land includes mainly cultivable land, which has not been brought under cultivation at any time. The area under this category works out to about 8448.4 ha. i.e. 26.89% of the total land in the study area.
- **Land not available for Cultivation:** All the remaining lands, which not included in the above categories of lands are considered in the category of land not available for cultivation. This category of land use mainly consists of the hilly and barren lands, human settlements, roads, water-bodies, etc. About 6772.60 Ha., of area working out to about 21.55% of the land portion of the study area falls in this category.

A.5 Land use / Land cover Study from Geographical Toposheet

A.5.1 Methodology

For ascertain the land use pertain survey of India the satellite image and top sheets 45L/11, 45L/15were taken in account. The detail of the area of the land under various use are given below in a tabular form.

Table 3.4: Land Use / Land Cover Pattern (Primary Data)

S. No.	Particulars of Land use	Area inSq. Km.	Area (%)
1.	Forest Land		
	(a) Reserved Forest	**10.8**	**34.37**
	(b) Open Forest	**4.61**	**1.46**
2.	Land Under Cultivation		
	(a) Irrigated land	**75.45**	**24.01**
	(b) Un irrigated land	**72.97**	**23.22**
3.	Cultivable waste land	**84.63**	**26.93**
4.	Area not available for cultivation	**65.69**	**20.91**
Total Area		**314.15**	**100**

A.6 Software's used

A. Coral Draw for image processing/digitization /rectification/classification/geo-coding.

B. Auto CAD for data preparation after visual interpretation of the image.

C. Global Mapper for image processing /rectification/ geo-coding/ data preparation.

A.7 Final Output

In the revealing map, the land use has been depicted with the help of different color code. The following observation in 10km. radius of the study area–

a. Agricultural land with single and doubal crops is the predominant class in the study area.

b. Nearest human settlement is Shivpura village. At distance of 0.54 Km.in (N-E) is present in the study area.

c. Ground water and Surface water major source of water in the study area.

d. Some open forest and Resveded forest available in the study area.

e. There are many stream channels which divided in water shade and they finally join the Zakam River.

f. Harkiya Nalla river 6.70 km. (SE) is present in the study area.

g. The study area has Stony waste and Open Scrub mixed area. Within 500 radial/aerial distance from mining less area,

h. Within the study area (Buffer zone) covering on area of 10 km. radius distance from the mine less area, the surface features, water bodies, villages, communication corridors etc.

A.8 Drainage Pattern

(A) Buffer Zone:

There are no prominent surface water bodies in the core as well the buffer zone area, except 10 village ponds and small anicuts. Surface runoff generated during monsoon period through the streamlets and local nallahs dries soon after the monsoon spell.

The drainage pattern is sub-dendritic to dendritic. The drainage joins river Jakam River which is passes the outside the study area.

(B) Core Zone:

The lease area is situated of the all flattest land. The slop of the lease area is NE to SW.There are 2 watersheds in the study area. 1 North West to South East and 2 North East to South West. In the first water shed are Develop the 1st order nallas in the rainy season in the study area and flows SE direction. the 1st order nallas has been create a 2nd order nalla and this is name Harkiya Nalla, this nalla finally join Harkiyakalan Reservoir at a distance of approximately 8.00 Km. in the SE direction. the Harkiyakalan Reservoir after overflow they have beenjoin the Retam River which is passes the outside of the study area.

Similarly, the second water shed are Develop the 1st order nallas in the rainy season in the lease hold and flows SW direction. The 1st order nallas has been creating a 2nd order nalla and this nalla finally join the Zakham River which is passes the outside of the study area.

A.9 Land use/Land cover Classification System

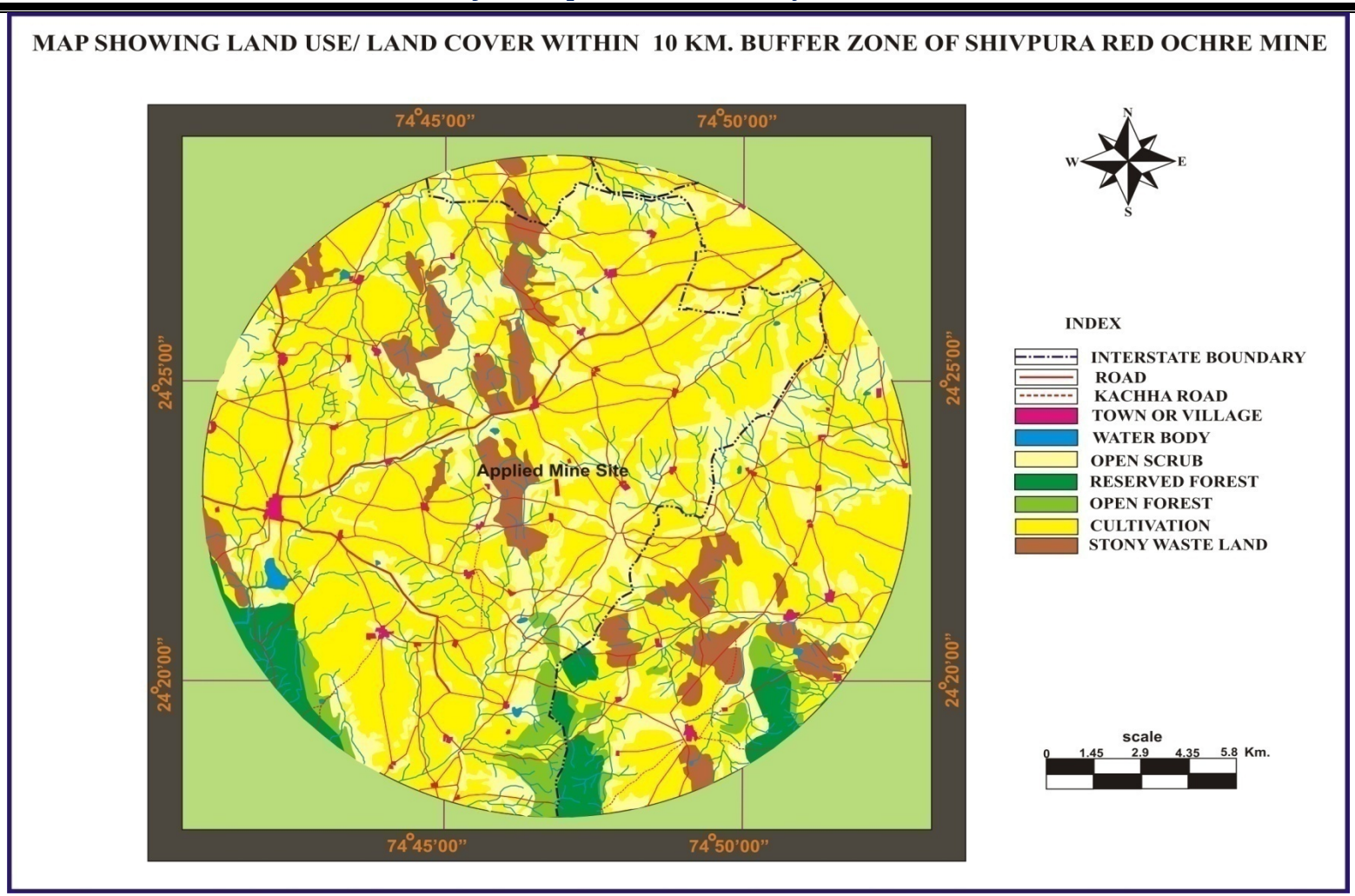
A land use classification is a classification providing information on land cover, and the types of human activity involved in land use. It may also facilitate the assessment of environmental impacts, and potential or alternative uses of land.

Table 3.5: Land use/ Land cover Classification System

S. No.	Level-1	Level-2
1.	Built up land	Town/cities/villages
2.	Agriculture land	Crop land
		Plantations
3.	Forest	Protected forest
		Reserved forest/ forest
		Plantation
4.	Waste land	Rocky/ stony waste land with/ without
		Scrubs/Follow land
5.	Water Bodies	River/stream/Reservoir tanks
6.	Others	Mining area

Table 3.6: Land use / Land cover breakup classification system of the study area

S. No.	Land use	Area (in km2)	Percentage (%)
1.	Built up land		
(A)	Settlements	**18.57**	**5.91**
2.	Forest		
(A)	Protected forest	**10.8**	**3.43**
(B)	Open forest	**4.61**	**1.46**
3.	Agricultural land		
(A)	Irrigated agricultural land	**75.45**	**24.01**
(B)	Un-irrigated agricultural land	**72.97**	**23.22**
4.	Waste land		
(A)	Land with open scrub	**65.86**	**20.96**
(B)	Stony waste	**33.64**	**10.70**
5.	Water Body	**29.12**	**9.26**
6.	Other mining area	**3.13**	**0.99**



Map 3.1: Showing Land Use/ Land Cover Pattern of the Buffer Zone

A.10 Observations

- **Built up land:** Total built up land comprises about 1857 Ha., of area which are about 5.91% of the study area.
- **Forest land:** Forest land comprises of 1541 Ha., of area which is about 4.90% of the total study area.
- **Agriculture land:** Agriculture land comprises of 14842 Ha., of area, which is about 47.24% of the total study area.
- **Waste land:** Total waste land of the study area is about 13175 Ha., of area which constitutes to 41.93 % of the study area.
- **Water bodies:** The total area of water bodies is about 2912 Ha., of area which is about 9.26% of the study area. This water bodies also include rivers/streams and pond.

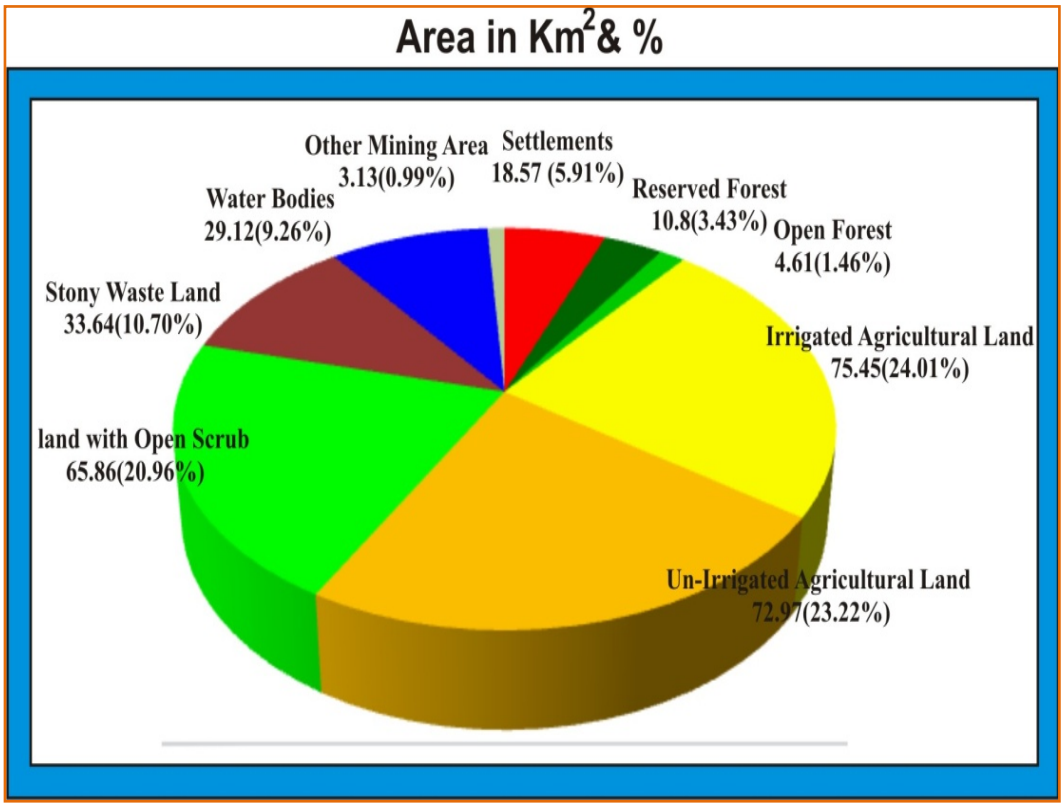


Figure 3.1: Pie diagram showing Land use / Land cover breakup classification system of the study area

A.10 Inference

The area of mining lease is 3.9859Ha. The lease area is situated all flattest land having little top soil. The mining lease area is a part of Private land.Presently mine is fresh. The maximum contour of the M.L. area is 513mRL which lies in central part of mining lease area, the lease area gentle slope of the SW direction.

Existing land use pattern:

It is a new mine. The total lease area is 3.9859 Hectares.

During Plan (5 years) period land use pattern

Out of the total lease area of 3.9859 Hect., 2.997 Hect. of area will bepartly excavated in the plan periodand 0.1245 Ha. area covered under waste dump. An area of 0.0115 Ha., will be covered under infrastructure. An area of 0.0135 Ha., will be covered under mineral stack and plantation will be planted over an area of 0.1125 Ha. During the plan period mining operation will be up to a depth of 18 meters from the surface. (i.e. 506 mRL to 488 mRL).

Conceptual land use pattern:

Out of the total lease area of 3.9859 Ha., about an area of 3.1526 Ha., will beexcavated in the course of mining. And about 0.4242 Ha., of excavated portionwill bea backfilling and about 0.8333 Ha, of area will be covered under plantation and remaining 2.7284 Ha., of excavated portionwill be used of storage of rain water.

Buffer zone:

The road constructed by the proponent outside the lease hold for connecting the mine. To the mine road will used by the local people after closer of mine. As far as buffer zone is concerned, no land degradation will take place therein as a result of mining.

The total area of the buffer zone (10 Km. around the lease hold) is 31415 Ha. Although some undulations are there, the major part of buffer zone is hilly area having forest and open scrubs. The drainage pattern is mostly Ist and IInd orders the natural drainage.The drainage pattern is sub-dendritic to dendritic.

There are Urban, Sami urban, rural and Tribal areas also within the buffer zone. In addition, there is a state highway etc. situated within the buffer zone. The buffer zone that is 4.89% is covered by two types of forest-

1. Protectedforest over 3.43%.

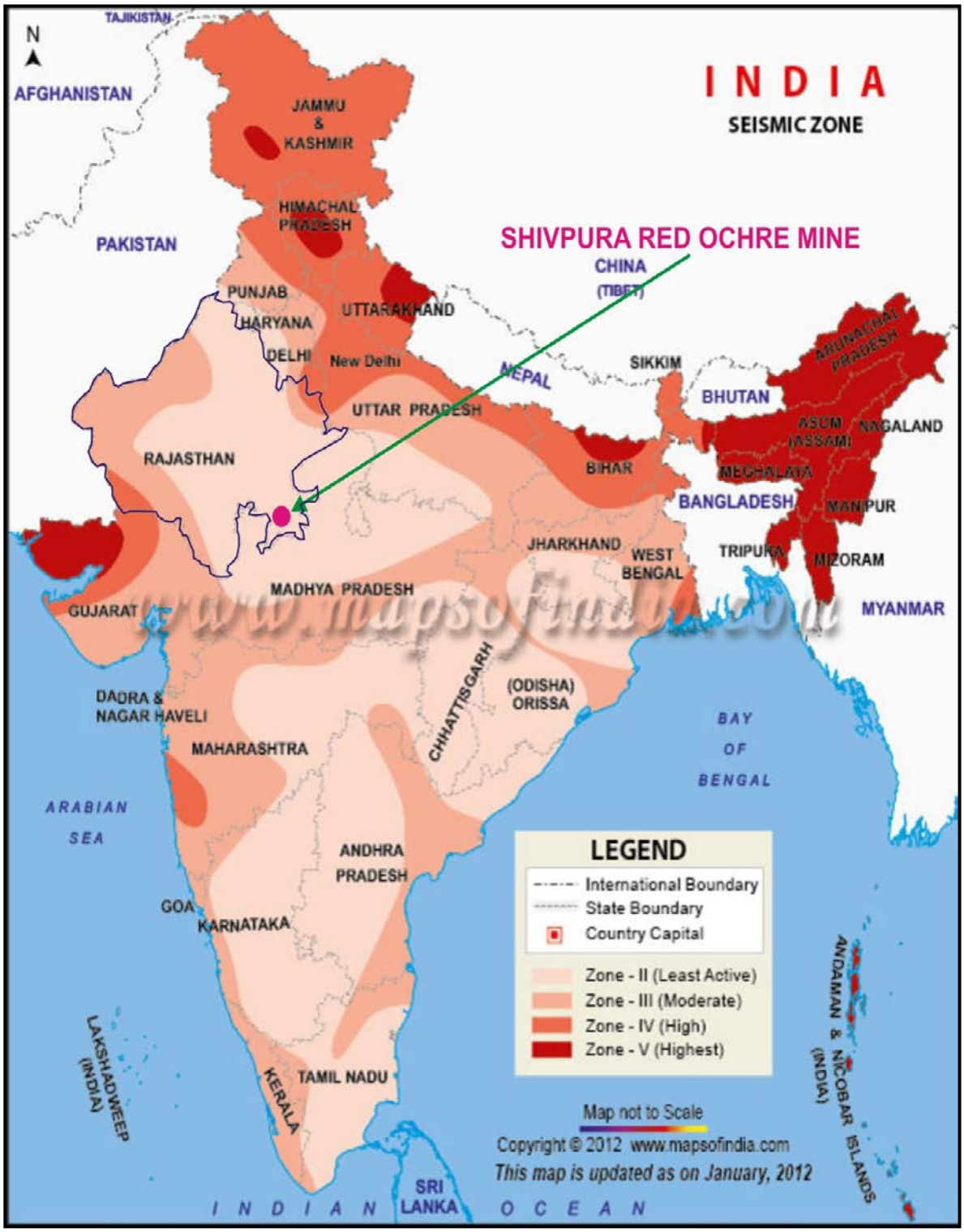
2. Open forest over 1.46% and 95.11% the remaining area covered by water bodies, Canals, open scrubs, agricultures fields, and waste land.

A.11 Seismicity of the Area

Many parts of the Indian Subcontinent have historically high Seismicity. Seven catastrophic earth quakes of magnitude greater than 8 (Richter scale) have occurred in the western, northern and eastern parts of India and adjacent countries in the past 100 years.

By contrast, peninsular India is relatively less seismic, having suffered only infrequent earthquakes of moderate strength. The main seismogenic belts are associated with the collision plate boundary between the Indian and Eurasian plates.

The mine site as well as study area lies in Zone –II of Seismic Zoning Map, and thus can be said to be located in an area of low seismic hazard by national standards. Hence the risk of earthquake at the site is minimal and so the site is safe. (Map 3.2).



Map 3.2: Showing Seismic Zones

3.1.B Soil Environment

Soil is the "skin of the earth". It is a complex mixture of minerals, water, air, organic matters and countless organisms/ microbes, the decaying remains of once living things.

It is essential to determine the potential of soil in the area and identify the impacts which may arise due to the mining. Accordingly, a study of assessment of the baseline soil quality has been carried out.

The present study of the soil quality establishes the baseline characteristics and this will help in future in identifying the incremental concentrations if any, due to the operation of the mine. The sampling locations have been identified with the following objectives:

(i) To determine the baseline soil characteristics of the study area.

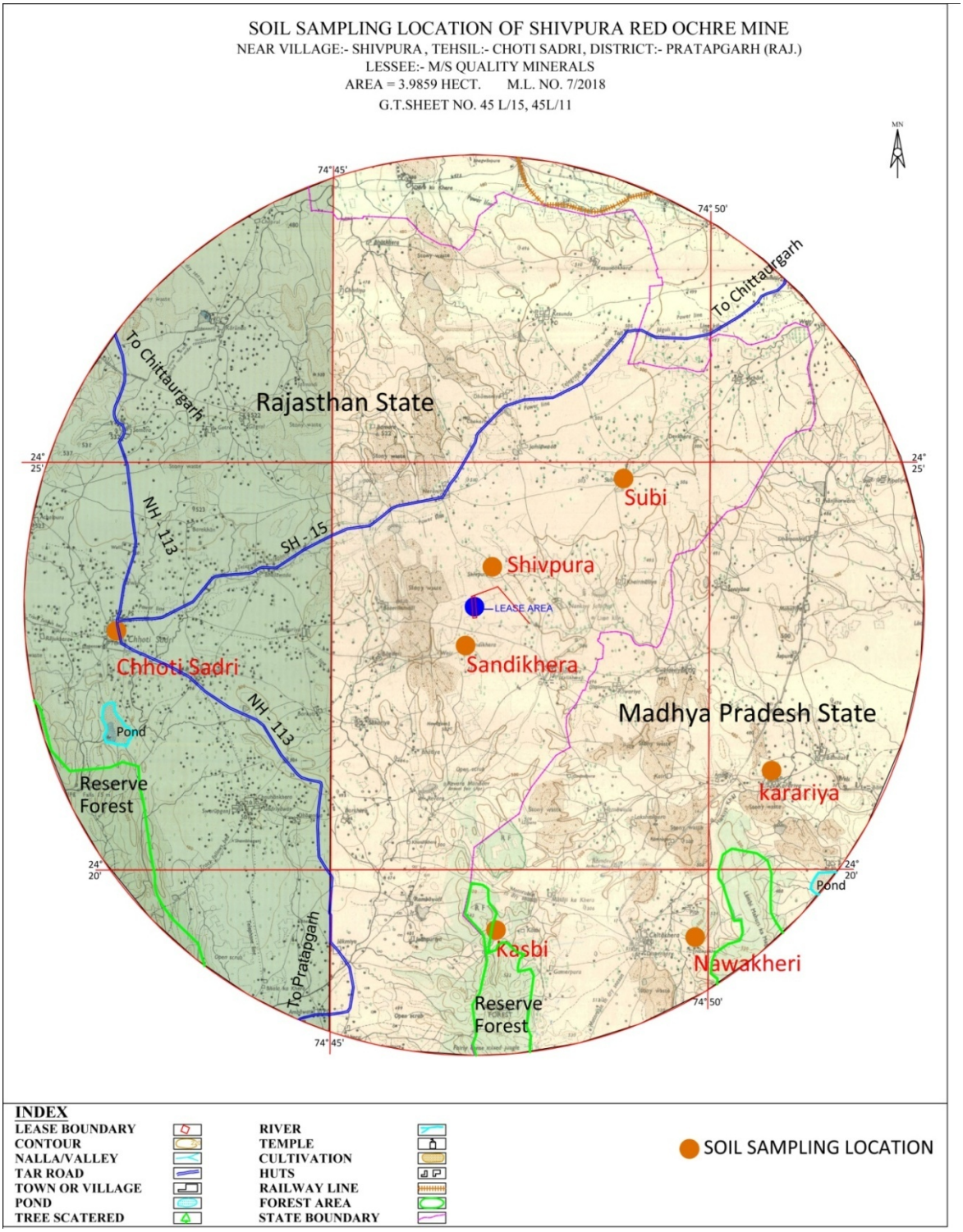
(ii) To determine the impact of proposed activity on soil characteristics and suggestion of mitigation measures;

B.1 Criteria Adopted for Selection of Sampling Locations

For studying the soil types and soil characteristics, 6 sampling locations were selected to assess the existing soil conditions representing various land use conditions and geological features.

B.2 Soil sampling locations and Methodology

Eleven locations (One sample from core zone and 7 samples from buffer zone) were selected for soil sampling and analysis in the study area. At each location, samples were collected with an auger from three different depths viz. 30 cm, 60 cm and 90 cm below the surface and the same were mixed and homogenized. The samples were taken, packed in bags and sealed. The samples were analyzed for chemical characteristics. These samples were analyzed as per the established scientific methods for chemical parameters. Photograph 3.1 Shows that soil sample was taken at Shivpura villageand this sampling point is located in agriculture land. It is situated near cultivated area. The details of the sampling locations (Table-3.7 and Map-3.4) and soil quality are given in Table 3.8.



Map 3.3: Showing the Soil Sampling Locations

Source: Geological Survey of India Toposheet No. 45L/15.

Table 3.7: Details of Soil Sampling Locations

Station Code	Name of the Station	Distance from the Core Zone (Km.)	Direction from the Core zone (Km.)	Location		Criteria of Selection
				Latitude (N)	Longitude (E)	
S1	Core Zone [proposed mine site]	-	-	24º23'13.36"	74º46'53.53"	Proposed lease area is a piece of private waste land.
S2	Chhoti Sadri	8.00 Km.	West	24º22'55.80"	74º42'04.47"	The point is situated on a piece of agricultural land.
S3	Subi	4.50 Km.	East	24º24'47.62"	74º48'50.81"	The point has been selected on a piece of agricultural land.
S4	Nawakheri	8.70 Km.	South-East	24º19'05.20"	74º49'47.62"	The point has been selected on a piece of agricultural land.
S5	Kasbi	7.00 Km.	South-East	24º19'17.43"	74º47'30.90"	This point is located over a piece of Reserve forest.
S6	Sandikhera	0.66 Km.	West	24º22'44.85"	74º46'46.43"	This point is located over a piece of agricultural land.
S7	Karariya	7.40 Km.	South-East	24º21'12.96"	74º50'48.32"	The point has been selected on a piece of agricultural land.
S8	Shivpura	0.74 Km.	North-East	24º23'42.67"	74º46'07.67"	This point is located over a piece of agricultural land.

Table 3.8: Soil Analysis Results

S. No.	Parameter	Core Zone [Mine Site] S1	Chhoti Sadri S2	Subi S3	Nawa Kheri S4	Kasbi S5	Sandi Khera S6	Karariya S7	Shivpura S8
1.	Color	Brown	Brown	Brown	Dark Brown	Dark Brown	Brown	Brown	Brown
2.	pH	6.80	7.10	7.85	7.67	7.70	7.60	7.75	7.68
3.	Calcium as $CaCO_3$(%)	4.0	12.0	14.5	12.5	6.00	4.00	10.5	4.00
4.	Nitrate as NO_3 (%)	0.0007	0.0040	0.0020	0.0020	0.0017	0.0022	0.0015	0.0015
	NO_3-N (mg Kg^{-1})	1.58	9.03	4.51	4.51	3.83	4.96	3.38	3.38
5.	Available Phosphorus as P (%)	0.0008	0.0003	0.0008	0.0009	0.0019	0.0008	0.0008	0.0005
	Available Phosphorus (Kg/Ha)	17.92	6.72	17.92	20.16	42.56	17.92	17.92	11.20
6.	Available Sodium as Na (%)	0.0105	0.0140	0.0220	0.0250	0.0250	0.0205	0.0210	0.0200
7.	Available Potassium as K(%)	0.0066	0.0080	0.0360	0.0280	0.0188	0.0156	0.0138	0.0130
	Available Potassium (Kg/Ha)	147.84	179.20	806.40	627.20	421.12	349.44	309.12	291.20
8.	Conductivity (µs/cm)	508	642	562	1235	798	529	567	543
9.	Conductivity (mho/cm)	0.508	0.642	0.562	1.235	0.798	0.529	0.567	0.543
	Total Soluble Sulphate as SO_4 (%)	0.0040	0.0064	0.0080	0.0278	0.0229	0.0111	0.0080	0.0069
	Sulphate as SO_4(mg kg^{-1})	40	64	80	278	229	111	80	69
10.	Organic Carbon (%)	0.93	0.79	1.34	1.76	1.53	1.18	1.11	0.91
11.	Organic Matter	1.60	1.36	2.31	3.03	2.64	2.03	1.91	1.57

The copy of original test reports is attached as annexure-7A-7B.

Table 3.9: Rating Chart for Soil Test Values

S. No.	Parameters	Classification	Reference
1.	pH	<4.5 extremely acidic 4.51 - 5.0 very strong acidic 5.01 - 5.5 strongly acidic 5.51-6.0 moderately acidic 6.1 - 6.5 slightly acidic 6.51 - 7.3 neutral 7.31 - 7.8 slightly alkaline 7.81 - 8.5 moderately alkaline 8.51 - 9.0 strongly alkaline >9.0- very strongly alkaline	Handbook of Agriculture, Indian Council of Agriculture Research, New Delhi.
2.	Nitrate-Nitrogen (NO_3-N) (mg Kg^{-1})	<10- low 10-20 –medium 20-30-high >30-excessive	Marx, E.S.,Hart, J.and Stevens, R.G. 1999.Soil Test Interpretation Guide. EC 1478.
3.	Available-Phosphorus (Kg/Ha)	<10- low 10-24.6 –medium >24.6 –high	Methods Manual-Soil Testing in India", Department of Agriculture & Cooperation Ministry of Agriculture Government of India 2011.
4.	Available Potassium (Kg/Ha)	<108- low 108-280 –medium >280 –high	Methods Manual-Soil Testing in India", Department of Agriculture & Cooperation Ministry of Agriculture Government of India 2011.
5.	Soil Electrical Conductivity (mho/cm) 1mho/cm =1000µs/cm)	Up to 1.0 average 1-2 harmful to germination 2-3 harmful to crops	Handbook of Agriculture, Indian Council of Agriculture Research, New Delhi.
6.	Sulphate as SO_4 (mg Kg^{-1})	<10- low >10 -15–medium above15-high	Rating chart for NPK after soil testing. www.satsawb.org/Consultancy/ Soil_Testing/Rating_chart.doc.
7.	Soil organic carbon (%)	< 0.50- low 0.50-0.75-medium > 0.75- high	Pathak, H.2010 Trend of fertility status of Indian soils. *Current Advances in Agricultural Sciences* 2(1): 10-12.

B.3 Nutrient Index

To evaluate the soil fertility status in the core zone and the buffer zone, nutrient index with respect to NO_3^-N, available Phosphors (P), available Potassium (K) and organic carbon were calculated based on the rating chart (Table 3.9). Table 3.9 represent the rating chart followed to the soil analysis results and criteria to calculate nutrient index, respectively.

The nutrient index of soil was evaluated for the soil samples analyzed by using the following formula described by Ravikumar and Somashekar (2013).

Nutrient Index = (1 x no. of samples in low category)+(2 x no. of samples in medium category) +(3x no. of samples in high category)/ Total No. of Samples

Table 3.10: Nutrient index with range and remarks

Nutrient index	Range	Remarks NO_3-N , P, K and OC
I	Below 1.67	Low
II	1.67 – 2.33	Medium
III	Above 2.33	High

B.4 Results

The results of chemical analysis of the soil collected from the core zone and the buffer zone are presented in table-3.8and Map 3.3.

B.5 Soil Color

Soil colour is one of the most obvious characteristics of soil and provides a valuable insight into the soil environment. Therefore, it is very important in assessment and classification. It provides indications of mineral and organic content, as well as moisture levels, in soils. Chemical, biological and physical changes which occur in the soil are reflected in the color of the soil. The amount of iron and manganese compounds as well as organic matter causes variation in soil color. Soil moisture is an important factor which affects the color of the soil. Additionally, soluble salts such as Carbonate, Sulphate and Chlorides may also affect the soil color. Result of the present study indicates that soil is brown (S1, S3 & S6-S8) and dark brown (S4-S5) in colour, collected from core zone and buffer zone. (Table 3.8). Brown colour of soil is may be due to moderate organic matter level and iron oxides. The dark brown color may be due to higher

amount of the organic matter or the increase in the among of organic matter in combination with iron. Soil at Nawa Kheri and Kasbi has high carbon and is dark brown in colour.

B.6 Soil pH

Soil pH is one of the most important measurements of soil fertility. It is important to plants because of its influence on nutrient availability and the toxicity of related elements or ions. In general, optimum availability occurs between a soil pH of 6.0 and 7.0. Low pH results in lower rates of N mineralization, a process dependent on active, viable microbial populations in the soil. Thus, ammonium accumulation has been shown at low soil pH.

Results of the study indicate that soil pH value varies between 6.80 to 7.85 in the soil samples collected from the core zone and buffer zone (Table 3.8).

Minimum pH value (6.80) was reported in the core zone (S1) soil samples whereas highest pH value (7.85) was reported in the S3 (Subi village agricultural field) soil sample.

Results of the study indicate that soil is neutral (S1 & S2), slightly alkaline (S4, S5, S6, S7 & S8) and moderately alkaline in nature (Table 3.8). Soil at S3 Subi is moderately alkaline.

Photograph No. 3.1 Showing Soil sampling at Chotti Sadri village

B.7 Calcium Carbonate as $CaCO_3$

Calcium (Ca) is an essential plant nutrient required by animals and plants in relatively large amounts for healthy growth. In addition to its role as one of the macronutrients in plant nutrition, sufficient Ca has a role in maintaining soil physical properties, and in reclaiming sodic soils. It occurs in soil and plant as the divalent cation Ca^{++}. It is required for the proper functioning of plant cell wall and membranes. The actively growing plant parts, fruits and roots require sufficient amount of Calcium. Calcium deficiencies can be observed only in highly acidic soils and can be corrected by liming with $CaCO_3$.When soil pH is adequate Ca is not deficient. Adequate amount of Ca to plants is available when soils are limed and adequate moisture is provided. In calcium deficient soils lime or gypsum (Calcium sulfate) is recommended.

Table No. 3.8 shows the levels of Ca as $CaCO_3$ in the core zone and buffer zone soil samples (S1-S8).

In the soil samples collected from the core zone and buffer zone, level of Ca as $CaCO_3$ ranges from 4.0% to 14.5%. Maximum level (14.5%) of Ca as $CaCO_3$ was noted in the Subi village agricultural field soil sample (S3) (Table No. 3.8).

Lowest (4.0%) level of Ca as $CaCO_3$ was reported in S1, S6 and S8 soil samples and Ca level is similar in the above soil samples.

B.8 Nitrate as NO_3^-

Plants require 17 elements for the proper growth including N, P and K. Nitrogen (N) is a key nutrient for plant growth; it is a major part of chlorophyll (essential for photosynthesis) and a central building block of proteins. It can often be the main limiting nutrient in soils and as a result is applied as fertiliser. Nitrogen is essential for almost every aspect of plant growth. It is an integral part of many enzymes, proteins, certain vitamins and hormones. Deficiency of nitrogen in the soil results in reduction in photosynthesis, delay in flowering and productivity. Nitrogen is only available to plants in inorganic form as either ammonium (NH_4^-) or nitrate (NO_3^-). The soil nitrate and ammonium content varies with soil types and weather conditions.

Ammonium and Nitrate-Nitrogen in soil is determined to ascertain their availability. In slightly acidic or slightly alkaline soils the NO_3^- form ofN is mainly absorbed by the plants. The nitrate content of soil varies with the depth of soil. Generally, a soil NO_3^--N concentration of 30 ppm or higher is required for the active growth of plants. When it is <30 ppm addition of fertilizer may

be required. Farm Yard Manure (FYM), Poultry manure, N, P, K fertilizers and Di-Ammonium Phosphate (DAP) etc. are generally applied for the building up nitrogen contents.

Table No. 3.8 shows that the concentration of NO_3^- content ranges between 0.0007% to 0.0040% in the 8 soil samples collected from the core zone and buffer zone.

Highest (0.0040%) level of NO_3^- was reported in S2 (Chhoti Sadri agricultural field) soil sample whereas minimum (0.0007%) concentration of NO_3^- content was reported in the core zone (S1) soil sample (Table No. 3.8).

Result of the study also indicate that the level of NO_3^- is similarin the S3&S4 (0.0020%) and S7&S8 (0.0015%) soil samples collected from the buffer zone (Table No. 3.8).

Result of the study indicates that NO_3^- level is low in the core zone and buffer zone (S1-S8) soil samples (Table 3.9).

B.9 Available Phosphorus (P)

Phosphorus (P) is a macronutrient that plays a number of important roles in plants. It is an essential element for plant growth. Almost all phosphorus is taken up by plants as either of two orthophosphate ions of $H_2PO_4^-$and HPO_4^{2-}. Soil P exists in various chemical forms including inorganic P (Pi) and organic P (Po) and is most available between pH 6.5 and 6.8.

Phosphorus is a major component of nucleic acids, membrane lipids, and phsophorylated intermediates of energy metabolism, in plant cells. Insufficient soil P can result in delayed crop maturity, reduced flower development, low seed quality, and decreased the yield of crop. Phosphorus plays a role in the photosynthesis, respiration, energy storage and transfer, cell division, cell enlargement, nodule development and several other properties in the living plant. Adequate P also ensures that plants use water efficiently.

Manure can be applied to soil to enhance phosphorus fertility. Because manure can also change soil pH and thus alter soil phosphorus availability.

Table No. 3.8 shows the level of available P in the core zone and buffer zone soil samples. Results of the study indicates that the concentration of available P ranges between 0.0003% (6.72 Kg/Ha) to 0.0019% (42.56Kg/Ha) in the soil samples collected from the core zone and buffer zone.

Maximum concentration [0.0019% (42.56Kg/Ha)] of available P content was noted in the Kasbi (S5) agricultural field soil sample whereas lowest [0.0003% (6.72 Kg/Ha)] concentration of available P content was reported in the S2 (Chhoti Sadri village agricultural field soil sample) (Table No. 3.8).

The concentration of available P level is low in S2, medium at S1, S3, S4, S6, S7, S8 and height at S5 Kasbi Soil samples (Table 3.9)

Photograph 3.2 Showing Soil sampling at Mine site

B.10 Available Sodium (Na)

Na is one of the alkali metals belonging to group Ist of the Periodic Table. It is not a plant nutrient but it does play a role in soil health.High amount of sodium in the soil is harmful for plant growth and affects soil structure and its permeability. High Sodium levels in the soil compete with K, Mg and Ca for uptake by plant roots resulting in deficiencies of these cations. High contents of Na results in the breakdown of soil particles which prevents proper aeration and penetration of water. Due to this, plant roots are not able to get enough water and oxygen. Moreover, due to the non-penetration of water in the soil most of the applied water runs off. The high contents of sodium results in slow growth of plants so much so that plants are affected from

physiological drought and the growth stops. It is associated with high pH or alkalinity. Due to high alkalinity many of minerals are not available to the plants for uptake. High sodium contents of soil can be managed by applying Gypsum.

Table No. 3.8 shows the levels of available Na. It varies between 0.0105% to 0.0250% in the soil samples collected from the core zone and buffer zone.

Results indicate that in core zone (S1) soil sample lowest (0.0105%) level of available Na was reported whereas maximum concentration (0.0250%) of available Na was reported in the Nawa kheri village agricultural field soil sample (S4) and Kasbi reserve forest (S5) soil sample.

B.11 Available Potassium (K)

Potassium (K), an essential plant nutrient, has a major role in crop production. It is one of the major nutrients required by the plant in large amounts (about 1.5 to 2.0% of plant weight). It is most abundant element in soils but the K content of the soil varies from place to place based on physicochemical properties of soil.Soils which are rich in clay have generally been found to be rich in potassium. For normal growth of plants the K level in plants should be between 2% to 3% of the dry weight. It is required by plants for various physiological and biochemical activities such as photosynthesis, protein synthesis, Osmoregulation, metabolism, enzyme activation, cation and anion balance. Its deficiency results in wilting and susceptibility to frost damage, pathogen attack and ripening disorders.

There are three categories of potassium status in soil (i) immediately available, which are water soluble and exchangeable (ii) moderately available and which is known as fixed potassium (iii) Slowly available which is the main reserve of potassium.

In soils only little amount is available for uptake. It is the water soluble and exchangeable K which is easily available and is only 0.1% to 2% of the total soil potassium in various soil types. In soils there is a constant conversion of K from unavailable to available from. The factors which affect the availability of K in soil to the plants include the type of soil, cation exchange capacity of the soil, the quantity of the available K in the soil, the K fixation capacity of the soil, the amount of the K in subsoil, soil temperature, soil moisture and soil tilth.

Table No. 3.8 indicate that the level of available K contents varies between 0.0066% (147.84 Kg/Ha) to 0.0360% (806.40 Kg/Ha) in the core zone and buffer zone soil samples. Maximum

[0.0360% (806.40 Kg/Ha)] levels of available K content were reported in Subi village agricultural land soil sample (S3) whereas minimum [0.0066% (147.84 Kg/Ha)] level of available K was reported in the core zone (S1) soil sample.

Results of the study indicate that the concentration of available K content is medium in S1-S2 soil samples and high in S3-S8 soil samples collected from the core zone and buffer zone, respectively (Table 3.9).

B.12 Electrical conductivity (EC)

Electrical conductivity (EC) is the most common measure of soil salinity and is indicative of the ability of an aqueous solution to carry an electric current. Plants are affected, both physically and chemically, by higher amount of salts. Table No. 3.8 indicate that, EC value varies between 508 µs/ cm to 1235 µs/ cm in the core zone and buffer zone soil samples.

Highest (1235µs/ cm) EC value was reported in Nawakheri village agricultural field (S4) soil sample. The minimum (508 µs/ cm) EC value was reported in the core zone soil sample (S1) (Table No. 3.8). This might be due to lower amount of different salts present in the soil samples. Results of the study indicate that EC of soil samples S1-S3 and S5-S8 are average. EC value of S4 soil sample is harmful to germination (seed germination) (Table-3.9).

B.13 Total Sulphate as SO4-

Sulphur (S) is an essential element and is required by all crop plants for optimum production. Sulphur is taken up by the plants in the sulphate (SO_4^{2-}) form which is very mobile in the soil.

It is leached very easily in wet soil conditions particularly in sandy soils. Sulphur is a component of plant proteins and as a role in chlorophyll synthesis. It is not readily translocated within plants. Therefore, plants need a continuous supply of Sulphur from seedling to crop maturity. Sulphur deficient plants have pale yellow leaves; the symptoms appear in the youngest leaves rather than old ones.

Soil texture has great influence on the presence and availability of sulphate. Sandy soils with low organic matter are more prone to sulphur deficiencies than medium and heavy textured soils. Soil organic matter is the primary source of plant available sulphate in surface soils. Calcium sulphate is the important source of plant available sulphur. Ammonium sulphate is also provided it dissolves quickly to release sulphate-sulphur provided there is adequate soil moisture. Oil seed

crops ex. *Canola* and forage crops have higher sulphur requirements than cereal crops. Table No. 3.8 gives the details of the sulphate concentration present in the core zone and the buffer zone soil samples.

Table No. 3.8 indicates that SO_4^- level in the core zone and buffer zone samples varies between 0.0040% to 0.0278%.

Maximum (0.0278%) concentration of SO_4^- was reported in the Nawakheri village agricultural field soil sample (S4) whereas minimum (0.0040%) level of SO_4^- was reported in the core zone soil sample (S1). Results of the present study indicate that SO_4^- level is high in the core zone and buffer zone soil sample (Table 3.9).

B.14 Organic Carbon

Organic carbon is important for all three aspects of soil fertility namely Chemical, Physical and Biological fertility. It is an important parameter of soil because it improves the physico-chemical properties of the soil and has many beneficial effects on soil quality. It also improves the soil structure, increase aeration, water penetration, and enhances water-holding capacity (WHC) and supplies nutrients to plant for better growth.

The amount of soil organic carbon (SOC) depends on soil texture, climate, vegetation, historical and current land use/ management.

Results of the present study indicate that organic carbon content in the core zone and buffer zone soil samples varies between 0.91% to 1.76% (Table No. 3.8).

Minimum (0.91%) organic carbon content was reported in the Shivpura village (S8) agricultural field soil sample. It is may be due to lack of several microbes, low humification rate, lack of weeds in the soil sampling site. Maximum (1.76%) organic carbon content was observed in the Nawakheri (S4) village agricultural field soil sample. This increase in the level of organic carbon might be due to presence of higher amount of humic substances in the soil samples from decomposition of plant material or presence of green manure.

Results of the study indicate that the amount of soil organic carbon is high in the soil samples collected from the core zone and buffer zone (Table-3.9).

B.15 Organic Matter (OM)

OM is the organic component of soil. Soil organic matter is made up of different components that can be grouped into three major types:

(i) Plant residues and living microbial biomass.

(ii) Active soil organic matter also referred to as detritus.

(iii) Stable soil organic matter, often referred to as humus.

It is the major source of nutrients such as nitrogen, and available P and K in unfertilized soils. OM also effect the biological (microflora and microfaunal organisms) and physico-chemical properties of the soil.

The level of organic matter in the soil samples (Core zone & buffer zone) ranges between 1.57 % to 3.03% (Table No. 3.8). Minimum (1.57%) level of organic matter was found in the S8 soil sample (Shivpura village agricultural field soil sample). It is due to presence of low amount of organic carbon in the soil whereas maximum (3.03%) amount of organic matter was reported in the Nawakheri (S4) village agricultural field soil sample. This increment might be due to presence of higher amount of humic substances in the soil.

B.16 Interpretation

On the basis of soil analysis results; the nutrient index values have been calculated for the core zone as well as the buffer zone soil samples. It is seen that the value of core zone soil sample is 2.0 which is within the range value of 1.67-2.33 thus the soil is of medium quality (Table No. 3.10).

Similarly, it is seen that the value of buffer zone soil sample is 2.2 which is within the range value of 1.67-2.33 (Table No. 3.10). Thus it is of medium quality of soil.

Plaughing and dewatering of land as S4 can lower the EC Nirogenous fertiligers have to be added as all places. Others parameters are normal and over all medium neutrient index has been allotted to buffer zone samples.

Mining activities will definitely adversely affect the quality of soil. The proposed mitigation measures to nullify the adverse impact of mining activity on soil are given in table 4.2 under chapter-4.

3.1.C Water Environment

Selected water quality parameters of ground and surface water resources within the study area have been studied for assessing the water environment and evaluate anticipated impact due to mining operations.

The purpose of this study is to:

- To evaluate the impacts on water environment and
- To evaluate the impacts on surface water run-off
- To predict impact on water quality due to the project.

A hydro geological field investigations and base line study was conducted to evaluate and assess the impact of mining of the mineral Red Ochre from the core zone on local and regional hydro geological parameters.

C.1 Topography and Drainage

Please refer to Chapter No. 2 Clause No. 2.4.1 Physiography/Topography & Geology.

C.2 Drainage

Please refer to Chapter No. 3 Clause No. A.8.

C.3 Climate and rainfall

The normal maximum temperature received is 45ºC and minimum is 6ºC. The relative humidity generally exceeds 87% in the month of August.The average annual rainfall is 856 mm as measured at Dabok IMD station.

C.4 Ground Water

C.4.1 Ground Water Condition

As the general water level in mining lease area during pre-monsoon periodis confinedbelow463-458 mRL and ultimate depth ofmain working pit is limited up tomaximum depth of 488 mRL & 488 mRL at the end fifth year. Ground water level will not be encountered till the close of the mining operation at end of the life of mine and no permission will be required to be taken from central ground water authorities. Mining pit also acts as storage for rain water during rainy/monsoon season.

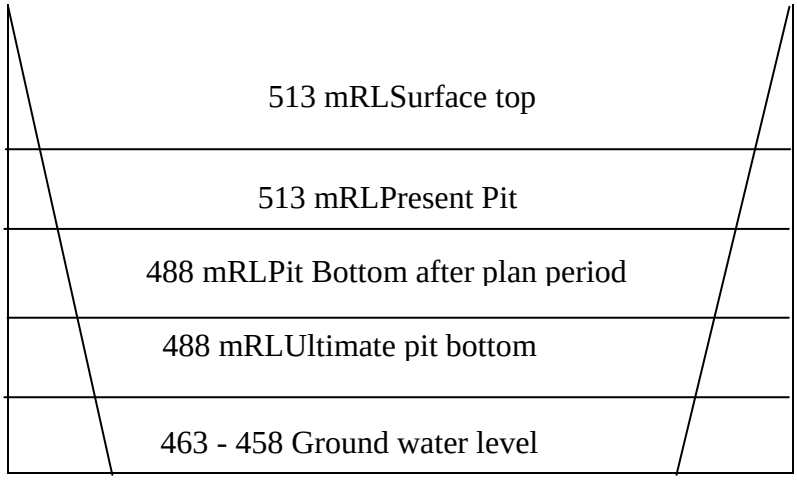
513 m RL = Surface top

513 m RL= Present Pit

488m RL= Pit Bottom after 5th year

488 m RL= Ultimate Pit Bottom

463-458 m RL= Ground Water level



Not to scale

Figure 3.2: Pit top, ultimate pit bottom and ground water levels

C.4.2 Ground water Estimation

Ground water estimation of an area is based on total recharge, stage of ground water development and its category as defined by the guide lines issued by ground water estimation committee 1977.

Buffer zone area:

The mining lease area at Shivpura village and adjoining area comes under Chhoti Sadri Tehsil of Pratapgarh district comprises Red Ochre mine.

C.4.3 Ground water status for mining lease area (core zone)

Ground water recharge and stage of development along with category of mining lease area of Red Ochre deposit is also calculated and summarized below:

A (i) Recharge through water level fluctuation method

Lease area considered for recharge in and around Shivpura mine area = 3.9859 ha.

Specific yield considered = 03 % or 0.03

Water level rise in the area is 3 mts

= Area in sq.km x specific yield of the formation x fluctuation. In metres

= 0.39859 x 0.03 x 3.00 mts.

= 0.0358731 MCM

A (ii) Recharge through Rainfall infiltration approach

The recharge from rain fall for the mining lease area is also calculated. Area in sq. km x rain fall infiltration factor x normal rain fall in metres

= 0.39859 x 0.03 x 0.990 meter

= 0.011838123 MCM

Remarks: variation in recharge calculated by both the methods is more than 20 %, as such recharge calculated from rain fall infiltration method has been considered for water balance studies as per guide lines of GEC. Thus 0.011838123 MCM recharge is considered for calculation purposes.

B. Ground water estimation

In the mines area water is required for mining activities, drinking and for domestic use. Drinking and domestic water requirement will be met by tube well located outside the lease hold area/or through tankers.

(I) Ground water required for 33 persons @ 0.50 lit/capital/day for 300 days

= 0.50 x300

= 150sq.mts

= 150/1000000

= 0.00015 MCM

C. Ground water balance

Total recharge - Total Draft

= 0.011838123 - 0.00015 MCM

= 0.011688123 MCM

D. Stage of ground water development: Since the ground water is used limited so that the stage of ground water development is only 75 % and categorized as ‘safe’. The area of core and

buffer zones comes under safe category and the entire core and buffer zones shows rising trend of water level with, no depletion trend during pre-monsoon to post monsoon periods.

C.5 Methodology of baseline data

The assessment of present status of water quality within the study is was conducted collection of water from ground water source and surface water source during the period of October, 2019 to December, 2019. The sampling locations were identified on the basis of their importance like:

1. Drainage Pattern of the regional area.
2. Location of the residential areas representing different activities likely impact areas.
3. Area representing the existing baseline environment.

Ground water source within the study area were examined for physiochemical parameter to assess the effect of mining and other activities on near resources. The samples were collected as per AEL/ WI /W-15/Water Sampling at Site and analysed as per IS: 10500:2012 and IS 2296-1982.

C.6 Purpose of water Quality Monitoring

As a natural resources water is essential to all life and to the health of the environment. Water quality describes the physical, chemical, biological and aesthetic characterized of water which is strongly influence its aquatic life, wildlife, irrigation, human consumption and mining use.

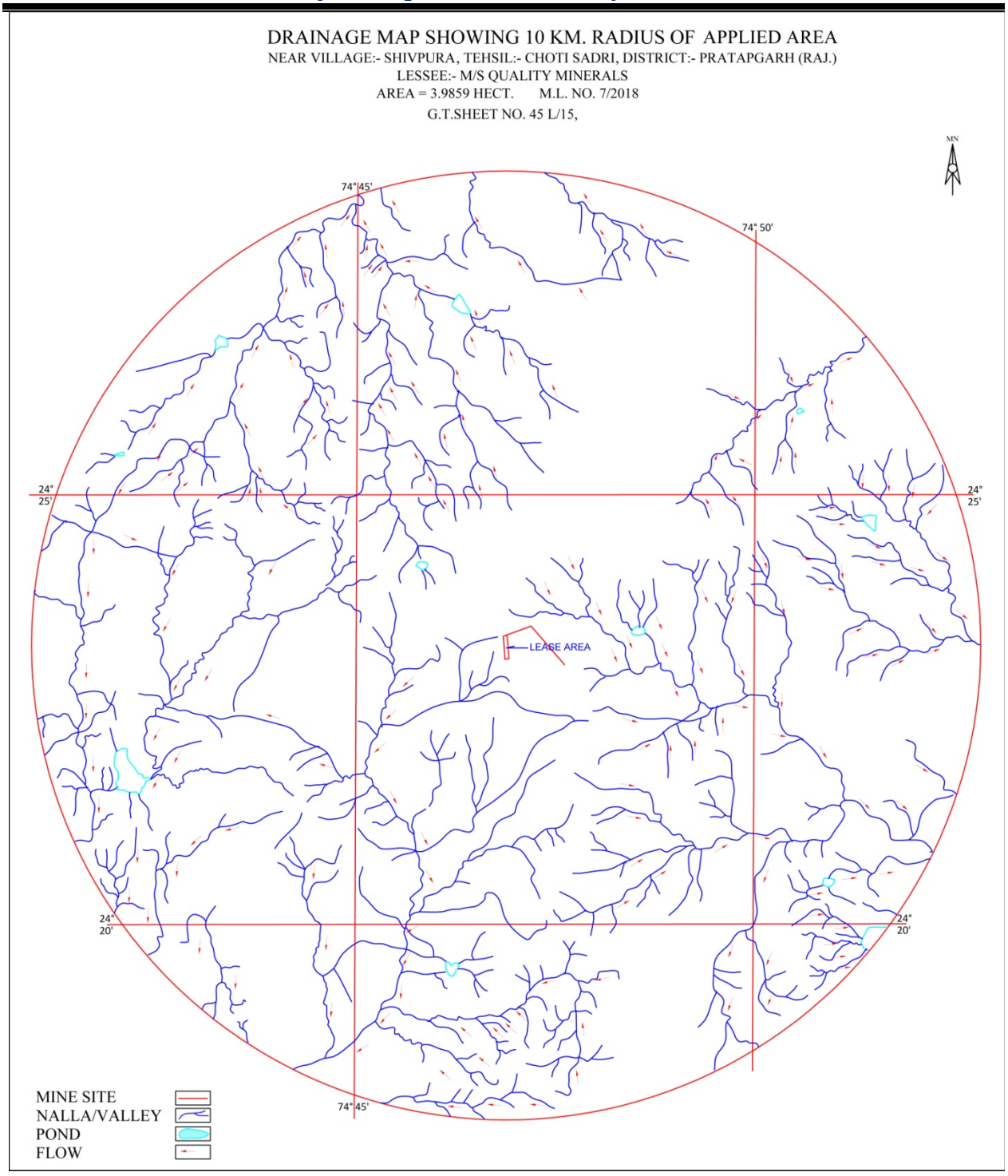
C.7 Objectives of Water Quality Monitoring

- Use baseline information to predict and assess impact.
- Allow the comparison of baseline data with operational and post closure water quality data in order to identify whether water quality is affected by mine-related activities and to verify that established water quality guidelines.

C.8 Ground Water Quality

The ground water analysis data for the monitoring period i.e. October, 2019 to December, 2019 is presented **Table 3.11.**

The physio-chemical characteristics of ground water are analysed with drinking water standards, prescribed in IS: 10500: 2017 and IS 2296-1982.



Map 3.4: Drainage Map

Source: Geological Survey of India Toposheet No. 45L/15.

Table 3.11Criteria of Selection of Water Sampling Stations

S. No.	Name of the sampling stations	Source	Coordinate	Location with respect to the project site	Criteria of Selection	Remarks
1.	Mine Site	Well	-	-	The elevation of the area is 463m. To check the ground water quality of mines sample is taken.	Ground water
2.	Chhoti Sadri	HP	24^{0}22'55.80" 74^{0}42'4.47"	8.0 Km W	The elevation of the area is 497m. To check the water quality sample were taken.	Ground water
3.	Subi	HP	24^{0}24'47.62" 74^{0}48'50.81"	4.50 Km NE	The elevation of the area is 506m. To check the ground water quality of village sample is taken	Ground water
4.	Nawa Kheri	HP	24^{0}19'5.20" 74^{0}49'47.62"	8.70 Km SE	The elevation of the area is 503m. The area represents agriculture land.	Ground water
5.	Kasbi	HP	24^{0}19'15.71" 74^{0}47'11.99"	7.0 Km SE	The elevation of the area is 502m. To check the groundwater quality while water will be used for drinking purpose or not.	Ground water
6.	Sandi Khera	HP	24^{0}22'44.85" 74^{0}46'46.43"	0.66 Km SW	The elevation of the area is 512m. To check the groundwater quality while water will be used for drinking purpose or not.	Ground water
7.	Kesunda Pond	-	24^{0}25'35.87" 74^{0}47'32.17"	6.10 Km NE	The elevation of the area is 509m. To check the water quality surface water, pond water is taken	Surface water
8.	Gomana Pond	Pond	24^{0}21'42.31" 74^{0}42'7.70"	8.36 Km SW	The elevation of the area is 480m. Surrounding area having good agriculture field.	Surface water

C.9 Quality of Ground water

The quality of groundwater is suitable for drinking and agriculture purpose of the study area. The chemical analysis results are appended in the report. The analysis result shows that ground water is suitable for drinking as well as for agriculture purposes. No change in quality is observed after mining activities in the core as well as in buffer zone area as mine pits are not touching ground water level. Moreover, Red Ochre itself is an inert mineral and no chemicals or pollutants are used in its mining, thereby, not leading to any consequential contaminating of ground water. Results of water analysis are shown in Table 3.12.

Photograph No. 3.3: Showing Water sampling at Nayan Khedi village

Table 3.12 Ground water quality analysis results

S. No.	Parameters	Ground Water						Surface Water	
		Mine Site (W1)	Chhoti Sadari (W2)	Subi (W3)	Nayan Kheri (W4)	Kasbi (W5)	Sandi Khera (W6)	Kesunda Pond (W7)	Gomana Pond (W8)
Source →		TW	HP	HP	TW	TW	TW	TW	TW
1.	pH	6.85	7.43	7.1	7	6.95	7	8.4	8.1
2.	Conductivity µmho/cm	980	1499	1404	161	745	930	260	220
3.	Turbidity NTU	-	-	-	-	-	-	-	-
4.	Total Hardness as $CaCO_3$ mg/l	350	500	450	80	270	410	110	100
5.	Chlorides as Cl mg/1	95	215	80	15	55	95	20	15
6.	Total Dissolved solid mg/l	680	973	1003	110	473	530	173	137
7.	Sulphate as SO_4 mg/l	65	128	348	9	56	47	14	3.4
8.	Alkalinity as $CaCO_3$ (mg/l)	420	340	390	70	240	320	110	110
9.	Fluoride as F (mg/l)	0.35	0.65	0.5	0.2	0.2	0.25	0.3	0.1
10.	Nitrate as NO_3 (mg/l)	14	90	10	5	38	5	10	5
11.	Magnesium as mg (mg/l)	36	50.4	60	4.8	19.2	43.2	14.4	7.2
12.	Calcium as Ca (mg/l)	80	116	80	24	76	92	20	28
13.	Sodium as Na (mg/l)	123	165	185	8.5	45	45	25	9
14.	Potassium as K (mg/l)	11.25	1	1.8	1.7	37.5	7.8	2.4	2.7

Copy of original test reports are attached as Annexure.

Note: The samples were analyzed as per the procedures specified in the standard methods for the examination of published by Bureau of Indian standard.

Parameter	**pH**	**Conductivity at 25°C**	**Turbidity**	**Total Hardness**	**Chloride as Cl**	**Total dissolved solids**	**Sulphates as SO_4**	**Total Alkalinity as $CaCO_3$**	**Fluoride as F**	**Nitrates as NO_3**	**Sodium as Na**	**Potassium as K**	**Calcium as Ca**	**Magnesium as Mg**
Acceptable Limits IS 10500, 2012	6.5 to 8.5	-	1	200	250	500	200	200	1.0	45	-	-	75	30
Permissible Limit as per IS 10500:2012	No Relaxation	-	5	600	1000	2000	400	600	1.5	No Relaxation	-	-	200	100
Tolerance Limits IS2296:1982	6.5 to 8.5	-	5	300	250	500	400	200	1.5	20	-	-	200	100

C.10 Report on Ground water quality

Background

Water is the most essential thing for life i.e. human beings, animals as well as plants and it must be pure and potable. If water is not suitable for drinking it can cause many diseases. In human beings 80% diseases are caused by water which are that is called water borne diseases. The main water borne diseases are Cholera, Typhoid Dysenteries, Hepatitis, Polio etc. Water with high F causes fluorosis due to which black spots on teeth, joint pain & bone deformity appears in human body.

Water used for agriculture also should be of good quality. In saline water, agriculture production decreases. Water with high sodium content hardens the soil affecting its permeability. High Boron also effects the growth of plants.

C.10.1 Impact on water quality

Quality of water depends upon its physical as well as chemical characteristics. Physical parameters are colour, odour, temperature (during transit from field to laboratory) & turbidity. Chemical quality of water depends upon the nature of soluble salts & elements present (independently or in combined form). For human drinking the parameters considered are-

A. Total Dissolve Solid (TDS)

Rain water is considered as of best quality as it is colorless, odorless and its TDS is low. However, when it comes in contact with soil & underground rocks it will dissolve a number of soluble which will increase TDS in water. As per IS 10500: 2012 the standard limit of TDS for drinking water is 500 mg/L and maximum permissible limits is 2000 mg/L. Main constituent elements & salts of TDS in water are Na, K, Ca, Mg, HCO_3, CO_3, Cl, SO_4 and NO_3. Besides there may be heavy metals like Fe, Cu, Zn, Pb, Mn etc., and same may be present in traces.

Inference: Analysis results of water sample drawn from Red ochre mines, near village Shivpura, Tehsil Chhoti Sadri, District Pratapgarh (Raj.) M/s Qulaity Minerals indicates that TDS is lowest 110 mg/L (Naya Kheri TW) and highest 1003 mg/L (Subi HP).

Out of 6 samples collected from core zone and buffer zone, 1 samples show TDS within 500 mg/L and 5 samples contain TDS more than 500 ug/L but less than 2000 mg/L. Core zone sample analyzed 680 mg/L TDS.

Contour Map showing TDS distribution for the buffer zone (10 km. around the mine site) is also given in the report.

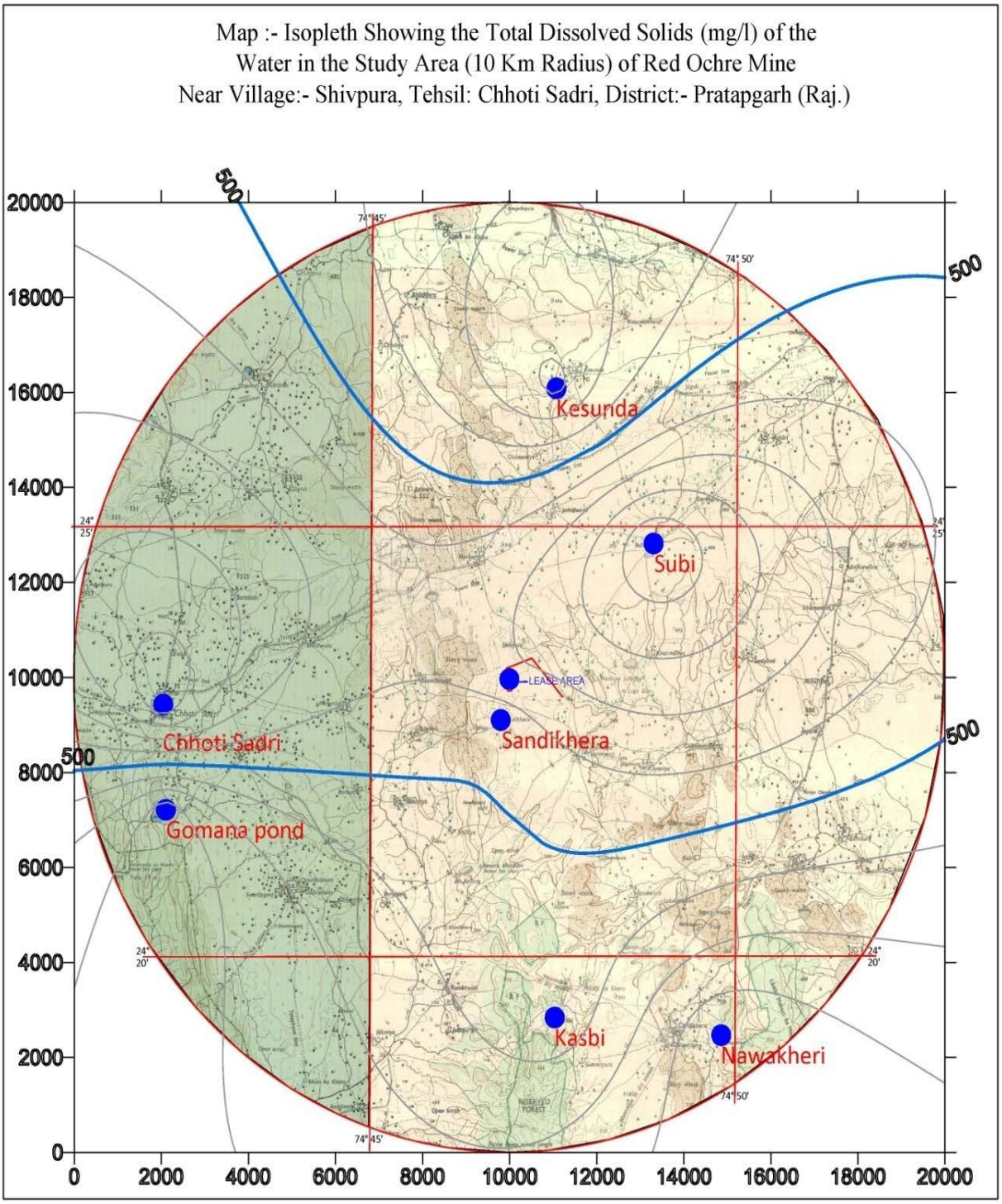
Isopleths of central part eastern to southern part depicted beyond blue-lined boundary have TDS high than acceptable limit of 500mg/L but conform to permissible limit as per IS10500;2012 for drinking water.

Inferences on Surface Water

Analysis results of water samples drawn from Red ochre mines, near village Shivpura, Tehsil Chhoti Sadri, District Pratapgarh (Raj.) of M/s Qulaity Minerals indicates that TDS 137 (Gomana Pond) to 173 mg/L (Kesunda Pond). All samples collected from surface water samples are under permissible limit of IS 2296:1982.

Isopleths of upper and lower peripheral part depicted within blue-lined boundary have TDS less than tolerance limit of 500mg/L but conform to permissible limit as per 2296:1982 for drinking water.

Photograph No. 3.4: Showing Water sampling at South side of Mine site



Map 3.5: TDS Isopleths

Source: Geological Survey of India Toposheet No. 45L/15.

B. Fluoride

High fluoride in drinking water causes flurosis due to which black and yellow spot on teeth, joint pain, deformities in bone appears. In recent research it is observed that high fluoride in drinking water shows adverse effects on nervous system as well as on soft parts of body. Fluoride also effect muscles, Red Blood Corpuscles, elementary canal, inner membrane of intestine and muscle which bound the bones together. It also shows effect on human spermatozoa, which decreases the male fertility. Fluoride also affects the animal. "Standard Acceptable Limits" of fluoride 1.00 mg/L and "Standard Permissible Limits" is 1.5 mg/L as per IS: 10500:2012.

Inference: Fluoride analysis result of water samples for core zone, buffer zone are given in the preceding table. It may be observed that Fluoride in water sample ranges from 0.20 mg/L to 0.65 mg/L. All samples are under acceptable and permissible limits of F for drinking water as per IS10500:2012.

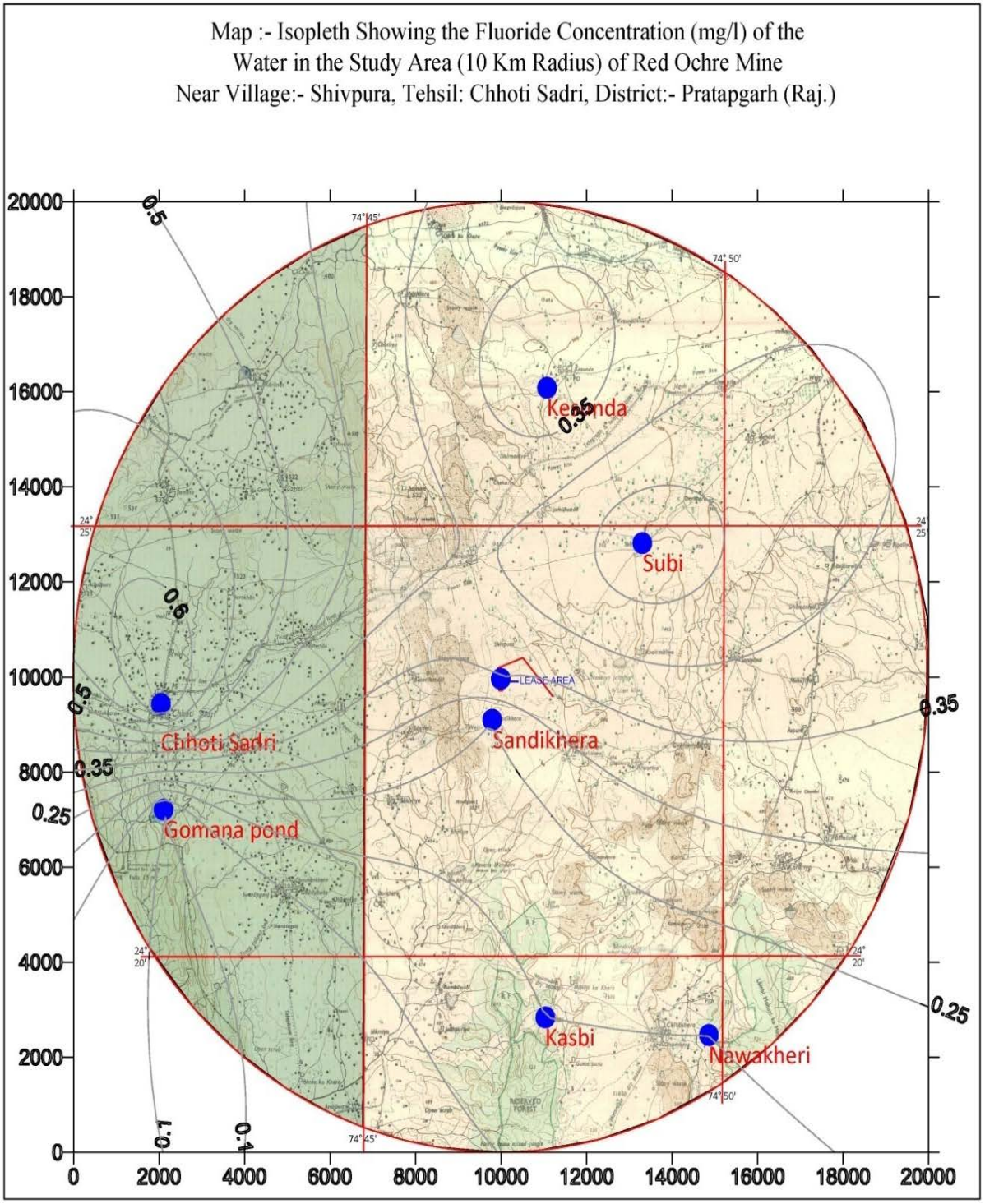
Contour map for fluoride distribution (within 10 km area around the core zone) is also attached in the report.

It may be observed that Isopleths shows that fluoride concentration in the whole area is under safe zone.

Inference on surface water: Fluoride analysis result of water samples for surface water is given in the preceding table. It may be observed that Fluoride content in all the water samples ranges from 0.10 mg/l to 0.30 mg/L. Hence, all water samples conform to tolerance limits of F in drinking water as per IS 2296:1982.

Contour map for fluoride distribution (within 10 km area around the core zone) is also attached in the report for quick understanding.

Total part of the area is depicted having F is less than 1.5 mg/l and conform to tolerance limit as per IS 2296:1982 for drinking water.



Map 3.6: Fluoride Concentration Isopleths

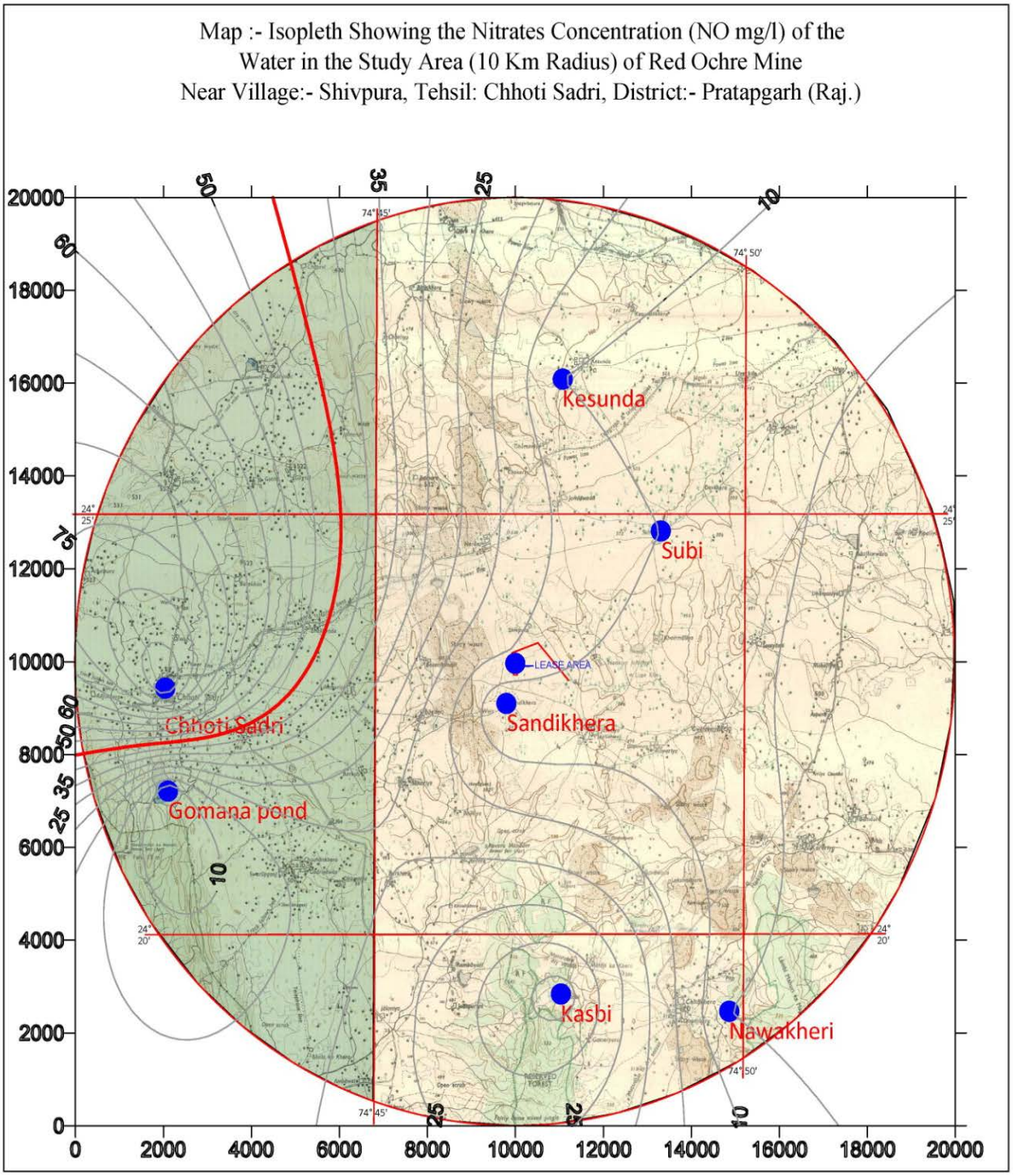
Source: Geological Survey of India Toposheet No. 45L/15.

C. Nitrate

In ground water Nitrate is found in small quantity but due to fiscal contamination& high use of nitrogenous fertilizers the concentration of NO_3 increases in ground water. As per IS 10500:2012, potable water must have NO_3 less than 45 mg/L. There is no relaxable limit for NO_3 for potable water. High NO_3 shows adverse effect on infants. It causes blue baby disease in the infants and develop intestine cancer in adults. In surface water high nitrate helps in growth of algae, aquatic water plants etc. out of which some species are poisons for human beings and animals.

Inference: Analysis results for all 6 water samples show that nitrate concentration varies from 5 mg/L (Sandi Khera and Naya Kheri) to 90 mg/L (Chotti Sadri HP). Contour line of western part beyond red line have nitrate more than acceptable limit (45mg/l) and other rest of samples have nitrate less than permissible limit for drinking water as per IS-10500:2012.

Surface water Inference: Analysis results for all the surface water samples show that nitrate concentration varies from 5-10 mg/L. It can be observed that nitrate values for water samples collected from different locations buffer zones of this mine, all samples are within tolerance limits for drinking water as per IS 2296:1982.



Map 3.7: Nitrate Concentration Isopleths

Source: Geological Survey of India Toposheet No. 45L/15.

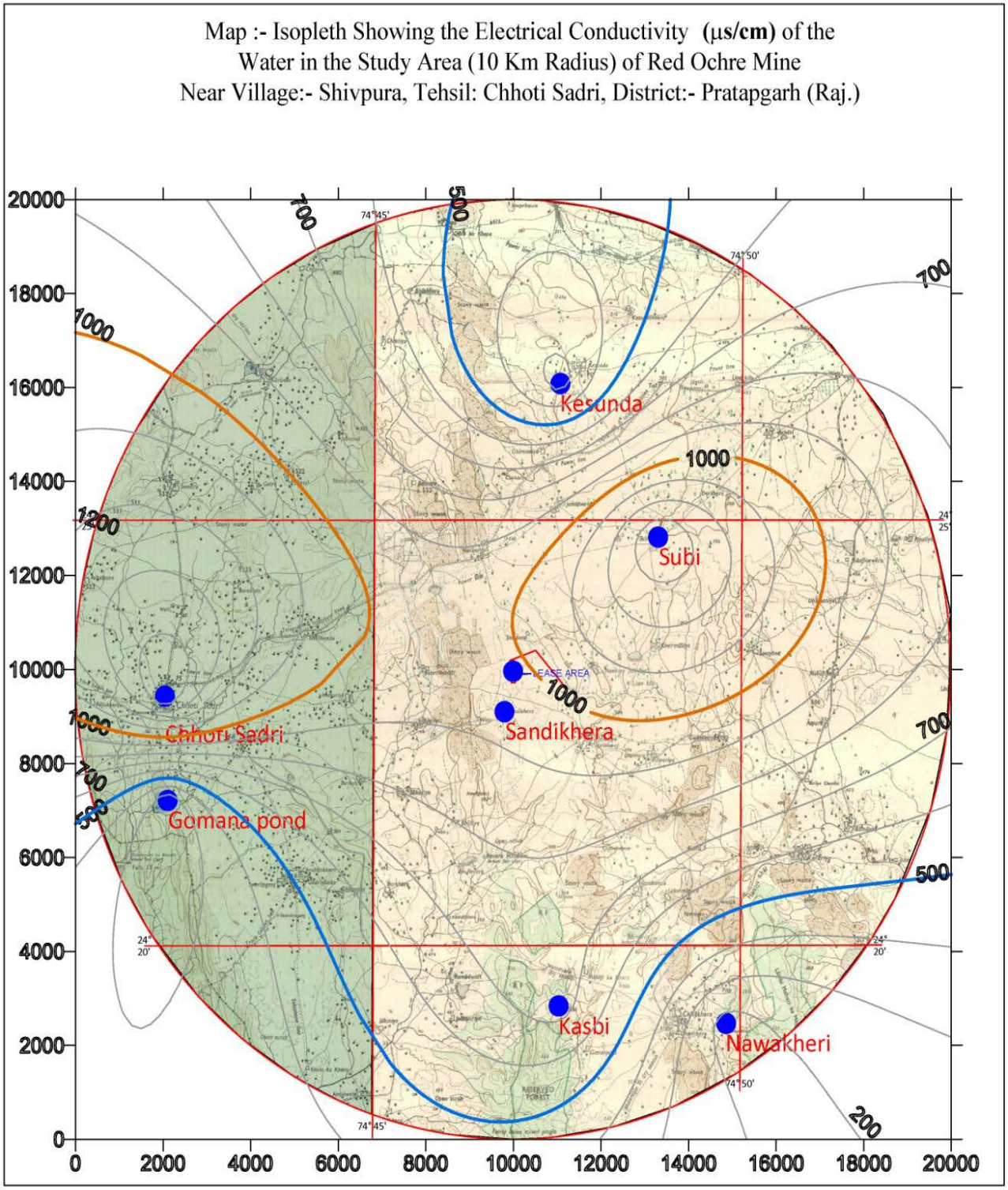
D. Electrical Conductivity (EC)

Conductivity in water shows dissolves salt in water. Low Conductivity (500 to 2000 µS/cm) is an indicates low salinity. Mid-range conductivity (2000 to 4000 µS/cm) is indicates moderately saline and beyond 4000 µS/cm is highly saline and not suitable for agriculture purpose.

Inference: Chemical analysis of water samples collected from in and around 10 km. area shows that conductivity (EC) ranges between 161 mg/L (Nayan Kheri (TW) to 1499mg/L (Chotti Sadri H.P.). All samples have low EC indicating low salinity in water.

Surface water Inference: Chemical analysis of water samples collected from in and around 10 km. area shows that conductivity (EC) ranges between 220 mg/L (Gomana pond) to 260 mg/L (Kesunda Pond). All samples have low EC indicating low salinity in water.

Photograph No. 3.5: Showing Water sampling at Keshunda Pond



Map 3.8: Electrical Conductivity Isopleths

Source: Geological Survey of India Toposheet No. 45L/15.

E. Hardness (TH)

Hard water & soft water is very old concept of water quality. In general, soft water give foam with soap while hard water does not. White powder is deposited after boiling hard water. Mainly hardness in water is due to bicarbonates, chlorides and sulphates of Ca & Mg. After boiling the bi-carbonates of Ca & Mg get converted into carbonate and the same are insoluble hence white deposit is seen at the bottom of container/vessel (temporary hardness). Hardness in water is of two types i.e. (1) Temporary (2) Permanent. Temporary hardness can be removed by boiling and aeration.

As per IS10500:2012 standard acceptable limit is 200 mg/L, while standard permissible limit is 600 mg/L.

Inference: Chemical analysisof water samples collected from in andaround 10 km. area from mine sale shows that total hardness (TH) ranges between 80 mg/L (Nayan Kheri TW) to 500 mg/L (Chotti Sadri H.P.). All samples are under acceptable and permissible limits of TH for drinking water as per IS10500:2012.

Surface water Inference: Chemical analysis of all the surface water samples collected from buffer zone shows that total hardness (TH) ranges between 100 mg/L (Gomana Pond) to 110 mg/L (Kesunda Pond).

TH values of surface water parameter are within tolerance limits as per IS 2296:1982 for TH for drinking water.

Overall Conclusion:

The total hardness of area is within acceptable/permissible limit as per IS10500:2012 except for Ghatia HP locations. Hardness of ground water for core zone, buffer zone is mainly due to carbonates, bicarbonates, chlorides and sulphates of Ca and Mg, which is indicative of both temporary & permanent hardness. pH value varies between 6.85 to 7.43 which is slight acidic to slightly alkaline in nature.

Ground water of the area has low salinity value as the electrical conductivity ranges between 161 mg/L (Nayan Kheri (TW) to 1499mg/L (Chotti Sadri H.P.) and considered as normal for irrigation purposes. All water samples conform to acceptable/ permissible limits of F and TDS in drinking water as per IS10500:2012.

The total hardness of area is within tolerance limits as per IS 2296:1982. Hardness of surface water is mainly due to carbonates, bicarbonates, chlorides and sulphates of Ca and Mg, which is indicative of both temporary & permanent hardness.

Suitability of water for Irrigational Purposes

Normally, suitability of water for irrigational uses is decided based on three parameters viz., Sodium Adsorption Ratio (SAR), Percent Sodium (PS) & Residual Sodium Carbonate (RSC); the values of which are derived from the normal chemical analysis conducted in the laboratory. Particular water sample is perceived to be suitable for use in irrigation if values of SAR, PS & RSC conform to the standard acceptability criteria viz.; SAR & PS values should not exceed 26 and 60 respectively, whereas RSC value should be less than 1.25

All water samples are suitable for irrigation purpose.

Secondary Data Validation:

In general, the chemical quality of Ground water in prelatic and deeper aquifers is good. Shallow groundwater of dug well zone is alkaline in nature with pH ranging from 7.5 to 8.7. The Specific Conductance is within 1500 mmhos/cm at 25^{o}C but higher values. The Chloride content varies from 43 ppm to 376ppm. High Chloride content (>250ppm) has been observed in Arnod block. The fluoride content in ground water is generally within the maximum permissible limit (1.5mg/lit). Nitrate concentrations in major part of the district are within 45ppm. Higher values of nitrate occur in isolated locations in Dhariyawad & Pratapgarh blocks. Concentration of iron is within the desirable limit of 0.3 mg/l in major part of the district and is within the maximum permissible limit of 1 mg/l. Higher values in excess of 1 mg/l have been observed in northwestern & southwestern parts of the district falling in Chhoti Sadri, Pratapgarh, Dhariawad and Peepalkhoont blocks.

3.1.D Air Environment

D.1 Introduction

The meteorological data helps for appropriate interpretation of the baseline status of the study area as well as for input into prediction models to evaluate air quality dispersion. Chronological data on meteorological parameters also plays an important role in identifying the general meteorological regime of the region. The year may broadly be divided into four seasons:

Winter Season: December to February

Pre Monsoon Season: March to May

Monsoon: June to September

Post Monsoon: October to December.

D.2 Methodology

The methodology adopted for monitoring surface observations is as per thestandard norms laid down by Bureau of Indian Standards (IS: 8829) and IndiaMeteorological Department (IMD). Data generated has been utilized andinterpreted with nearest IMD data at Maharana Pratap Airport, Dabok, Udaipur.

Hourly maximum, minimum & average values of wind speed, direction and temperature were recorded. The entire data were recorded continuously in a memory module, which was attached to data logger.

Secondary data from already published literature of National Data Centre of Indian Meteorological Department (IMD), Maharana Pratap Airport, Dabok, Udaipur located at92.47 kms from core zone, have been utilized to establish the historical meteorological trend.

Sources of Information (India Meteorological Department– Maharana Pratap Airport, Dabok, Udaipur).

Site specific primary meteorological data was collected from October, 2019 to December, 2019. Secondary information on meteorological conditions has beencollected from the nearest IMD station at Dabok for a period of 30 years (1971-2000).

D.3 Ambient Air Quality (AAQ)

The prime objective of the baseline study with respect to AAQ is to establish the baseline air quality and its conformity with prescribed AAQ standards.

Table 3.13: Monitored parameters and Frequency of sampling

Parameters	Sampling Frequency
PM_{10}	24 hourly sample twice a week
$PM_{2.5}$	
Sulphur Dioxide (SO_2)	
Nitrogen Dioxide (NO_2)	

D.5 Selection for Monitoring Stations

For collecting primary baseline data, a weather instrument was installed at the station within the core zone. Secondary data for last 30 years for wind speed were collected from National Data Centre of Indian Meteorological Department (IMD), Dabok. Wind direction in percentage days for last 30 years by IMD, Dabok given in each month. It helps in selecting of monitoring station in buffer zone

Table 3.14 (A)Wind direction in percentage days of last 30 years by IMD Dabok

8.30 AM

Month	N	NE	E	SE	S	SW	W	NW	CALM
October 2019	4	2	0	0	4	3	2	5	80
November 2019	7	2	0	0	4	3	2	11	78
December 2019	7	1	0	0	0	0	2	14	76
Total	18.00	5.00	0.00	0.00	8.00	6.00	6.00	30.00	234.00
Avg.	6.00	1.67	0.00	0.00	2.67	2.00	2.00	10.00	78.00

Table 3.14 (B) Wind direction in percentage days of last 30 years by IMD Dabok

17.30 PM

Month	N	NE	E	SE	S	SW	W	NW	CALM
October 2019	6	15	9	2	7	8	9	5	80
November 2019	4	18	12	2	5	3	3	1	52
December 2019	3	18	15	4	5	3	2	2	48
Total	13.00	51.00	36.00	8.00	17.00	14.00	14.00	8.00	180.00
Avg.	4.33	17.00	12.00	2.67	5.67	4.67	4.67	2.67	60.00

Site specific micrometeorological data (Primary baseline data) were collected. It was observed that wind is predominantly blowing in the direction from NE to SW during the study period (October 2019 to December 2019). The historical secondary data shows wind blowing from NE to SW in the study area. The average for the above table for the morning and evening study time shows that the wind is from NE to SW. The monitoring station were selected as mentioned below:

- First predominant upwind direction was NE and hence the first monitoring station of the buffer zone, Station 2 (Subi), was selected.
- First predominant downwind direction, 180-degree reverse of NE (First Upwind), i.e. SE is the second monitoring station of the buffer zone, Station 3 (Sandi Kheri).
- Second predominant downwind of the second upwind direction was selected as reverse of NW i.e SE, Station 4 (Kasbi).
- Station 5 (Chhoti Sadri) is in W direction, this area is selected as populated.
- Station 6 (Nawa Kheri) is in SE direction, which were selected as sensitive.

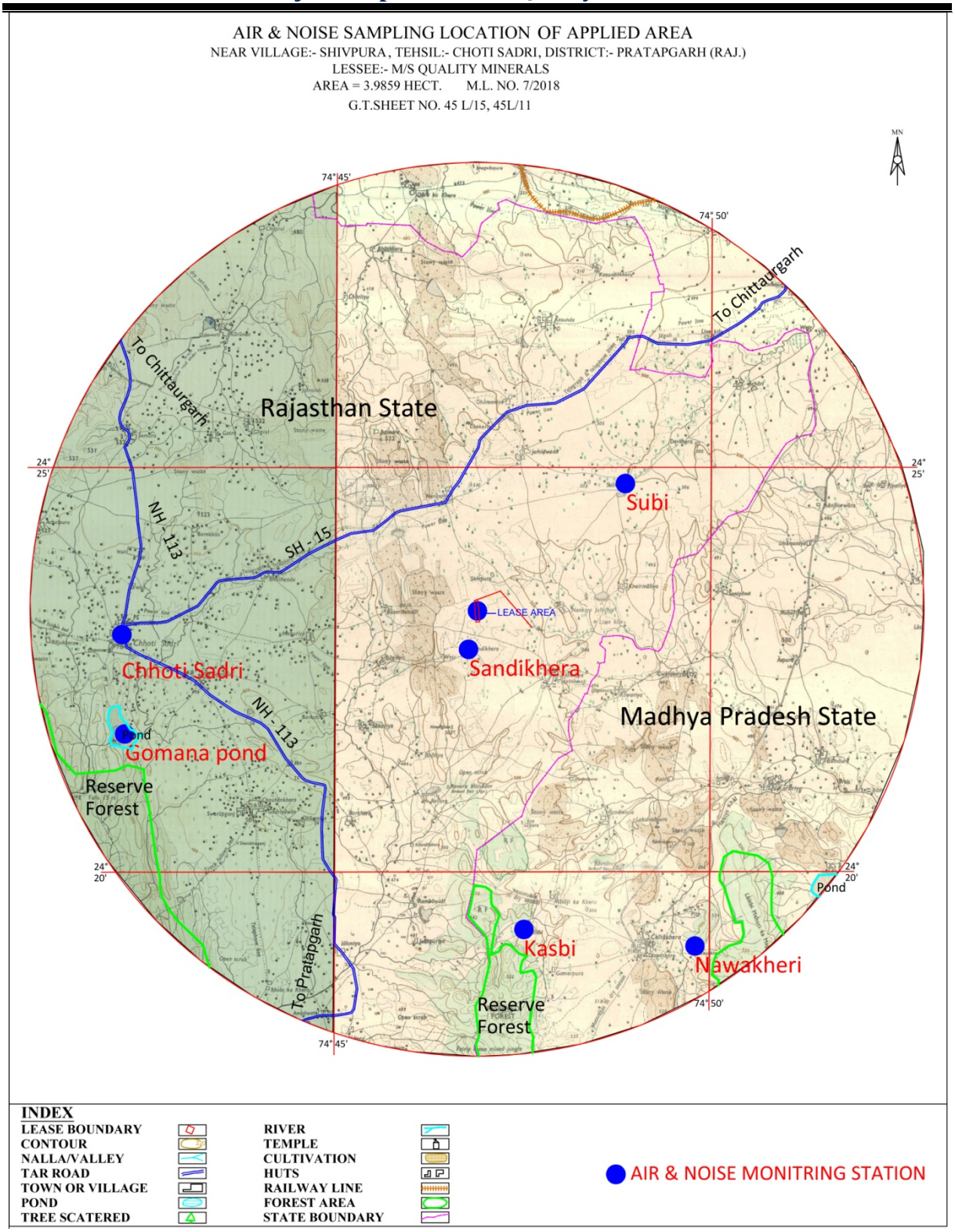
AAQ sampling for determining PM_{10}, $PM_{2.5}$, SO_2 & NO_2 components was collected continuously for 24 hours with a frequency of two days per week at each of the 12 locations including mine site.

Photograph No. 3.6: Showing Air sampling at Subi Village

Table 3.15: Detailed Location of Sampling Points

Station Code	Name of the Station	Coordinate		Distanceand direction from Mine Site (km)		Type of area	Wind direction
AAQ1	Mine Site	24°23'22"	74*46'53"	-	-	Mining Activities	
AAQ2	Subi	24°24'58	74*48'57"	4.50	NE	Mining Activities	First upwind (from evening time)
AAQ3	Sandi Khera	24°22'46"	74*46'43"	0.66	SW	Mining Activities	First downwind
AAQ4	Kasbi	24°32’138	74.79’351	7.00	SE	Mining Activities	Second downwind of Second upwind
AAQ5	Nawa Khedi	24°19'3"	74*49'42"	8.70	SE	Urban Activities	Populated
AAQ6	Chotti Sadari	24°23'8"	74*42'34"	8.00	W	Rural/Residential Activities	Sensible Zone

Note: Air samples were collected and transported from sampling site to the laboratory by following the prescribed procedure for quality assurance for the samples collected at site in order to protect their integrity and identity of these samples. Proper records are maintained in the field data sheets.



Map 3.9: Showing the location of Air monitoring stations

Source: Geological Survey of India Toposheet No. 45L/15.

D.6 Topography of the Area

Please refer to Chapter No. 2 Clause No. 2.4.1 Physiography/Topography & Geology.

D.7 Sampling Method & Field Measurement

Calibrated respirable dust samplers were installed for the collecting the samples at each of the 6 sampling stations for determining PM_{10}, $PM_{2.5}$, SO_2 and NO_2 content of AAQ.

The six locations within the study area were selected on the basis-

- Meteorological condition
- Topography/terrain
- The direction of the wind
- Populated area
- Residential and sensitive areas

D.8 Methodology Adopted for Air Quality Monitoring

Table3.16: Methods adopted for PM_{10}, $PM_{2.5}$, SO_2& NO_2

S. No.	Parameters	Instrument	Type of method	Method of Analysis
1	PM_{10}	Respirable Dust Sampler and High Volume air sampler	BIS 5182 Part 23 2006	Gravimetric
2.	$PM_{2.5}$	Fine Particulate Sampler	As per CPCB Guidelines	-
3.	Sulphur Dioxide	Respirable Dust Sampler and High Volume air sampler	BIS 5182 Part 2-2001 Improved West & Gaeke method (Pararosaniline method)	Calorimetric
4.	Nitrogen Dioxide	Respirable Dust Sampler and High Volume air sampler	BIS 5182 Part 6- 2006 Jacob & Hochheiser modified (Sodium-Arsentine method)	Calorimetric

D.9 Detail of Sampling Locations

AAQ1: Mine site: As per the ToR Condition Ambient Air Quality, monitoring has been carried out at the study area including lease area. The area is on a plateau, sloping in all directions. Regional drainage pattern of the area is almost in Western to southern direction. The sampler was installed on a fabricated steel stand at a height of 3.2m above the ground level & free from any obstructions.

AAQ2: Subi: -The sampler was installed on the roof top at a height of about 4.0 m. above the ground level & free from obstruction. This location represents the rural area.

AAQ3: Sandi Kheri: The sampler was installed on the roof top at a height of about 3.5 m free from obstruction. These areas covered generally rural & agricultural fields.

AAQ4: Kasbi: The sampler was installed on roof top at a height of 4.5 m above the ground level. Level area, and agriculture fields are present.

AAQ5: Chhoti Sadri: The sampler was installed on roof top at a height of 4.5 m above the ground level. The station is taken as populated due to presence of urban activity.

AAQ6: Nawa Kheri: The sampler was installed on roof top at a height of 4.5 m above the ground level. The station is taken as sensitive area.

D.10 Quality Assurance/Control Procedure

Standard method & procedure have been adhered to for this study. QA/QC procedures were implemented for sample collection, labeling on sample containers, chemical analysis &for data verification.

The quality assurance procedure covers all aspects of the study and includes sample collection, handling, laboratory analyses, data coding, statistical analyses, presentation & communication of results. The chain of custody procedure including sample handling, transportation, and logging and crosschecking samples in the laboratory have been followed.

D.11 Summary of AAQ

A summary of the Ambient Air Quality measurement taken for the base line data of the Core zone is presented in table-3.17.

Table 3.17:AAQ results in study area compared with National Ambient Air Quality Standards

Parameters	National Ambient Air Quality Standards for 24 hours duration	Range	Mine Site	Subi	Sandi Khera	Kasbi	Nawakhedi	Chhoti Sadri
PM_{10} microgram/m^3	100	Max	84.10	68.80	80.40	72.20	69.90	63.10
		Min.	80.40	66.60	78.70	70.30	68.50	59.90
		Avg	81.93	67.60	79.53	71.35	69.20	61.22
		Percentile 98	84.10	68.65	80.35	72.20	69.85	63.10
$PM_{2.5}$ microgram/m^3	60	Max	40.40	33.60	36.10	32.20	34.80	30.30
		Min.	38.50	31.90	33.40	31.10	32.80	29.50
		Avg	39.39	32.82	34.85	31.61	33.87	29.94
		Percentile 98	40.30	33.60	35.95	32.15	34.80	30.30
SO_2 microgram/m^3	80	Max	10.20	10.40	10.80	10.10	10.90	9.50
		Min.	8.50	8.10	7.80	8.10	8.40	7.50
		Avg	9.43	9.20	9.30	9.13	9.70	8.34
		Percentile 98	10.20	10.35	10.75	10.00	10.85	9.45
NO_2 Microg66.5ram/ m^{366}	80	Max	83.30	67.70	80.10	71.10	69.80	60.10
		Min.	13.20	14.70	14.40	13.80	13.10	13.30
		Avg	20.59	19.70	20.78	19.44	18.74	17.72
		Percentile 98	82.55	67.55	79.40	70.70	69.40	60.05

Note: The study of the above table reveals that all the figures of AAQ measured in the rural areas in the study zone are within prescribed standard parameters.

The copy of original test reports is attached as anexure-9A-9L.

D.12 Inferences

Ambient Air Quality observations at all the monitored locations are well within the prescribed limits. These will be always kept within the prescribed limits by taking the appropriate mitigation measures described in the preceding section.

D.13 Modelling for evaluation of anticipated increase in air pollution levels due to the operation of the mine

AAQ modeling is one of the main tools for predicting the increase in pollution level in the buffer zone as a result of mining.

The increase in pollution level as a result of mining is directly proportional to production level. After calculating the incremental values, we can prepare an effective management plan. The entire project under reference fugitive dust model (FDM) has been used.

The following activities were carried out for the purpose of preparation of the input file.

1. An activity sheet was prepared and daily basis for activity the production target.
2. The quantum of OB required to be removed for achieving the annual production was calculated.
3. An activity sheet covering mineral and OB handling on hourly basis has been calculated.
4. Moisture and silt content of the area/ rock has been taken into account.

The following additional factors also be taken into account for preparing the input file. Calculated for a period of 3 months on the basis of meteorological data obtained from the weather station. Quadrate of transport road, pit area & dump area etc.

Average vehicle speed in Haul Road, transport road, pit area & dump area etc.	4.5 m/s
Capacity of dumper	25 t
Drop height in mineral loading	2.0 m
Drop height in mineral unloading	2.0 m
Size of loader in	0.9 m
Capacity of unloaded in OB unloading	25 t

Emission rates for points, line and area sources are given g/s, g/s/m and g/s/m2 has been calculated and furnished in following table:

Table 3.18(A): Sources of Air Pollution and their Emission Factors withoutControl Measure

S. No.	Source of Air Pollution	Emission Rate		Influencing Parameters
Source		Activity		
1.	Exposed Pit	Overburden	0.0000198 gm/sec/m^2	Moisture content of pit surface 1%, silt content 18%, wind speed 3m/s& area of active pit 0.001245 Sq.km.
		Pit surface	0.0000051 gm/sec/m^2	Moisture content of pit surface 1%, silt content 20%, wind speed 3m/s & area of active pit 0.01 Sq.km.
2.	Mineral	Loading	1.360697 gm/sec.	Moisture content of loading material 1%, silt content of loading materials 12%. Drop height 3.0 m, size of loader 1.2 M^3. & frequency of loading 42.0 of trip /hour
		Unloading	0.3597402 gm/sec.	Moisture content of loading material 1%, silt content of loading materials 12%. Drop height 3.0 m, Capacity of dumper 15 M^3. & frequency of loading 7 of trip /hour
3.	Overburden	Loading	14.5576288 gm/sec.	Moisture content of loading material 1%, silt content of loading materials 18%. Drop height 3.0 m, size of loader 1.2 M^3. & frequency of loading 6.0 of trip /hour
		Unloading	0.5775443 gm/sec.	Moisture content of loading material 1%, silt content of loading materials 20%. Drop height 3.0 m, Capacity of dumper 15 M^3. & frequency of loading 1 of trip /hour
4.	Transportation Road	Mineral transport	0.0180075 gm/sec/m.	Moisture content of transport road 1%, silt content 20% & Frequency of vehicle movement 16 trip per hr. and average vehicle speed 5.5 m/sec.
5.	Haul Road	Mineral transport	0.0287987 gm/sec/m.	Moisture content of transport road 5%, silt content 15% & Frequency of vehicle movement 16 trip per hr. and average vehicle speed 5.5 m/sec.

Note: Data are being calculated through 'Emissions' Software for determination of emission rates for Coal and Non-Coal Mines from Central Research Institute, Dhanbad.

The copy of activity sheet and input & Output files are attached as anexure-10.

Table 3.18(B): Sources of Air Pollution and their Emission Factors with Control Measure

S. No.	Source of Air Pollution	Emission Rate		Influencing Parameters
Source		Activity		
1.	Exposed Pit	Overburden	0.0000123 gm/sec/m^2	Moisture content of pit surface 2%, silt content 10%, wind speed 3m/s & area of active pit 0.001245 Sq.km.
		Pit surface	0.0000025 gm/sec/m^2	Moisture content of pit surface 10%, silt content 5%, wind speed 3m/s & area of active pit 0.01 Sq.km.
2.	Mineral	Loading	0.2307385 gm/sec.	Moisture content of loading material 5%, silt content of loading materials 5%. Drop height 2.0 m, size of loader 1.2 M^3. & frequency of loading 42.0 of trip /hour
		Unloading	0.4203128 gm/sec.	Moisture content of loading material 5%, silt content of loading materials 5%. Drop height 2.0 m, Capacity of dumper 15 M^3. & frequency of loading 7 of trip /hour
3.	Overburden	Loading	0.9031993 gm/sec.	Moisture content of loading material 5%, silt content of loading materials 5%. Drop height 2.0 m, size of loader 1.2 M^3. & frequency of loading 6.0 of trip /hour
		Unloading	0.328456 gm/sec.	Moisture content of loading material 5%, silt content of loading materials 5%. Drop height 2.0 m, Capacity of dumper 15 M^3. & frequency of loading 1 of trip /hour
4.	Transportation Road	Mineral transport	0.0032412 gm/sec/m.	Moisture content of transport road 5%, silt content 5%& Frequency of vehicle movement 14 trip per hr. and average vehicle speed 5.5 m/sec.
5.	Haul Road	Mineral transport	0.0179987 gm/sec/m.	Moisture content of transport road 15%, silt content 5% & Frequency of vehicle movement 16 trip per hr. and average vehicle speed 5.5 m/sec.

Note: Data are being calculated through 'Emissions' Software for determination of emission rates for Coal and Non-Coal Mines from Central Research Institute, Dhanbad.

The copy of activity sheet and input & Output files are attached as anexure-10.

D.14 Fugitive Dust Model

The fugitive dust model has been used to predict the ground level SPM concentration in and around the mine. FDM is a computerized Gaussian plume dispersion model, specifically developed by the United State Environment Protection Agency (USEPA) for the estimation of particulate concentrations.

$$C_{xo} = \frac{Q}{2\pi\, u\, \sigma_y\, \sigma_z}$$

where,

C = Polluant concentration, g/m^3

Q = pollutant emission rate, g/s

π = pi, 3.14159

u = mean wind speed, m/s

σ_y = standard deviation of horizontal plume concentration,

σ_z = standard deviation of vertical plume concentration.

D.15 Base Line Incremental and Cumulative PM_{10} & $PM_{2.5}$ Values

On the basis of this data, Base Line & Incremental values of PM_{10} & $PM_{2.5}$ were computed with controlled measures and cumulative incremental increase. In order to arrive at the overall incremental emissions including contribution from the surrounding mines in the study area. The calculated results are given as follows:

Table 3.19: Incremental Increase in PM_{10} with Controlled Measures($\mu g/m^3$)

Station	Coordinates		Base Line PM_{10} Cum.	Incremental PM_{10} Cum.	Resultant PM_{10} Cum.
	X	Y			
Subi	13304	12813	68.80	0.54	69.34
Sandi Khera	9794	9104	80.40	0.76	81.16
Kasbi	11033	2837	72.20	0.59	72.79
Nayan khedi	14859	2467	69.90	0.48	70.38
Chhoti Sadari	2041	9432	63.10	0.42	63.52

Table 3.20: Incremental Increase in $PM_{2.5}$ with Controlled Measures ($\mu g/m^3$)

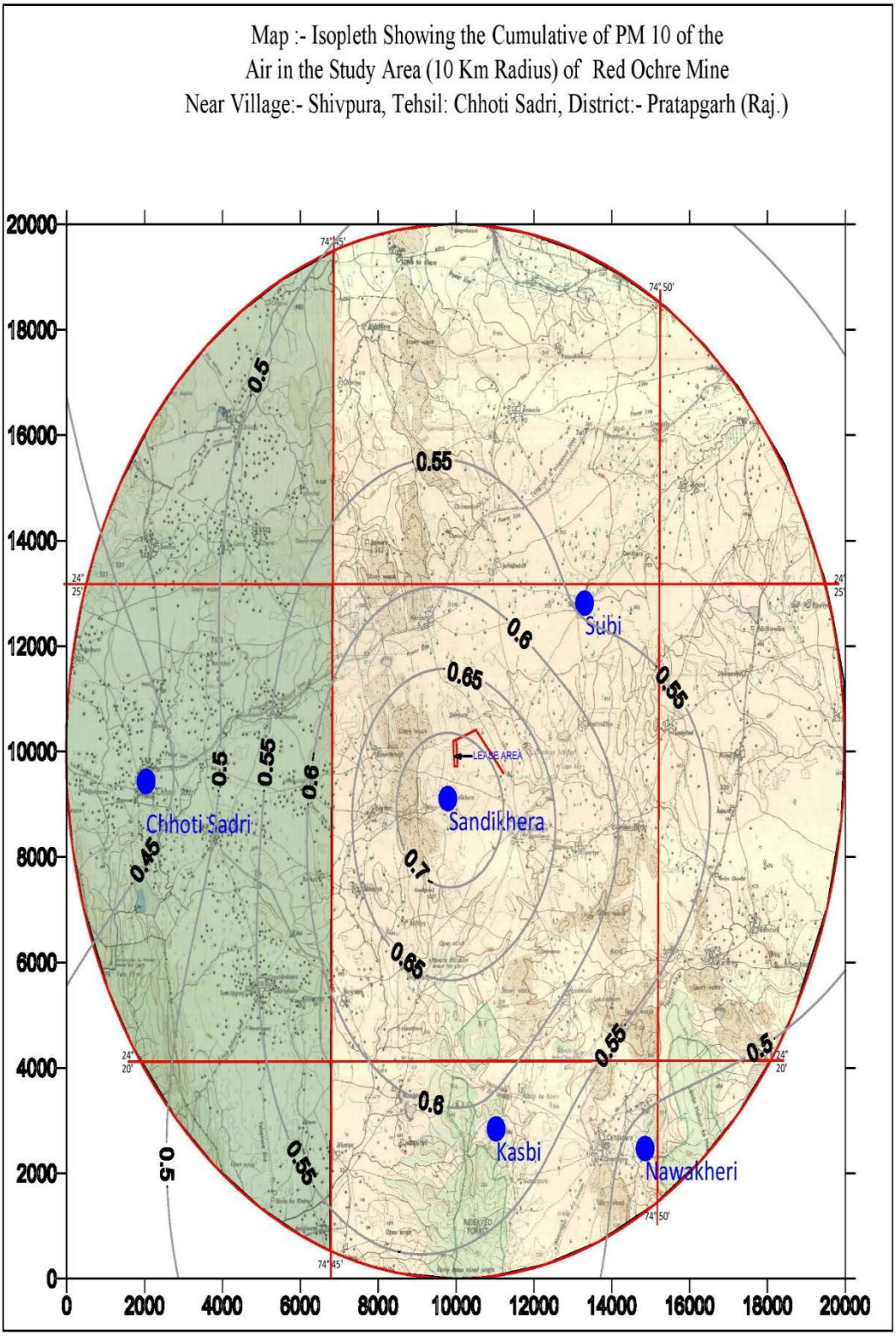
Station	Coordinates		Base Line $PM_{2.5}$Cum.	Incremental PM_{10} Cum.	Resultant PM_{10} Cum.
	X	Y			
Subi	13304	12813	33.60	0.18	33.78
Sandi Khera	9794	9104	36.10	0.26	36.36
Kasbi	11033	2837	32.20	0.21	32.41
Nayan khedi	14859	2467	34.80	0.16	34.96
Chhoti Sadari	2041	9432	30.38	0.17	30.55

D.16 Conclusion

It is known thatdust is generated during loading & unloading of mineral as well as overburden and plying trucks/tippers from transportation during operations of open cast mining. The above tabular incremental values have been calculated to ascertain the impact on air quality due to the present mining activity the 10 km radius comprising the buffer zone.

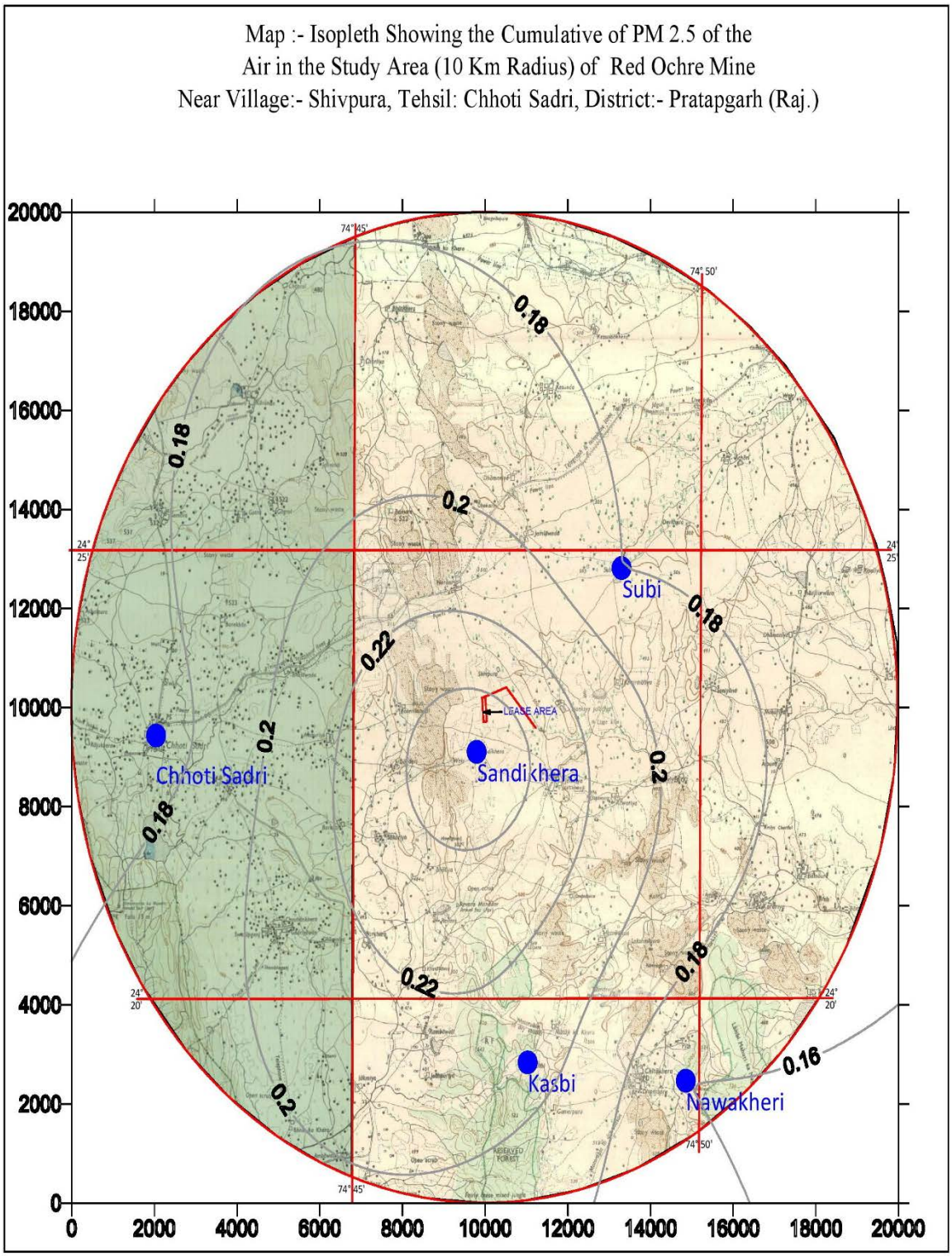
It may be observed that all the baseline values, incremental and resultant values for PM_{10} and $PM_{2.5}$ values are well below the specified NAAQS norms. Consequently, this study does not indicate any harmful impact on the air quality in the core and buffer zones due the present mine operations.

Photograph No. 3.7: Showing Air sampling at Nayan Khedi Village



Map 3.10: Isopleths showing the concentration of Incremental values of PM_{10}

Source: Geological Survey of India Toposheet No. 45L/15.



Map 3.11: Isopleths showing the concentration of Incremental values of $PM_{2.5}$

Source: Geological Survey of India Toposheet No. 45L/15.

3.1.E Noise Environment

E.1 Introduction

The physical description of sound concerns its loudness as a function of frequency. Noise in general is sound, which is composed of many frequency components of various types of loudness levels distributed over the audible frequency range. The most common and universally accepted scale is the A weighted scale, which is measured as dB (A). This is more suitable for audible range of 20 to 20,000 Hz. The scale has been designed to weigh various components of noise according to the response of human ear.

E.2 Noise Level Survey

The impact of noise sources on surrounding community depends on:

- Characteristics of noise sources (instantaneous, intermittent or continuous in nature). It can be observed that steady noise is not as annoying as one which is continuously varying in loudness;
- The time of day at which noise occurs, for example high noise levels at night in residential areas are not acceptable because of sleep disturbance; and
- The location of the noise source, with respect to noise sensitive land use, which determines the loudness and period of exposure.

The environmental impact of noise can have several effects varying from Noise Induced Hearing Loss (NIHL) to annoyance depending on loudness of noise. Noise survey has been conducted in the month of October, 2019 to December, 2019, in the study area in while covering three zones viz., residential, commercial and silence zones. Noise monitoring has been undertaken for 24 hr at each location.

E.3 Identification of Sampling Locations

A preliminary reconnaissance survey has been undertaken to identify the major noise generating sources in the area. Noise at different generating sources has been identified based on the residential, industrial and commercial activities in the area. The noise monitoring has been conducted for determination of noise levels at 6 locations covering both core and buffer zone in the study area. The noise levels at each location were recorded for 24-hrs. The environment sensitivity of each noise monitoring location is being monitored.

Photograph No. 3.8: Showing Noise sampling at Subi village

E.4 Details of Noise Monitoring Station

Core Zone: Mine site: As per the ToR Condition Noise station, monitoring has been carried out at mine site including lease area. The sampler was installed on a stand stand at a height of 1.5 m above the ground level & free from any obstructions.

Buffer Zone

N1: Mine Site: The sampling location is about 8.86 km from the mine site in the SSW direction. This location represents the rural area with agricultural land. Second order stream is passing through this village so the agriculture land is good as well as the nearby area.

N2: Subi: The sampling location is about 4.50 km from the mine site in the NE direction. The instrument is placed on the roof top building periphery above the ground level. The location represents the hilly area with agriculture land.

N3: Sandikhera: The sampling location is about 0.66 km from mine site in SW direction. The area is surrounding hilly with dense forest area.

N4:Kasbi: The sampling location is about 7.00 km from mine site in SE direction. The area located surrounding hilly with dense forest.

N5:Nawakhedi: The sampling location is about 8.70 km from mine site in SE direction. The area located surrounding hilly with dense forest.

N6:Chhoti Sadari: The sampling location is about 8.00 km from mine site in W direction. This location represents the plain & populated urban area. Railway line passing through this area.

E.5 Methodology

Sound Pressure Levels (SPL) measurements were recorded at seven locations including mine site. The readings were taken for every hour for 24 hrs. The day noise levels have been monitored during 6 am to 10 pm and night noise levels during 10 pm to 6 am at all the locations covered in the study area, which covers residential areas, highways, industrial areas, commercial areas, and silence zones.

Table 3.21: Ambient Noise level

S. No	Location	Distance & Direction from Mine Site		Noise Level		Standard Limits in dB (A)		Zone
				Day Time	Night Time	Day Time	Night Time	
1.	Mine Site	-	-	60.2	58.7	75	70	Core Zone
2.	Subi	4.50	NE	53.2	43.6	55	45	Buffer Zone
3	Sandi Khera	0.66	SW	54.6	44.1	55	45	Buffer Zone
4.	Kasbi	7.00	SE	50.0	40.2	55	45	Buffer Zone
5.	Nawa Khedi	8.70	SE	51.9	41.8	55	45	Buffer Zone
6.	Chotti Sadri	8.00	W	52.8	42.9	55	45	Buffer Zone

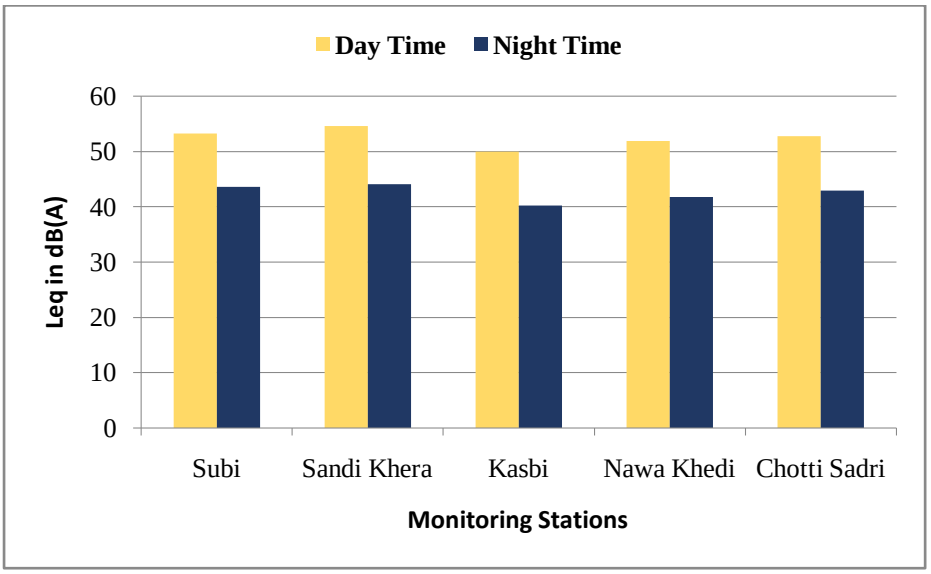


Figure 3.3: Graph showing Noise Level in Buffer Zone

E.6 Discussion

A) Day Time Noise Levels [Leq(day)]

The day time [Leq(day)] noise levels at all the residential locations were observed to be in the range of 54.6 to 50.0 dB(A). The maximum noise level of 54.6 dB (A) was observed at village Sandi Khera and the minimum noise level of 50.0 dB(A) was observed at village Kasbi during the study period. It is observed that the day time noise levels are under prescribed limit.

B) Night time Noise Levels [Leq(night)]

The night time [Leq (night)] noise levels at all the residential locations was observed to be in the range of 44.1 to 40.2 dB(A). The maximum noise level of 44.1 dB (A) was observed at village Sandi Khera and the minimum noise level of 40.2 dB (A) at village Kasbi during the study period. It is observed that the night time noise levels are under prescribed limit.

Overall Conclusion

The overall conclusion of baseline collection of study area shows that the noise level of Day and Night time as per Ambient Noise Level Standards, notified under Noise Pollution (Regulation and Control) Rules, 2000, all values are under standard limits.

3.1.F Ecology & Bio Diversity

F.1 Introduction

Study of the biological environment is one of the most important aspects of Environment Impact Assessment (EIA) in view of the need for conservation of environmental quality and biodiversity. Biodiversity makes up the structure of the ecosystem and habitats that support essential living resources, including wildlife and forest. It helps to provide basic human needs such as food, shelter and medicine. It composes ecosystem that maintains O_2 in the air, enriches the soil, purifies water, protects against the flood, storms damage and also regulates climate. Biodiversity is an important characteristic which is considered to be insurance for the survival of human race on the earth. Higher biodiversity ensures rich gene pool, which provides stability to different ecosystems and valuable resources to fulfill the basic requirements of human being. Vegetation is one of the major geographical features of almost all parts of earth's surface.

Flora is an important part of the ecosystem that integrates the effects of the total environment. It is predominantly a result of physico-climatic conditions of a region. In other words, floristic composition represents a true image of a terrain and seasonal variations of temperature and precipitation and provides basic information for understanding of regional development. It has a highly functional role in providing nutrients for an ecosystem and provides suitable habitat, food and shelter for other biota. It can provide information regarding species composition and structure and its functional role in the landscape as a whole. Knowledge of floristic composition is valuable for many ecological studies such as succession and nature of plant communities which are supportive in reclamation of abandoned sites.

Therefore, it becomes essential to assess in advance the likely impact of any mining activity on the environment of the area. Keeping this fact in view, a study was carried out to establish the present status of flora & fauna in the region (Covering a radius of 10 Kms.), while carrying out the said study, the following objectives were kept in view:

F.2 Objectives of Ecological Studies

The present study was undertaken with the following objectives:

(i) The objectives of the study were to assess the vegetation types, identify the flora, rare and endangered species (if any) and assess the impact of the proposed project activities on the biodiversity.

(ii) Determination of frequency, abundance and density in the core zone and the buffer zone.

(iii) Study the crop pattern.

(iv) Study of the fauna in the core zone and buffer zone.

(iv) Listing of all identified species of flora and fauna of the core zone and buffer zone.

(v) To identify the impacts of proposed mining activity on flora and fauna.

(vii) To suggest mitigative measures to minimize adverse impacts on flora and fauna.

F.3 Methodology Adopted for the Survey

(A) For Flora

(i) Phytosociological study

Standard methods of phytosociology pioneered by Braun Blanquet (1932) and Dieter Muller-Dombois and Ellenberg (1974) were followed for the analysis of vegetation cover. Quadrats of appropriate size, depending on the type of vegetation available, were laid down. All the species encountered in the quadrat were counted and noted in the table. Quadrate size of $1\times1m^2$, $5\times5m^2$ and $10\times10\ m^2$ was taken for herbs, shrubs and trees respectively. On the basis of the data thus collected, frequency, density and abundance of the species growing there was calculated.

(i) Frequency:

Frequency refers to the degree of distribution of individual species in an area and is usually expressed in terms of percentage occurrence. The percentage of frequency was calculated by the following formula-

$$\%\text{Frequency}=\frac{\text{Number of quadrats of occurance of the species}}{\text{Total number of quadrats studied}}\times100$$

(ii) Abundance:

Abundance is described as the number of individuals of different species in the community per unit area. It gives an idea of the distribution pattern of the species.

$$\text{Abundance} = \frac{\text{Total number of individuals of a species in all quadrats}}{\text{Total number of quadrats in which the species occurred}}$$

(iii) Density:

Density represents the numerical strength of a species in the community.

$$\text{Density} = \frac{\text{Total number of individuals of a species in all quadrats}}{\text{Total number of quadrats studied}}$$

(II) Floristic Studies

All the plant species growing in 10 km radius area (core zone & buffer zone) were collected. Standard herbarium techniques were employed for this purpose. Most of the plants were known to the FAE and could be identified in the field itself. Rest of the plant were identified by the FAE with the help of published flora and published literature of the region. Some of the information were collected from the local inhabitants of the study area (Buffer zone).

F.4 Results*:*

F.4.1 Floristic composition

Details of the reported plant species in the core zone and the buffer zone are presented in Table 3.22 & 3.23.

In the core zone a total of 28 species of plants were reported during the survey (Table 3.24).

In the core zone a total of 12 species of herbs belonging to 12 genera and 6 families were found. In case of shrub (2 species), Climbers (2 species) Trees (5 species) and Grass (2 species) belonging to 2, 2, 4, 2 genera and 2,1,4,1 families were recorded. Sedges were not reported during the study period in the core zone.

In the buffer zone a total of 67 plant species (Herb, Shrub, Climber, Tree, Sedges and Grass) were encountered (Table 3.25).

In the buffer zone 21 species of herb belonging to 19 genera and 14 families, 8 species of shrub belonging to 8 genera and 6 families, 4 species of climbers belonging to 4 genera and 3 families, 25 species of trees belonging to 22 genera and 15 families, 3 species of sedges belonging to 2 genera and 1 family were reported.

Results of study indicate that the numbers of herbs, shrubs, climbers, trees, sedges and grasses are less in the core zone as compare to buffer zone (Table 3.22 & 3.23).

Pithocelloium dulace (Jangal Jalebi),*Cassia siamea* (Kassod), *Butea monosperma* (Palash), *Acacia leucophloea* (Ronjh), *Azadirachta indica* (Neem), *Diospyros melanoxylon* (Tendu), *Mangifera indica* (Aam), *Holoptelea integrifolia* (Papri) and *Tectona grandis* (Sagwan) are dominant tree species in the buffer zone of the mine site.

The results of percentage frequency, abundance and density of plant species occurring in the core zone and the buffer zone are presented in table 3.24 & 3.25.

F.4.2 Aquatic flora*:*

Aquatic weed like *Lemna minor* (Common duckweed), *Hydrilla verticillata* (Kureli), are seen in the water bodies and *Potamogeton crispus* (Curlyleaf pond weed), *Typha angustifolia* (Patera), *Limnophylla heterophylla* (Crepe Myrtle)and *Nymphaea nouchali* (Neelkamal) were seen at the banks of water bodies.

F.4.3 Rare, Endangered and Red Listed Plant species

The study area does not have any rare, endangered and red listed plant species according RED Data Book of Indian Plants (Nayar and Sastry, 1990).

F.4.4 Description of Forests, in the Study Area

There are 3 reserved forests (~5.17 Km. in South, ~6.0 Km. in South and 8.50Km. South-West) and 1 protected forest (~7.55 Km. in South-East), within a distance of 10 Km from the proposed lease area/ site.

Table 3.22: Percentage frequency, density and abundance of the plant occurring in the core zone.

S.No.	Botanical Name	Frequency	Abundance	Density
1.	*Parthenium hysterophorus* L.	91.67	3.64	3.33
2.	*Physalis minima* L.	75.00	3.56	2.67
3.	*Solanum nigrum* L.	83.33	2.80	2.33
4.	*Euphorbia hirta* L.	75.00	2.56	1.92
5.	*Lepidagathis trinervis* Wall. ex Nees.	66.67	2.63	1.75
6.	*Tridax procumbens* L.	75.00	3.00	2.25
7.	*Apluda mutica* L.	91.67	3.09	2.83
8.	*Arthraxon lancifolius* (Trin.) Hochst.	75.00	2.89	2.17
9.	*Cynodon dactylon* (L.) Pers.	83.33	2.60	2.17
10.	*Dactyloctenium aegyptium* (L.)Willd.	75.00	2.67	2.00
11.	*Heteropogon contortus* (L.) P. Beauv. Ex Roem.& Schult.	91.67	2.64	2.42
12.	*Jatropha curcas* L.	75.00	2.78	2.08
13.	*Lantana camara* L.	66.67	2.50	1.67

14.	*Azadirachta indica* A. Juss	66.67	2.13	1.42
15.	*Butea monosperma* (Lamk.)Taub.	66.67	2.00	1.33
16.	*Cassia fistula* L.	83.33	2.60	2.17
17.	*Cassia siamea* Lamk.	66.67	2.25	1.50
18.	*Achyranthes aspera* L.	83.33	2.30	1.92
19.	*Ageratum conyzoides* L.	75.00	3.11	2.33
20.	*Alternanthera pungens* H.B.K.	75.00	3.22	2.42
21.	*Argemone mexicana* L.	91.67	2.91	2.67
22.	*Acanthospermum hispidum* DC.	83.33	3.10	2.58

Table 3.23: Percentage frequency, density and abundance of the plant occurring in the buffer zone.

S.No.	Botanical Name	Frequency	Abundance	Density
1.	*Euphorbia geniculata* Orteg.	66.67	2.38	1.58
2.	*Oxalis corniculata* L.	91.67	2.45	2.25
3.	*Parthenium hysterophorus* L.	83.33	3.20	2.67
4.	*Physalis minima* L.	83.33	3.10	2.58
5.	*Solanum nigrum* L.	91.67	3.00	2.75
6.	*Tridax procumbens* L.	91.67	2.00	1.83
7.	*Xanthium strumarium* L.	83.33	3.10	2.58
8.	*Apluda mutica* L.	83.33	2.60	2.17
9.	*Acanthospermum hispidum* DC.	75.00	3.44	2.58
10.	*Achyranthes aspera* L.	91.67	3.27	3.00
11.	*Ageratum conyzoides* L.	91.67	3.09	2.83
12.	*Alternanthera paronychioides* A. St.-Hilaire	83.33	3.50	2.92
13.	*Alternanthera pungens* H.B.K.	91.67	3.36	3.08
14.	*Argemone mexicana* L.	58.33	3.14	1.83
15.	*Boerhavia diffusa* L.	66.67	2.88	1.92
16.	*Commelina benghalensis* L.	83.33	2.80	2.33
17.	*Crotalaria medicaginea* Lamk.	83.33	2.90	2.42
18.	*Datura innoxia* Mill.	83.33	2.60	2.17
19.	*Euphorbia hirta* L.	66.67	3.00	2.00
20.	*Lepidagathis trinervis* Wall. ex Nees.	75.00	2.78	2.08
21.	*Leucas urticifolia* R.Br.	75.00	2.67	2.00
22.	*Malvastrum coromandelianum* (L.) Garcke	66.67	2.63	1.75
23.	*Arthraxon lancifolius* (Trin.) Hochst.	83.33	3.10	2.58
24.	*Cynodon dactylon* (L.) Pers.	75.00	2.78	2.08
25.	*Dactyloctenium aegyptium* (L.)Willd.	91.67	2.55	2.33
26.	*Heteropogon contortus* (L.) P. Beauv. Ex	83.33	2.90	2.42

	Roem.& Schult.			
27.	*Sporobolus diander* (Retz.) P. Beauv.	75.00	3.00	2.25
28.	*Adhatoda vasica* (L.)Nees	83.33	3.10	2.58
29.	*Annona squamosa* L.	83.33	2.80	2.33
30.	*Barleria prionitis* L.	75.00	2.33	1.75
31.	*Calotropis procera* (Ait.) R.Br.	58.33	3.29	1.92
32.	*Jatropha curcas* L.	75.00	2.67	2.00
33.	*Lantana camara* L.	83.33	3.40	2.83
34.	*Prosopis juliflora* (Sw.) DC.	66.67	2.63	1.75
35.	*Acacia leucophloea* (Roxb.) Willd.	75.00	3.78	2.83
36.	*Acacia nilotica* (L.) Wild ex. Del.	66.67	2.88	1.92
37.	*Ailanthus excelsa* Roxb.	66.67	3.50	2.33
38.	*Dalbergia sissoo* Roxb.	83.33	3.10	2.58
39.	*Azadirachta indica* A. Juss.	83.33	3.10	2.58
40.	*Butea monosperma* (Lamk.)Taub.	83.33	3.90	3.25
41.	*Cassia fistula* L.	75.00	3.89	2.92
42.	*Cassia siamea* Lamk.	91.67	3.73	3.42
43.	*Delonix regia* (Boj. Ex Hook.) Raf.	58.33	2.14	1.25
44.	*Diospyros melanoxylon* Roxb.	75.00	3.22	2.42
45.	*Madhuca indica* Gmel.	75.00	2.89	2.17
46.	*Mangifera indica* L.	66.67	2.88	1.92
47.	*Ficus benghalensis* L.	66.67	2.88	1.92
48.	*Ficus religiosa* L.	66.67	2.38	1.58
49.	*Holoptelea integrifolia* (Roxb.) Planch	75.00	4.33	3.25
50.	*Leucaena latisiliqua* (L.) Gillis	66.67	2.25	1.50
51.	*Pongamia pinnata* (L.) Pierre	66.67	3.75	2.50
52.	*Syzygium cumini* (L.) Skeels.	58.33	1.71	1.00
53.	*Tectona grandis* L.	66.67	2.38	1.58
54.	*Phoenix sylvestris* (L.)Roxb.	58.33	2.29	1.33
55.	*Pithocellobium dulace* (Roxb.)Benth.	91.67	2.36	2.17

Table 3.24: List of plants found growing in the core zone of the project area

S.No.	Botanical Name	Family	Common Name
Herb			
1.	*Physalis minima* L.	Solanaceae	Rasbhari
2.	*Lepidagathis trinervis* Wall. ex Nees.	Acanthaceae	Pathar-phor buti
3.	*Parthenium hysterophorus* L.	Asteraceae	Gajar Ghas
4.	*Tridax procumbens* L.	Asteraceae	Akal Kohadi
5.	*Solanum nigrum* L.	Solanaceae	Mokoi
6.	*Achyranthes aspera* L.	Amaranthaceae	Latjira
7.	*Ageratum conyzoides* L.	Asteraceae	Jangli pudina

8.	*Alternanthera pungens* H.B.K.	Amaranthaceae	Khaki weed
9.	*Argemone mexicana* L.	Papaveraceae	Satyanashi
10.	*Acanthospermum hispidum* DC.	Asteraceae	Akal kohadi
11.	*Datura innoxia* Mill.	Solanaceae	Safed datura
12.	*Euphorbia hirta* L.	Euphorbiaceae	Baridhudi
Shrubs			
13.	*Jatropha curcas* L.	Euphorbiaceae	Jamal Ghota
14.	*Lantana camara* L.	Verbenaceae	Raimuniya
Climber			
15.	*Trichosanthes cucumerina* L.	Cucurbitaceae	Padwal
16.	**Mukia maderaspatana** (L.) Roem	Cucurbitaceae	Agumaki
Trees			
17.	*Cassia fistula* L.	Caesalpinaceae	Amaltas
18.	*Leucaena latisiliqua* (L.) Gillis	Mimosaceae	Safed babool
19.	*Cassia siamea* Lamk.	Caesalpiniaceae	Kassod
20.	*Azadirachta indica* A. Juss	Meliaceae	Neem
21.	*Butea monosperma* (Lamk.)Taub.	Fabaceae	Palash
Grasses			
22.	*Apluda mutica* L.	Poaceae	Lapdu
23.	*Arthraxon lancifolius* (Trin.) Hochst.	Poaceae	-
24.	*Cynodon dactylon* (L.) Pers.	Poaceae	Doob
25.	*Dactyloctenium aegyptium* (L.)Willd.	Poaceae	Crowfoot Grass
26.	*Heteropogon contortus* (L.) P. Beauv. Ex Roem.& Schult.	Poaceae	Black Speargrass

Table 3.25: List of plants found growing in the buffer zone of the project area

S.No.	Botanical Name	Family	Common Name
Herb			
1.	*Boerhavia diffusa* L.	Nyctaginaceae	Gadha-cand
2.	*Commelina benghalensis* L.	Commelinaceae	Kaua-kaini
3.	*Crotalaria medicaginea* Lamk.	Fabaceae	-
4.	*Acanthospermum hispidum* DC.	Asteraceae	Akal kohadi
5.	*Achyranthes aspera* L.	Amaranthaceae	Latjira
6.	*Ageratum conyzoides* L.	Asteraceae	Jangli pudina
7.	*Alternanthera paronychioides* A. St.-Hilaire	Amaranthaceae	Joyweed
8.	*Alternanthera pungens* H.B.K.	Amaranthaceae	Khaki weed
9.	*Argemone mexicana* L.	Papaveraceae	Satyanashi
10.	*Leucas urticifolia* R.Br.	Lamiaceae	Chhota halkusa
11.	*Malvastrum coromandelianum* (L.) Garcke	Malvaceae	Kharenti
12.	*Oxalis corniculata* L.	Oxalidaceae	Amrul
13.	*Lepidagathis trinervis* Wall. ex Nees.	Acanthaceae	Pathar-phor buti
14.	*Datura innoxia* Mill.	Solanaceae	Safed datura
15.	*Euphorbia geniculata* Orteg.	Euphorbiaceae	Wild poinsettia

16.	*Euphorbia hirta* L.	Euphorbiaceae	Baridhudi
17.	*Tridax procumbens* L.	Asteraceae	Akal Kohadi
18.	*Xanthium strumarium* L.	Asteraceae	Chota Gokhuru
19.	*Parthenium hysterophorus* L.	Asteraceae	Gajar Ghas
20.	*Physalis minima* L.	Solanaceae	Rasbhari
21.	*Solanum nigrum* L.	Solanaceae	Mokoi
Shrubs			
22.	*Jatropha curcas* L.	Euphorbiaceae	Jamal Ghota
23.	*Lantana camara* L.	Verbenaceae	Raimuniya
24.	*Prosopis juliflora* (Sw.) DC.	Mimosaceae	Vilaiti Keekar
25.	*Vitex negundo* L.	Verbenaceae	Nirgundi
26.	*Adhatoda vasica* (L.)Nees	Acanthaceae	Arusa
27.	*Annona squamosa* L.	Annonaceae	Sitaphal
28.	*Barleria prionitis* L.	Acanthaceae	Vajradanti
29.	*Calotropis procera* (Ait.) R.Br.	Asclepiadaceae	Aak
Climber			
30.	*Ipomoea nil* (L.) Roth	Convolvulaceae	Kaladana
31.	*Cryptostegia grandiflora* (Roxb.)R.Br. ex Lindl.	Asclepiadaceae	Kadva Parvar
32.	*Trichosanthes cucumerina* L.	Cucurbitaceae	Padwal
33.	**Mukia maderaspatana** (L.) Roem	Cucurbitaceae	Agumaki
Trees			
34.	*Leucaena latisiliqua* (L.) Gillis	Mimosaceae	Safed babool
35.	*Madhuca indica* Gmel.	Sapotaceae	Mahua
36.	*Delonix regia* (Boj. Ex Hook.) Raf.	Caesalpiniaceae	Gulmohar
37.	*Diospyros melanoxylon* Roxb.	Ebenaceae	Tendu
38.	*Eucalyptus citriodora* Hook.	Myrtaceae	Safeda
39.	*Ficus benghalensis* L.	Moraceae	Bar
40.	*Ficus religiosa* L.	Moraceae	Pipal
41.	*Butea monosperma* (Lamk.)Taub.	Fabaceae	Palash
42.	*Cassia fistula* L.	Caesalpinaceae	Amaltas
43.	*Cassia siamea* Lamk.	Caesalpiniaceae	Kassod
44.	*Dalbergia sissoo* Roxb.	Fabaceae	Sheesham
45.	*Acacia leucophloea* (Roxb.) Willd.	Mimosaceae	Ronjh
46.	*Acacia nilotica* (L.) Wild ex. Del.	Mimosaceae	Babool
47.	*Ailanthus excelsa* Roxb.	Simbouraceae	Mahanimb
48.	*Albizia odoratissima* (L.f.) Benth.	Mimosaceae	Kala-siris
49.	*Azadirachta indica* A. Juss	Meliaceae	Neem
50.	*Holoptelea integrifolia* (Roxb.) Planch	Ulmaceae	Papri
51.	*Mangifera indica* L.	Anacardiaceae	Aam
52.	*Peltophorum pterocarpum* (DC.) Backer & Heyne	Caesalpinaceae	Peela gulmohar
53.	*Phoenix sylvestris* (L.)Roxb.	Arecaceae	Khajur
54.	*Syzygium cumini* (L.) Skeels.	Myrtaceae	Jamun
55.	*Tectona grandis* L.	Verbenaceae	Sagwan
56.	**Phyllanthus emblica L.**	Euphorbiaceae	Amla

57.	*Pithocellobium dulace*(Roxb.)Benth.	Mimosaceae	Jangal Jalebi
58.	*Pongamia pinnata* (L.) Pierre	Fabaceae	Karanj
Sedges			
59.	*Cyperus rotundus* L.	Cyperaceae	Nagarmotha
60.	**Fimbristylis dichotoma (L.) Vahl.**	Cyperaceae	Tall fringe rush
61.	*Cyperus difformis* L.	Cyperaceae	Motha
Grasses			
62.	*Heteropogon contortus* (L.) P. Beauv. Ex Roem.& Schult.	Poaceae	Black Speargrass
63.	*Sporobolus diander* (Retz.) P. Beauv.	Poaceae	Khui ghas -Santali
64.	*Cynodon dactylon* (L.) Pers.	Poaceae	Doob
65.	*Apluda mutica* L.	Poaceae	Lapdu
66.	*Arthraxon lancifolius* (Trin.) Hochst.	Poaceae	-
67.	*Dactyloctenium aegyptium* (L.)Willd.	Poaceae	Crowfoot Grass

Table 3.26: Details of forest area in the Buffer zone

S.No.	Category of the Forest Area	Direction	Distance From Core Zone (in Km.)
1.	***Reserved forest***	South	5.17 Km.
2.	***Reserved forest***	South	6.00 Km.
3.	***Reserved forest***	South-West	8.50 Km.
4.	***Protected forest***	South-East	7.55 Km.

Crop Pattern:

Cropping pattern refers to the proportion of area under different crops at a particular time period. The area under reference is irrigated mainly with tube well water. Crops are mostly cultivated with the help of bore well water. Generally, two crops such as Rabi and Kharif are grown. In the study area vegetables, spices, medicinal and aromatic crops are cultivated over the land suitable for agricultural purpose. Survey of the area (Core & buffer zone) and dialogue with the local farmers of the area revealed that the following crops are mainly grown in the fields by the farmers.

Table 3.27: Crops (Kharif and Rabi) are growing in the study area by farmers

S.No.	Botanical Name	Common Name	Family
1	*Brassica campestris* L.	Sarson	Brassicaceae
2	*Cicer arietinum* L.	Chana	Fabaceae
3	*Zea mays* L.	Makka	Poaceae
4	*Oryza sativa* L.	Dhan	Poaceae
5	*Triticum aestivum* L.	Gehun	Poaceae

(i) Field Crops

The major field crops of the area are Sarson, Chana, Makka, Dhan and Gehun (Table 3.27).

(ii) Horticulture Crops-Vegetable

Bathua, Mooli, Palak, Tamatar, Gajar, Piaz, Matar, Mirch, Aloo, Methi, Lehsun, Arvi, Bhindi, Karela and Lauki are cultivated in the study area during the Monsoon and Post-Monsoon period (Table 3.28).

Table 3.28: The common vegetables grown in the area are

S. No.	Botanical Name	Common Name	Family
1.	*Chenopodium album* L.	Bathua	Chenopodiaceae
2.	*Raphanus sativus* L.	Mooli	Brassicaceae
3.	*Spinacia oleracea* L.	Palak	Chenopodiaceae
4.	*Solanum esculentum* L.	Tamatar	Solanaceae
5.	*Daucus carota L.var. sativa* DC.	Gajar	Apiaceae
6.	*Allium cepa* L.	Piaz	Liliaceae
7.	*Pisum sativum* L.	Matar	Fabaceae
8.	*Capsicum frutescence* L.	Mirch	Solanaceae
9.	*Solanum tuberosum* L.	Aloo	Solanaceae
10.	*Trigonella foenum-graecum* L.	Methi	Fabaceae
11.	*Allium sativum* L.	Lehsun	Liliaceae
12.	*Colocasia esculenta* (L.)Schott.	Arvi	Araceae
13.	*Abelmoschus esculentus* (L.)Moench.	Bhindi	Malvaceae
14.	*Momordica charantia* L.	Karela	Cucurbitaceae
15.	*Lagenaria siceraria* (Molina)Standl.	Lauki	Cucurbitaceae

(iii) Horticulture crops-Fruits:

Lemon, Aonla and Pomegranate are the horticulture fruit crops.

(iv) Condiments Crops: *Zingiber officinale* (Adrak), *Trigonella foenum-graecum* (Methi), and *Coriandrum sativum* (Dhania) are major condiments crops cultivated in the study area from bore well water (Table-3.29).

Table- 3.29: The condiments crops grown in the area are

S.No.	Botanical Name	Common Name	Family
1.	*Zingiber officinale* L.	Adrak	Zingiberaceae
2.	*Trigonella foenum-graecum* L.	Methi	Fabaceae
3.	*Coriandrum sativum* L.	Dhania	Apiaceae

(v) Pulses:

Lens culinaris (Masoor), *Vigna aconitifolia* (Moth), and *Glycine max* (Soybean) are grown as major pulses crops in the study area (Table 3.30).

Table 3.30: The common pulses grown in the area are

S. No.	Botanical Name	Common Name	Family
1.	*Lens culinaris* Medic.	Masoor	Fabaceae
2.	*Vigna aconitifolia* (Jacq.) Marechal.	Moth	Fabaceae
3.	*Glycine max* (L.)Merr.	Soybean	Fabaceae

(vi) Medicinal and aromatic crops:

Trachyspermum ammi (Ajwain), *Papaver somniferum* (Postha) and *Anethum graveolens* (Sova) are major medicinal and aromatic crops cultivated in the study area from bore well water (Table 331).

Table 3.31. Medicinal and aromatic crops are also grown in the area. These are as following

S.No.	Botanical Name	Common Name	Family
1	*Trachyspermum ammi* (L.) Sprague	Ajwain	Apiaceae
2	*Papaver somniferum* L.	Postha	Papaveraceae
3	*Anethum graveolens* L.	Sova	Apiaceae

(vii) Fodder Crops:

Sorghum, Pearl millet and Maize are cultivated as fodder crop.

(B) For Fauna*:*

The evaluation of fauna has been done on the basis of secondary data collected from different government offices like forest department, wildlife department, etc. The assessment of avifauna has been done on the basis of actual field observation by direct sighting and observation and collection of indirect evidences.

F.5 Fauna Survey Results

Results of survey indicated that both vertebrates and invertebrates are found in buffer zone. In core zone the number of birds and mammals is very less as compared to buffer zone. The buffer zone represents different habitats and ecological setups like the agricultural land, forest land, stony waste land, cultivable waste land with scrub land and water bodies (Pond, river and nallah etc).

A night survey was conducted in core zone, buffer zone and different locations in the study area with the help of spot light on foot (by walking) for the records of nocturnal birds, mammals and reptiles. Water bodies (Pond, river and nallah) also were visited to study the amphibians.

Details of observed fauna in the core zone and buffer zone are given in Table 3.28 and 3.29.

F.5.1 Avifauna (Birds)

A total of 31 species of birds were observed in the buffer zone and all the species comes under Schedule-IV of the Wildlife (Protection) Act, 1972(Table 3.32).

In the core zone 7 species of birds were observed and they belong to Schedule-IV of the Wildlife (Protection) Act, 1972 (Table 3.32),

No endemic, endangered or rare species of birds were reported either in the core zone or the buffer zone.

F.5.2 Reptile

The details of reported reptiles and amphibians in the core zone and the buffer zone with their common names / local names and their schedule have been presented in tables 3.32 & 3.33.

In the buffer zone 2 species of reptiles and 3 species of amphibians were reported. All the above mentioned species (reptiles and mammals) have been included in Schedule-IV of Wildlife (Protection) Act, 1972. The presence of only 1 species of reptile was reported in the core zone, which comes under Schedule-IV of the Wildlife (Protection) Act, 1972.

During survey period no species of amphibians were either noticed or reported in the core zone.

F.5.3 Butterflies

In the buffer zones 3 species of butterflies were reported. These species belong to 3 genera and come under Schedule-IV of the Wildlife (Protection)Act, 1972 (Table 3.33), but the ***butterfly***has ***not*** been***reported*** in the core zone.

F.5.4 Mammals

Details of observed small and large mammals found in the core zone and the buffer zone with their status as per Wildlife (Protection) Act, 1972 are given in tables 3.33.

In the study area (buffer zone) 8 species of small and large mammals were reported in the agricultural fields. These are **Funambulus pennanti (**Indian Palm squirrel), *Hyaena hyaena* (Striped Hyaena), **Lepus nigricollis *(***Indian Hare***),* Megaderma lyra *(***Indian False Vampire Bat***),* **Mus platythrix *(Field mouse),* Viverricula indica *(Common civet),* Vulpes bengalensis *(Common fox) and* Boselaphus tragocamelus *(Nilgai).***

The Core zone is largely devoid of mammals. However, **Funambulus pennanti (**Indian Palm squirrel) and **Lepus nigricollis *(***Indian Hare***) were** reported, which belongs to Schedule-IV of Wildlife (Protection) Act, 1972 (Table3.32).

In the buffer zone, Boselaphus tragocamelus (Nilgai) were seen in the fields of maize in groups of 1 to 2.

Out of 8 mammalian species found in the buffer zone, 3 species belong to Schedule-IV, one to Schedule-V, two species belongs to Schedule-II Part II and two species comes under Schedule-III of Wildlife (Protection) Act, 1972.

A number of Megaderma lyra (**Indian False Vampire Bat**) were seen during day time sitting on the walls of an old building and inside the cavities of some trees.

Table 3.32: Details of observed Fauna in the Core Zone of the project area

S.No.	Scientific Name	Common Name	Family	Conservation Status as Per WL(P)A,1972
Birds				
1	*Pycnonotus cafer*	Red-vented Bulbul	Pycnonotidae	Sch-IV
2	*Merops orientalis*	Green Bee-eater	Meropidae	Sch. IV
3	*Corvus splendens*	House crow	Corvidae	Sch. V
4	*Columba livia*	Rock Pigeon	Columbidae	Sch-IV
5	**Lanius vittatus**	Bay-backed Shrike	Laniidae	Sch. IV
6	*Streptopelia chinensis*	Spotted Dove	Columbidae	Sch-IV
7	*Vanellus indicus*	Redwattled Lapwing	***Charadriidae***	Sch-IV
Mammals				
8	*Funambulus pennant*	Five Stiped Palm Squirrel	Felidae	Sch-IV
9	*Lepus nigricollis*	Indian Hare	Leporidae	Sch-IV
Reptiles				
10	*Hemidactylus flaviviridis*	House Gecko	Gekkonidae	Sch. IV
11	**Calotes versicolor**	Indian Garden Lizard	Agamidae	Sch. IV
Butterflies				

12	**Nil**
Amphibians	
13	**Nil**

WL(P)A,1972= Wildlife (Protection) Act, 1972; **Sch.=**Schedule

Table 3.33: Details of observed Fauna in the Buffer Zone of the project area

S. No.	Zoological Name	Common Name	Family	Conservation Status as Per WL(P)A,1972
Birds				
1.	*Acridotheres tristis*	Common Myna	Sturnidae	Sch-IV
2.	*Alcedo atthis*	Common Kingfisher	Alcedinidae	Sch-IV
3.	*Ardeola grayii*	Pond Heron	Ardeidae	Sch-IV
4.	*Bubo bubo*	Indian Great Horned Owl	Strigidae	Sch-IV
5.	*Bubulcus ibis*	Cattle Egret	Ardeidae	Sch-IV
6.	*Centropus sinensis*	Crow Pheasant	Cuculidae	Sch-IV
7.	*Circus macrourus*	Pale Harrier	***Accipitridae***	Sch-IV
8.	*Columba livia*	Rock Pigeon	Columbidae	Sch-IV
9.	*Copsychus saularis*	Magpie Robin	Turdidae	Sch-IV
10.	*Coracias benghalensis*	Indian Roller	Coraciidae	Sch-IV
11.	*Corvus macrorhynchos*	Jungle Crow	Corvidae	Sch-IV
12.	*Corvus splendens*	House Crow	Corvidae	Sch-IV
13.	*Dendrocitta vagabunda*	Tree Pie	Corvidae	Sch-IV
14.	*Dicrurus adsimilis*	Black Drongo	Dicruridae	Sch-IV
15.	*Dicrurus caerulescens*	White Bellied Drongo	Dicruridae	Sch-IV
16.	*Egretta garzetta*	Little Egret	Ardeidae	Sch-IV
17.	*Eudynamys scolopacea*	Eurasian Koel	Cuculidae	Sch-IV
18.	*Lanius cristatus*	Brown Shrike	Laniidae	Sch-IV
19.	*Motacilla maderaspatensis*	Large Pied Wagtail	Motacillidae	Sch-IV
20.	*Passer domesticus*	House Sparrow	Passeridae	Sch-IV
21.	*Phalacrocorax niger*	Little Cormorant	Phalacrocoracidae	Sch-IV
22.	*Psittacula eupatria*	Alexandrine Parakeet	Psittaculidae	Sch-IV
23.	*Psittacula krameri*	Rose Ringed Parakeet	Psittaculidae	Sch-IV
24.	*Pycnonotus cafer*	Red-vented Bulbul	Pycnonotidae	Sch-IV
25.	*Streptopelia chinensis*	Spotted Dove	Columbidae	Sch-IV
26.	*Sturnus pagodarum*	Brahminy starling	Sturnidae	Sch-IV
27.	*Tringa hypoleucos*	Common Sandpiper	Scolopacidae	Sch-IV
28.	*Turdoides striatus*	Jungle Babbler	**Leiothrichidae**	Sch-IV
29.	*Vanellus indicus*	Redwattled Lapwing	***Charadriidae***	Sch-IV
30.	*Vanellus malarbaricus*	Yellow Wattled Lapwing	Charadriidae	Sch-IV
31.	*Merops orientalis*	Green Bee-eater	Meropidae	Sch. IV
Reptiles				
32.	*Calotes versicolor*	Garden Lizard	Agamidae	Sch-IV
33.	*Hemidactylus flaviviridis*	House Gecko	Gekkonidae	Sch-IV

Butterflies				
34.	*Eurema hecabe*	Common Grass Yellow	**Pieridae**	Sch-IV
35.	*Danaus chrysippus*	Plain Tiger	***Nymphalidae***	Sch-IV
36.	*Euploea core*	Common Indian Crow	Nymphalidae	Sch-IV
Amphibians				
37.	*Bufo andersoni*	Marbled Toad	Bufonidae	Sch-IV
38.	*Bufo melanostictus*	Common Indian Toad	Bufonidae	Sch-IV
39.	*Rana tigrina*	Indian Bull Frog	Dicroglossidae	Sch-IV
Mammals				
40.	*Funambulus pennant*	Five Stiped Palm Squirrel	Felidae	Sch-IV
41.	*Hyaena hyaena*	Striped Hyaena	Hyaenidae	Sch-III
42.	*Lepus nigricollis*	Indian Hare	Leporidae	Sch-IV
43.	*Megaderma lyra*	Inidan False Vampire Bat	***Megadermatidae***	Sch-V
44.	*Mus platythrix*	Field Mouse	Muridae	Sch-IV
45.	*Viverricula indica*	Common civet	Viverridae	Sch-II Part II
46.	*Vulpes bengalensis*	Common Fox	Canidae	Sch-II Part II
47.	**Boselaphus tragocamelus**	Nilgai	Bovidae	Sch. III

WL (P) A, 1972=Wildlife (Protection) Act, 1972;

F.6 National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors etc. (Existing as well as proposed)

There are no existing as well as proposed eco-sensitive areas like National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ElephantReserveswithin the core zone and buffer zone (i.e. - within distance of 10 Km radius from the proposed lease area).

F.7 Critically Endangered, Endangered and Vulnerable fauna

The study area does not have any Critically Endangered, Endangered and Vulnerable faunal species according to IUCN red list.

F.8 Interpretation

The results of the study show that local herbs within the core zone will have to be uprooted in the course of mining. These herb species is also available in plenty in the buffer zone.The livelihood of the local people is not dependent on the flora. Thus the earning of the local people will not be affected by it.

Results of the study indicate that in case of flora there are no Rare, Endangered and Threatened species of flora and fauna in the study area (Core zone & Buffer zone). There are no Rare, Endangered and Threatened species of fauna in the core zone. The study area doesn't form a part of eco-sensitive areas like National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors and Elephant Reserves. Likewise, the area does

not form a part of the migratory route of fauna. But proposed mining activities will have impacts on flora and fauna of the core zone and the buffer zone.

In order to minimize this impact mitigating measures have been suggested in Table 4.9 of chpater-4.

3.1.G Traffic Density

G.1 Introduction

Since there are a number of existing/proposed Red Ochre or other mineral mines in the adjoining areas/region, the evacuation of any mineral from all the mines will move on the same roads. The exiting road of mining area situated at a distance of 48.00 km from DistrictPratapgarh.

G.2 Methodology

The vehicles running in both the directions were counted continuously for 24 hours at each location. The vehicles were counted every hour and recorded under respective category. The vehicles were categorized under various heads like two or three wheelers, Four Wheelers, Buses and Trucks/Trailers. The categorization of the vehicles is necessary to calculate speed and interference factors varying with the type of vehicle.

Table 3.34 (A): Recommended PCU Factors for Various Types of Vehicles

S. No.	Vehicle Type	Equivalency Factor
1	Fast Vehicles	
2	Motor Cycle or Scooter	0.50
3	Passenger Car, Pick-up Van or Auto-rickshaw	1.00
4	Agricultural Tractor, Light Commercial Vehicle	1.50
5	Truck or Bus	3.00
6	Truck-trailer, Agricultural Tractor-trailer	4.50

Source: As per Guideline of IRC

Table 3.34 (B): Recommended Design Service Volume

S. No.	Category of Road	Maximum PCU/Day
i.	Intermediate Lane	6000
ii.	Two lane road	15000

Source: As per Guideline of IRC

The production capacities of existing and applied mines for the project proponents in this region, using the same route for evacuation of mineral produce from their mines are tabulated as under:

Table 3.35 Production capacities of Mine

S. No.	Project Proponent	M. L. No.	Existing capacity TPA	Revised applied capacity /Additional capacity TPA
1	M/s Quality Minerals	07/2018	0.00	2,33,445
	Total		**0.00**	**2,33,445**

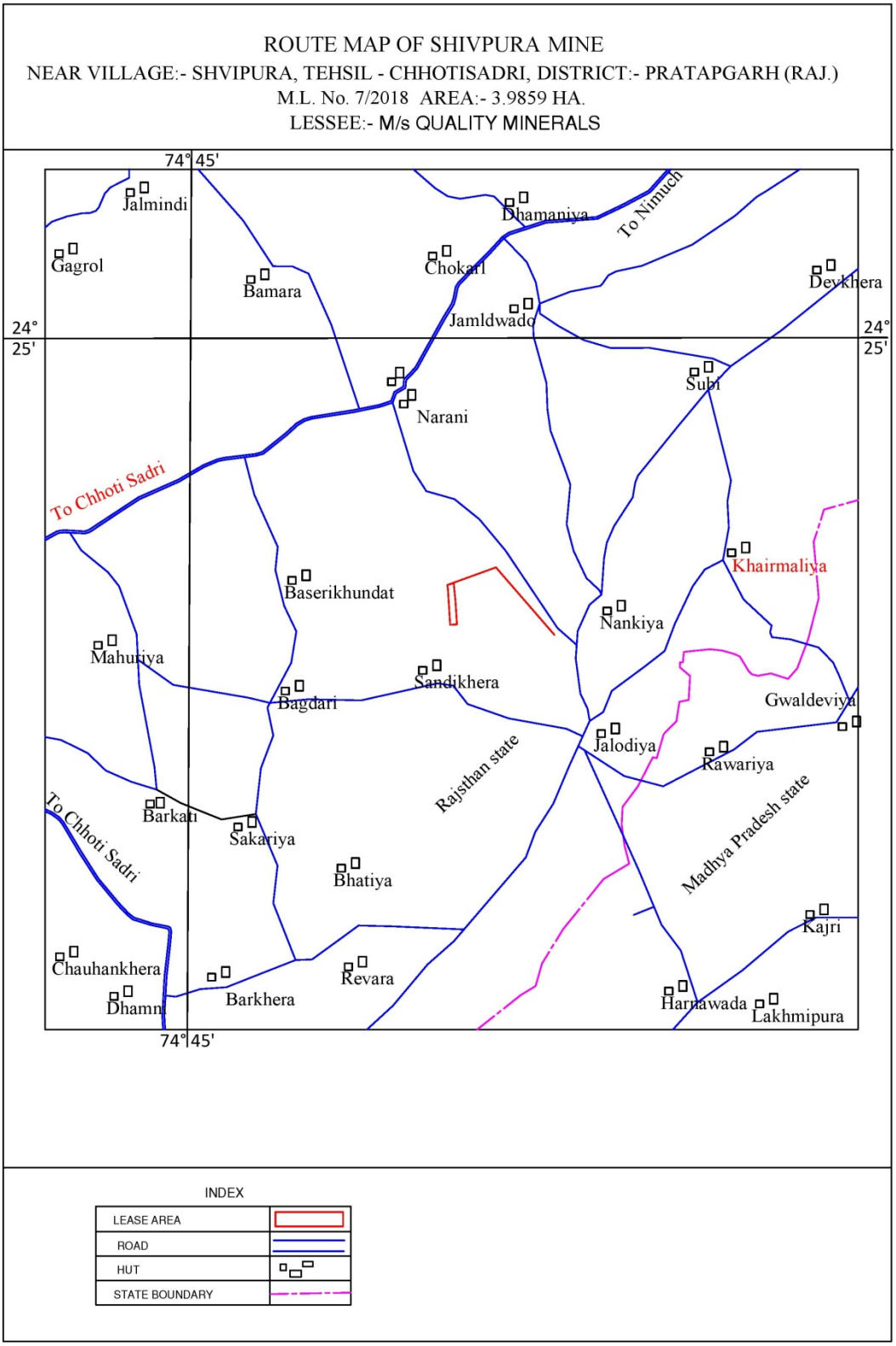
The additional traffic on roads due to evacuation of additional produce of Red Ochre mine as per above table is 2,33,445 tonnes per annum. Considering dispatch of Red Ochre on 330 days per annum basis the daily average traffic will be 2,33,445/330 = About 707.40 tonnes daily. It is observed that truck trailers travelling on the road carry on an average 15 tonnes per trip and therefore the additional traffic will be 707.40 /15 = 47.16 truck trailers daily. The peak traffic is observed moving between 8AM to 11 PM that is during 15 hours daily and thus on an average additional 47.16/15 = 3.14 loaded truck trailers per hour will move on the Narani Chokti to Chhoti Sadri Road.

Photograph No. 3.9: Showing Traffic Survey for Shivpura Mine

G.3 Traffic of trucks trailers carrying Red Ochre during 24 hours' time cycle

Existing traffic on the roads includes only the evacuation of Red Ochre being produced and dispatched from mines at the existing production levels. Therefore, no additional traffic due to the increased in production capacity proposed for this mine has be estimated for evaluating the impact on traffic due to no increase in production.

Photograph 3.10: Showing Traffic survey



Map 3.12:Mineral Evacuation Map

G.4 Vehicular Traffic Density

Monitoring of traffic for movement of Red Ochre from the existing mines and increased produce after getting EC to various destinations.

Table 3.36: Details of Traffic Location and Existing Traffic Volume

Code	Road	Traffic*	2wheelers /Cycles	3 Wheelers	4 Wheelers	Bus/ Trucks/ Trailers	Tractors	PCU
T1	Narani Chokti to Chhoti Sadari	Existing	250	30	185	60	59	878
		Additional	33	2	2	47	2	171.5
		Total	283	32	187	107	61	1049.5
T2	Chhoti Sadari to Narani Chokti	Existing	310	38	135	74	44	815.5
		Additional	33	2	2	47	2	171.5
		Total	343	40	137	121	46	987.0

G.5 Inferences

Careful examination of estimated PCU values range from 1049.50 to 987.00. Maximum PCU value is observed (1049.50) on Narani Chokti to Chhoti Sadari, Highway, which is within the prescribed limits and considered safe as per Indian Roads Congress Standards.

Hence, the existing road/highway is suitable / capable of sustaining the additional traffic load likely to be generated by plying more number of vehicles due to additional proposed production of the present mine.

3.1.H Socio - Economic Environment

H.1 Introduction

By social impacts we mean the consequences to human population of any public or private actions that alter the ways in which people live, work play relates to one another, organize to meet their needs and generally cope as members of society. The term also includes cultural impacts involving changes to the norms, values and beliefs that guide and nationalize their cognition of themselves and their society.

H.2 Demography & socio-economic

The growth of mining and industrial sectors and infrastructure developments in and around the agriculture dominant areas, villages and towns is bound to create its impact on the socio-economic aspects of the local population of the area experiencing development. The impacts may be positive or negative depending upon the developmental activity. To assess the anticipated impacts of the mining and industrial growth on the socio-economic aspects of people, it is necessary to study the existing socio-economic status of the local population, which will be helpful for making efforts to further improve the quality of life in the area under study. For assessing the prevailing socio-economic aspects of people in the study area around the existing mine, the required data has been collected from various secondary sources and analysed.

The demographic and socio-economic scenario, prevailing in the 10 km radius of the proposed project Red ochre mine situated at near village Shivpura, Tehsil Choti Sadri, District Pratapgarh & State Rajasthan were analyzed. The socio-economic data forms the basis for developing appropriate social responsibility plans to address the needs of the population.

The project proponent is committed to take up the socio-economic development initiatives not only to minimize the negative impact on the population but also to improve the socio-economic status of population living in 10 km radius of the plant through sustained efforts as part of the proposed CER programme.

H.3 Methodology Adopted for the Study

This chapter describes the methods and procedures used in selection of location and sample for the study. It also includes measuring devices and tools use for data collection and statistical methods used for analysis.

- **Selection of location**: - This study was conducted in concern of Red ochre mine situated at near village Shivpura, Tehsil Choti Sadri, District Pratapgarh & State Rajasthan. The lease hold area is located between latitude 24°23'20.9236"Nto 24°23'21.6925"N and longitude74°46'51.0648"E to 74°46'53.7769E.
- **Selection of villages and respondents:** - Therefore, out of 54 villages in the study area, 6 villages were selected on the basis of the maximum population, situated near to core zone area and mostly affected by mine and 30 respondents were selected from 6 villages for the survey of baseline data by random sampling technique.
- **Construction of interview schedule: -** Interview schedule was prepared according to study.
- **Collection of data:**The information was elicited from the respondents with the help of structured interview schedule. Face to face interview technique was employed for collecting the data from respondents. The final schedule was used to gather the information from the respondents by personal interview method. The interview was conducted by translation in Hindi.
- **Analysis of data: -** The data so collected were transferred to tally sheets. They were then scrutinized, proceeded, classified, tabulated and analyzed for statistical treatments.
- **Statistical measures: -** Percentage and frequency were used to analyse data.
- Review of secondary data, such as District Primary Census Statistical Hand Book of Pratapgarh district, 2011 & Provisional Census data of Pratapgarh district, 2011 within the study area around the existing M/s Quality Minerals.
- Estimated population was calculated by 1.23 per cent growth rate. (According to World Bank population of India is increasing by average growth rate of 1.23 per cent per year during 2010 to 2015 and 1.1 per cent per year during 2015 to 2020.)
- Interactions or group discussions with the villagers for eliciting the general information of the study area, to support and/or supplement the information collected through secondary and primary surveys with respect to population, density, household size, sex ratio, social stratification, literacy rate and occupational structure for 10 km radius studyarea.

H.4 Review of the Demographic and Socio-Economic Profile -2011

The sociological aspects of this study included human settlements, demography, social strata such as Scheduled Castes and Scheduled Tribes and literacy levels besides infrastructure facilities available in the study area. The economic aspects include occupational structure of workers. The information on socio-economic aspects of the study area has been collected from secondary sources, which mainly include District Primary Census Handbook 2011 Pratapgarh district.

The village-wise demographic data as per 2011 is presented in Annexure 12. The salient features of the demographic and socio-economic aspects of the study area are described in the following sections.

H.5 Demographic Aspect

The study area consisted of 70183 persons inhabited within the Buffer zone.The data incorporated in Table-H1clearly shows that out of total 70183 people, 35672 (50.83%) people were males and 34511 (49.17%) were females.

Table-H1further shows that out of total 4429 people in 0-3 km radius, 2235 (50.46%) people were males and 2194 (49.54%) were females, whereas, in 3-7 km radius, out of total 17095 people, 8604 (50.33%) people were males and 8491 (49.67%) were females.

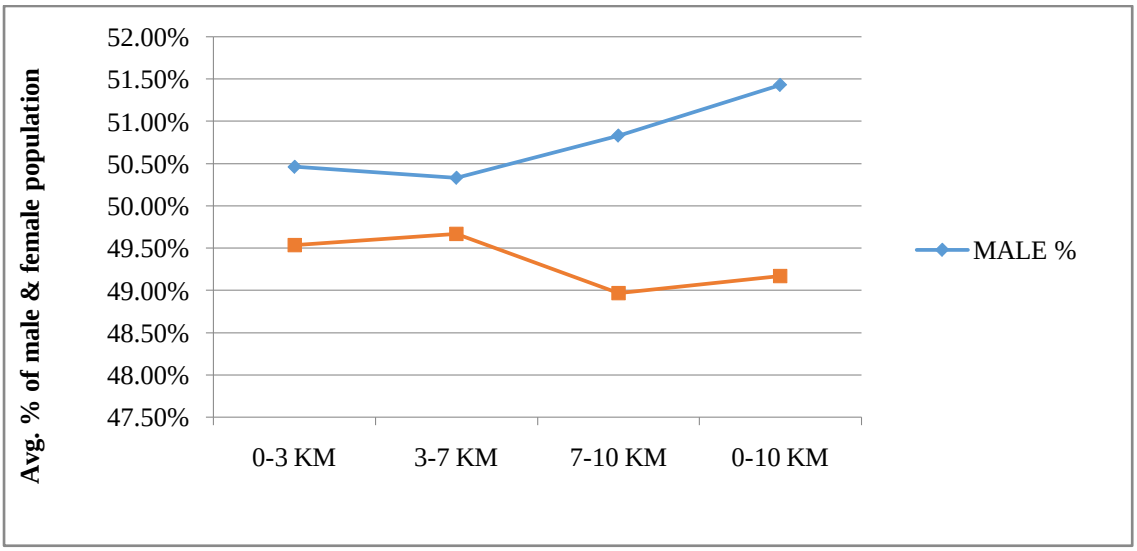


Figure 3.4: Population of males and females in study area

Table:3.37: Distribution of population

S. No.	Particular	0-3 km	3-7 km	7-10 km	0-10 km
1.	No. of Households	799	3603	10392	14794
2.	Male population	2235	8604	24833	35672
3.	Female population	2194	8491	23826	34511
4.	Total population	4429	17095	48659	70183
5.	Average households size	5.54	4.74	4.68	4.74
6.	% of male to total population	50.46	50.33	51.04	50.83
7.	% of female to total population	49.54	49.67	48.97	49.17
8.	Sex Ratio (M:F)	982	987	959	967
9.	Male Population (0-6 years)	308	1305	3581	5194
10.	Female Population (0-6 years)	283	1210	3365	4858
11.	Total Population (0-6 years)	591	2515	6946	10052
12.	Sex Ratio of below 0-6 years age group (M:F)	919	927	940	935

The data in Table-3.37 also indicates that in 7-10 km radius, out of total 48659 people, 24833 (51.04%) people were males and 23856 (48.97%) were females.Therefore, it may be concluded from Table-H1that maximum (48659) population was observed in 7-10 km radius and minimum (4429) in 0-3 km radius.

H.6 Average Household Size

The average household size in study area (buffer zone) varies from 4.68 to 5.54, as per provisional data of 2011. The data presented in Table-H1indicates that maximum (5.54) average household size was occurred in 0-3 km radius and minimum (4.68) average household size in 7-10 km radius.

The data also indicates in Table-3.37 that overall average household size was 4.74 in the study area. The low family size could be attributed to high degree of urbanization with migration of people with high literacy level who generally opt for smaller family size and family welfare measures.

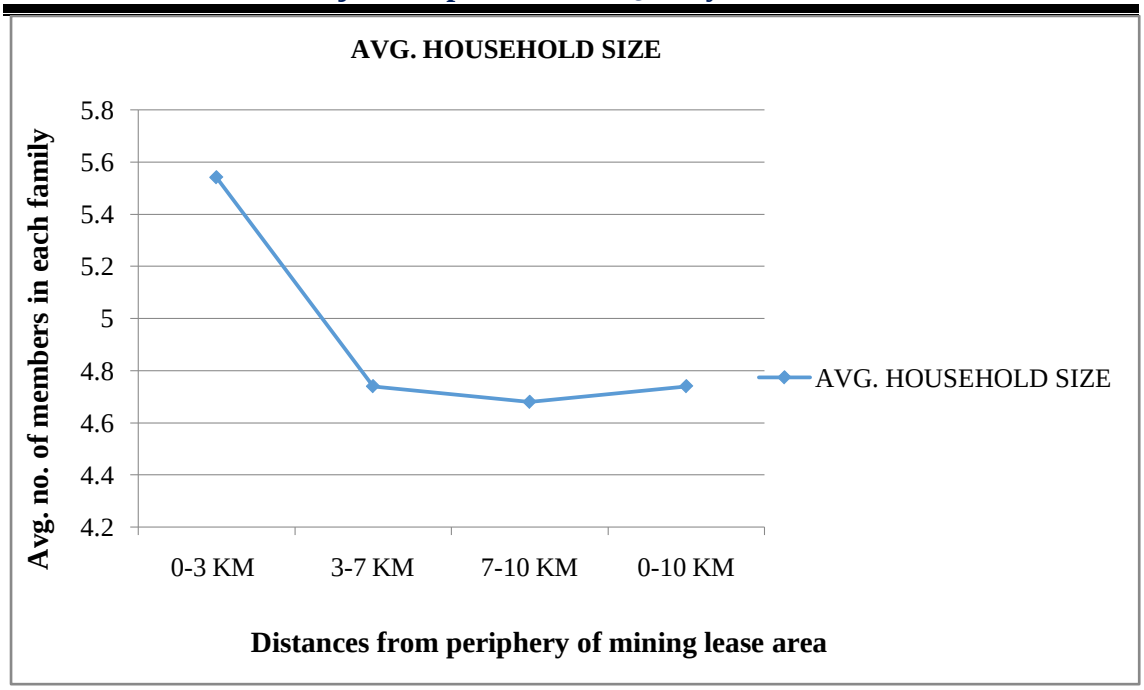


Figure 3.5: Average household size in the study area

H.7 Population density

The density of population refers to the numbers of the people living in an area per kilometer squire. The study area has an overall density of persons 224 per km^2 ($PPkm^2$).

H.8 Sex Ratio

The sex ratio i.e. the number of females per 1000 males indirectly reveals certain sociological aspects in relation with female births, infant mortality among female children and single person family structure, a resultant of migration of industrial workers.

The data in Table-H1shows that study area on an average had 967 females per 1000 males. Maximum (1000:987) sex ratio was observed in 3-7 km radius and minimum (1000:959) in 7-10 km radius whereas, sex ratio was 1000:982 observed in 0-3 km radius. There were 935 females per 1000 males in the age group of 0-6 years.

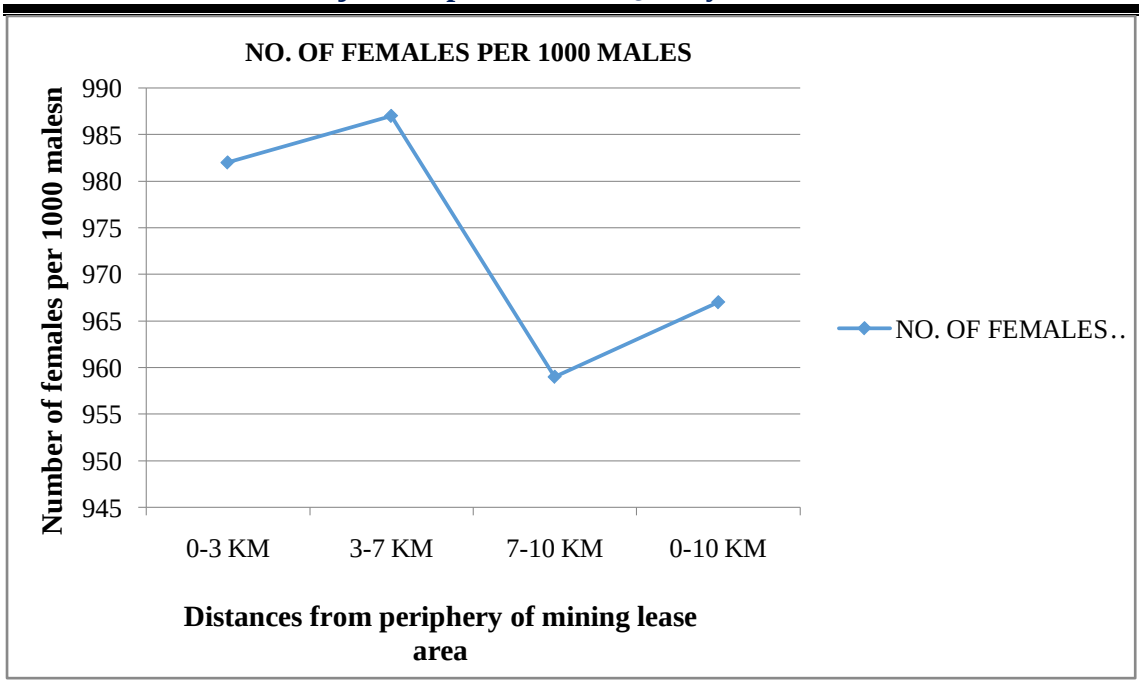


Figure 3.6: Sex Ratio in the study area

H.9 Social Structure

Various religious communities are living in the study area. Table-3.38 shows that out of total 70183 people, 7844 (11.18%) were belonged to SC caste and 19346 (27.56%) were belonged to ST caste in the study area. Total SC & ST population was 27189 (38.74%) in the buffer zone.

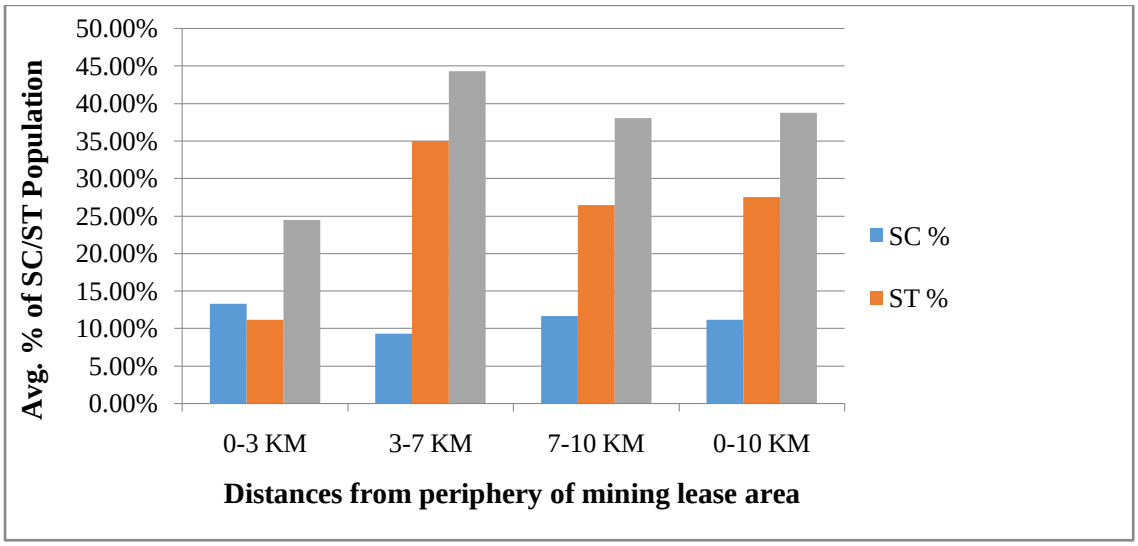


Figure 3.7: Population of SC and ST Caste in study area

Table-3.38 further indicates that maximum (11.63%) per cent of SC caste was observed in 7-10 km radius and minimum (9.34%) per cent in 3-7 km radius, whereas, SC caste

was 13.30 per cent in 0-3 km radius. Therefore, maximum (34.98%) per cent of ST caste was found in 3-7 km radius and minimum (11.18%) per cent in 0-3 km radius, whereas, ST caste was 26.45 per cent in 7-10 km radius. Distribution of the population according to social structure is show in Table-3.38.

Table 3.38: Distribution of population according to social structure

S. No.	Particulars	0-3 km	3-7 km	7-10 km	0-10 km
1.	Total population	4429	17095	48659	70183
2.	Schedule caste (SC)	589	1597	5658	7844
3.	% of SC to total population	13.30	9.34	11.63	11.18
4.	Schedule tribes (ST)	495	5979	12872	19346
5.	% of ST to total population	11.18	34.98	26.45	27.56
6.	Total SC & ST population	1084	7576	18529	27189
7.	% of SC & ST to total population	24.48	44.32	38.08	38.74

H.10 Literacy level

Literacy level of the people in the study area is showed in following table-3.39.

Table 3.39: Distribution of population according to literacy and rate of literacy

S. No.	Particulars	0-3 km	3-7 km	7-10 km	0-10 km
1.	Male population	2235	8604	24833	35672
2.	Female population	2194	8491	23826	34511
3.	Total population	4429	17095	48659	70183
4.	Male literates	1602	5802	17864	25268
5.	Female literates	1067	3706	12540	17313
6.	Total literate	2669	9508	30394	42571
7.	Male literacy rate (%)	71.68	67.43	71.93	70.83
8.	Female literacy rate (%)	48.63	43.65	52.63	50.16
9.	Total literacy rate (%)	60.26	55.62	62.46	60.66

The study indicated that total literacy rate of people was 60.66 per cent the study area. Out of total 35672 males, 25268 (70.83%) males were literate and out of total 34511 females, 17313 (50.16%) females were literate, in the study area.

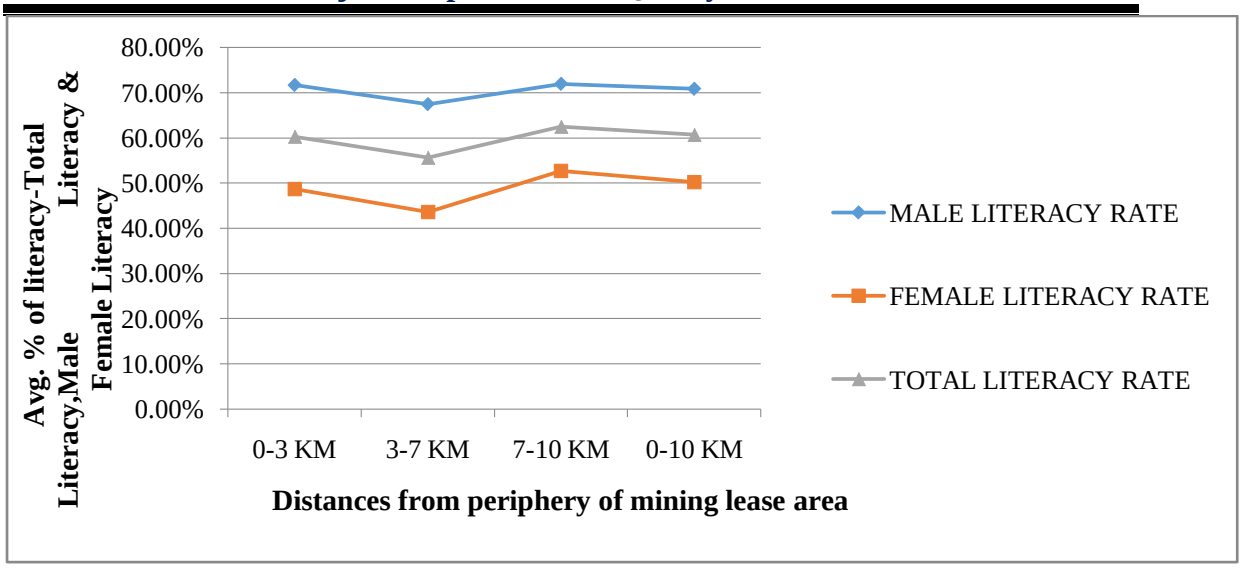


Figure 3.8: Literacy rate in the study area

Table-3.39 shows that maximum (71.93%) rate of literacy of males and maximum (52.63%) rate of literacy of females were observed in 0-3 km.

Therefore, it may be concluded from the results that total literacy rate of females is very low (50.16%) as compare to males (70.83%) in the study area. so there is need to enhance the rate of literacy for females.

H.11 Occupational structure

Occupational structure of residents in the study area was studies with reference to main workers, marginal workers and non-workers.the main workers include 10 categories of workers defined by the Census Department consisting ofcultivators, agriculture labours, those engaged in live-stock, forestry, fishing, mining and quarrying; manufacturing, processing and repairs in household industry; and other than household industry, construction, trade and commerce, transport and communication and other services.

The marginal workers are those workers engaged in some work for a period of less than six months during the reference years prior to census survey. The non-workers included those engaged in unpaid household duties, students, retired persons, dependents, beggars, vagrants etc; institutional inmates or all other non-workers who do not fall under the above categories.

Table 3.40: Distribution of population according to occupational structure

S. No.	Particulars	0-3 km	3-7 km	7-10 km	0-10 km
1.	Total population	4429	17095	48659	70183
2.	Total main workers	1412	5073	15564	22049
3.	% o main workers to total population	31.88	29.68	31.99	31.42
4.	Marginal workers	475	3270	5280	9025
5.	% of marginal workers to total population	10.72	19.13	10.85	12.86
6.	Non-workers	2542	8752	27815	39109
7.	% of Non-workers to total population	57.39	51.20	57.16	55.72

The data presented in Table-3.40 shows that out of total 70183 people in the study area, 22049 (31.42%) were main workers, whereas, 9025 (12.86%) were marginal workers and remaining 39109 (55.72%) were non-workers.

Table-3.40 further shows that maximum main workers (15564), non-workers (27815) and marginal workers were observed in 7-10 km radius.

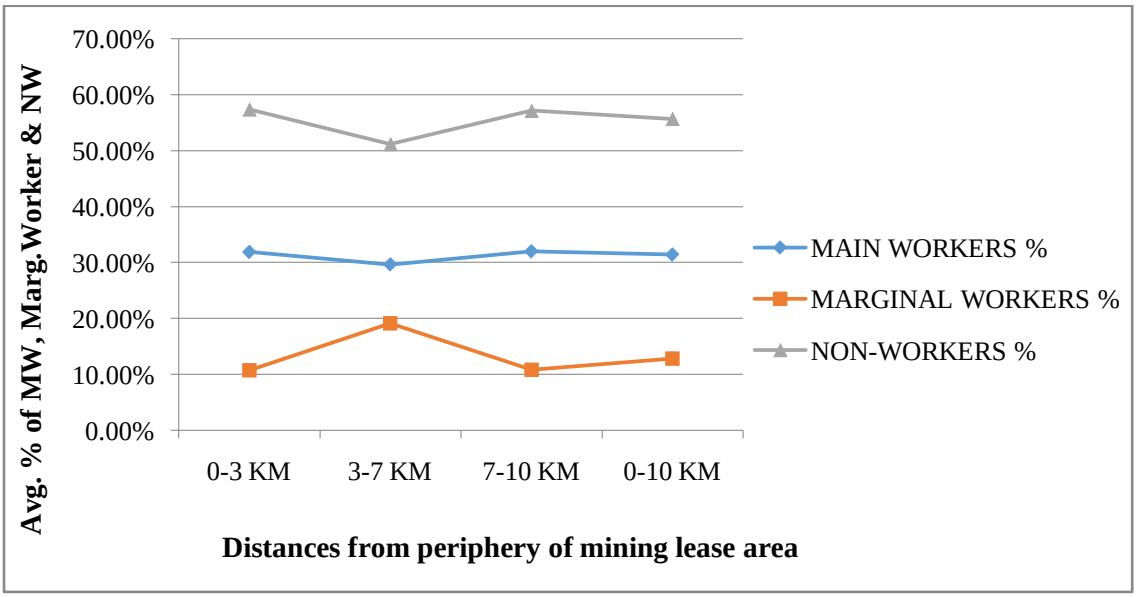


Figure 3.9: Main, Marginal and Non Worker in the study area

H.12 Infrastructure Facilities

The infrastructure and amenities available in the study area denotes the economic well being of the region. The study area as a whole possesses poor to moderate level of

infrastructure facilities. However, in comparison with the facilities available in the other parts of the districts, this area enjoys higher level of amenities like education, health, drinking water, electrification, transport and communication network.

A review of infrastructure facilities available in the study area has been done based on the information given in the district census handbook of Pratapgarh for the year 2011. The data on various aspects are given district-wise in these documents. Infrastructure facilities available in the area are described in the subsequent sections:

H.12.1 Education facilities

The education facilities are evenly distribution in the study area.Table 3.41 shows that out of 50 schools in the study area, 19 Primary schools, 20 Upper Primary schools, 04 Secondary school and 7 Senior Secondary school.

Table 3.41: Education facilities in the study area

Sr. no.	Type of school	Number of schools
1.	Primary school	19
2.	Upper Primary school	20
3.	Secondary school	04
4.	Senior secondary school	07
Total		50

The education facilities are evenly distribution in the study area.Table 3.41 shows that out of 50 schools in the study area, 19 Primary schools, 20 Upper Primary schools, 04 Secondary school and 7 Senior Secondary school.

(District Census Hand Book of Pratapgarh, 2011)

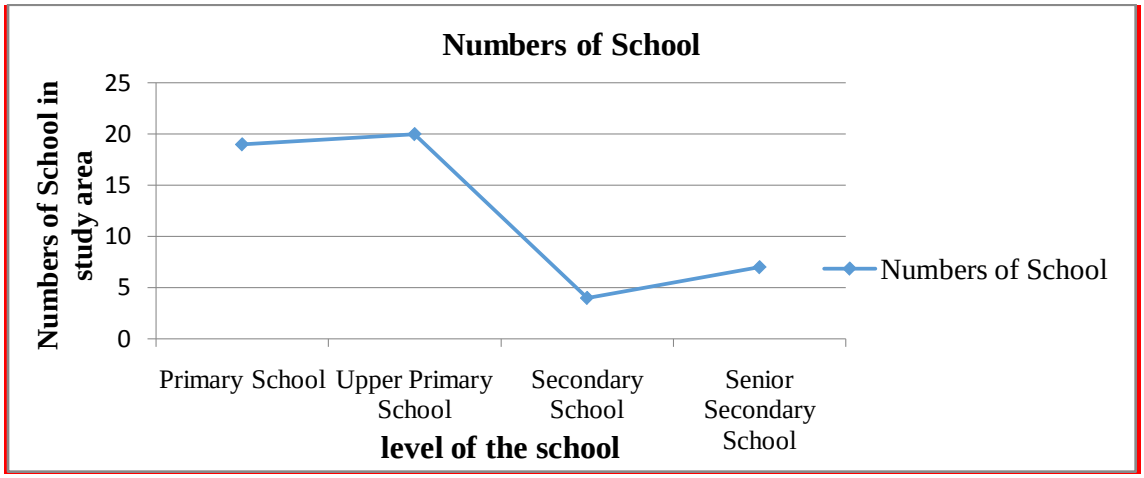


Figure 3.10: Graphical representation of availability of the schools in the study area

H.12.2 Health facilities

Health facilities, which include deferent type of hospitals and dispensaries, are available in the study area. The level of health facilities is found to be poor; altogether there were 7 Primary Health Centres, 5 Dispensaries, 4 Community Health Centre, 12 Primary Sub-Health Centres and 1 Govt. Hospitals.

Table: 3.42 Health facilities in study area

Sr. no.	Name of the health centre	Number of centre
1.	Primary Health Centre	7
2.	Dispensaries	5
3.	Community Health Centre	4
4.	Primary Sub Health Centre	12
5.	Govt. hospital	1

(District Census Hand Book of Pratapgarh, 2011)

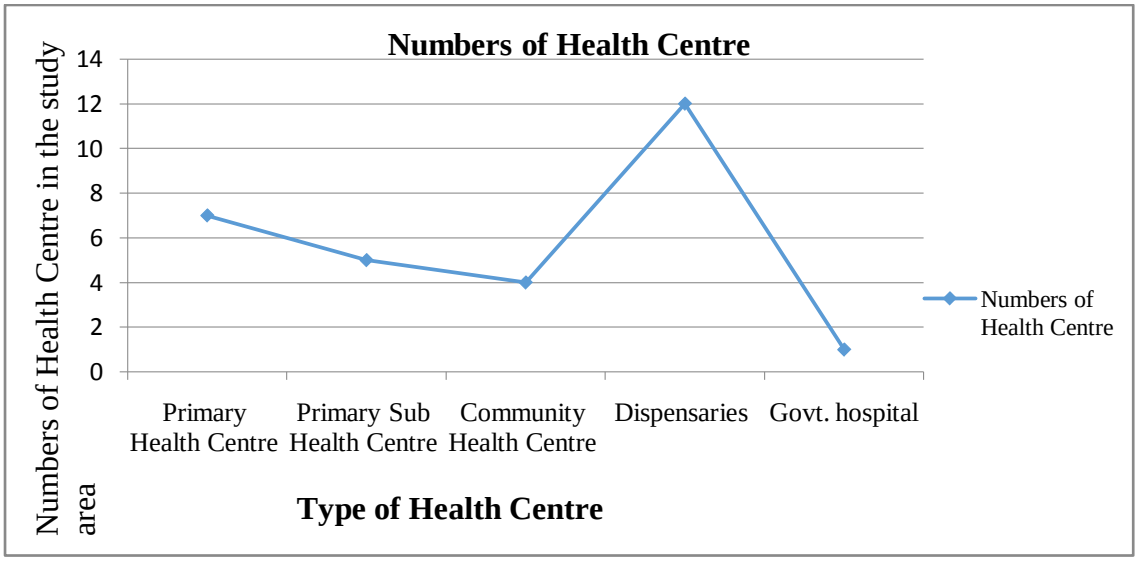


Figure 3.11: Graphical representation of availiability of the health centres in the study area

H.12.3 Transport facilities

The study area was served by road transport. There was a good road network, out of the total inhibited villages only few villages were approachable by mud road. Many villages had transport/travel facilities like Bus. The people resident in other villages had to travel certain distance to avail the facility of bus in order to reach their desired destination.

H.12.4 Electrification

All villages that fallen in study area are electrified and electricity is supplied for domestic, non-domestic, industrial, agriculture and public lighting purposes.

H.13 Baseline status

Base line data was collected by a team deputed by the consultants. The team have been carried out the studies in the study area and collected between the months of October to December in 2019. Sampling villages were identified within 3 km radius, 3-7 km radius and 7-10 km radius and sampling data was collected.There were 54 villages in the 10 km radius area. A total of 30 respondents were selected for the survey of baseline data by proportional random sampling method from 6 villages (selection of the villages on the basis of the densely population, sensitive areas, and villages situated near to core zone means mostly affected by mine). Team members were visited also in Govt. Primary schools Shivpura, Choti Sadri and collected needs of schools. Data were collected from District Primary Census Statistical Hand Book of Pratapgarh district, 2011 & Provisional Census data of Pratapgarh district, 2011 the district.

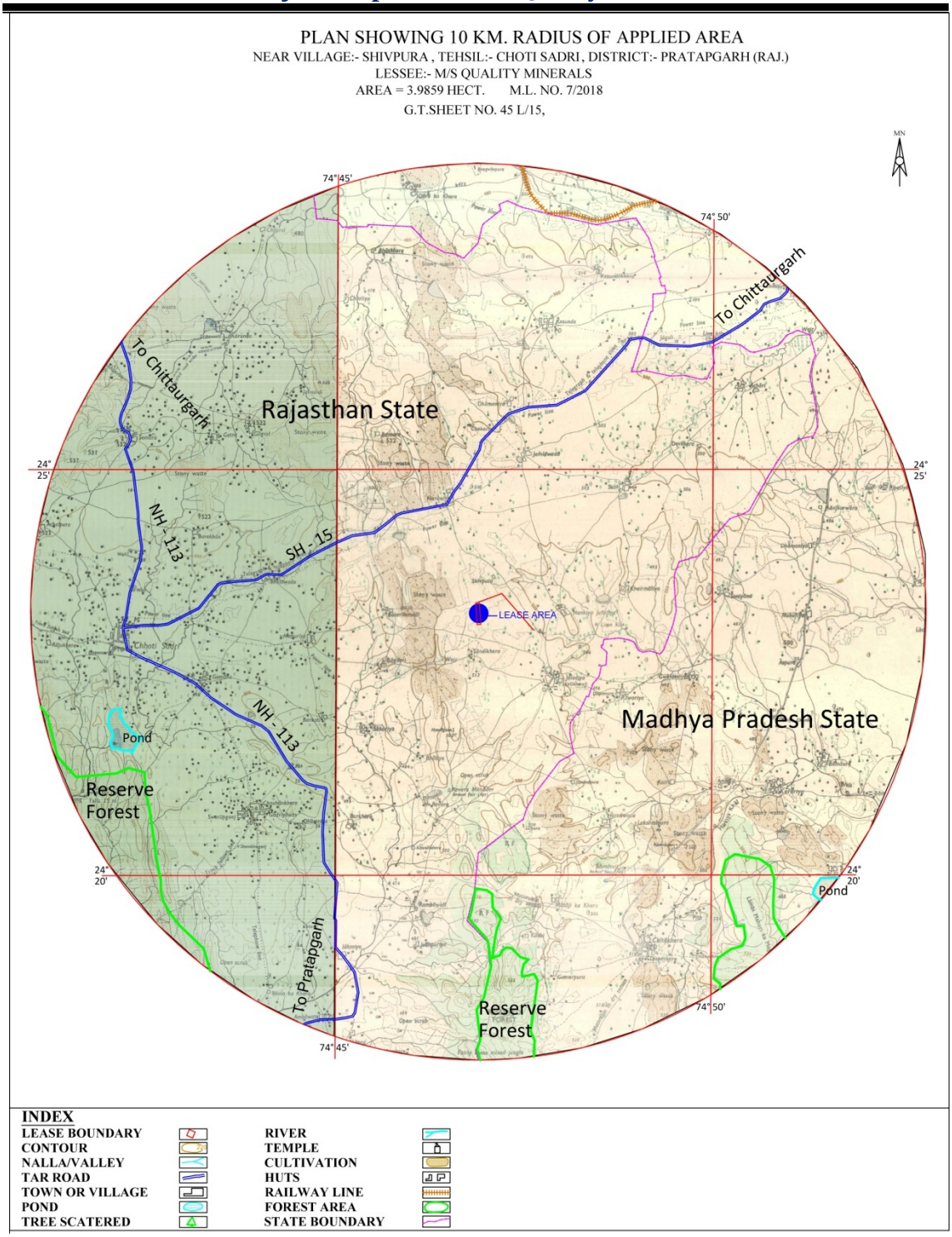
H.14 Conclusion

From secondary data

- The study area consisted of 70183 persons inhabited within the Buffer zone.Out of total 70183 people, 35672 (50.83%) people were males and 34511 (49.17%) were females.
- The average household size in study area (buffer zone) varies from 4.68 to 5.54.
- The study area has an overall density of persons 224 per km^2 ($PPkm^2$).
- Study area on an average has 967 females per 1000 males, whereas, 935 females per 1000 males in the age group of 0-6 years.
- Out of total 70183 people, 7844 (11.18%) were belonged to SC caste and 19346 (27.56%) were belonged to ST caste in the study area. Total SC & ST population was 27189 (38.74%) in the buffer zone.
- Total literacy rate of people was 60.66 per cent the study area. Out of total 35672 males, 25268 (70.83%) males were literate and out of total 34511 females, 17313 (50.16%) females were literate, in the study area.

- Out of total 70183 people in the study area, 22049 (31.42%) were main workers, whereas, 9025 (12.86%) were marginal workers and remaining 39109 (55.72%) were non-workers.
- The education facilities are evenly distribution in the study area.Table 3.41 shows that out of 50 schools in the study area, 19 Primary schools, 20 Upper Primary schools, 04 Secondary school and 7 Senior Secondary school.
- The level of health facilities is found to be poor; altogether there were 7 Primary Health Centres, 5 Dispensaries, 4 Community Health Centre, 12 Primary Sub-Health Centres and 1 Govt. Hospitals.
- All villages that fallen in the study area are electrified and electricity is supplied for domestic, non-domestic, industrial, agriculture and public lighting purposes.
- **From the primary data (annexure no. 13):**
- Out of total 30 respondents, 2 (6.70%) respondents were literate, 10 (33.30%) were literate up to primary level, 10 (33.30%) were literate up to secondary level, 6 (20.00%) were literate up to senior secondary level and remaining 2 (6.70%) respondents were literate up to graduate level.
- There were 43.30 per cent and 36.70 per cent people were involved in agriculture and business, respectively. 13.3 per cent and 6.7 per cent were involved in labour and unemployed, respectively.
- In the study area, 40.00 per cent and 33.30 per cent respondents were belonged to OBC caste ST caste, respectively. Whereas, 13.30 per cent respondents were belonged to General caste and respondents of SC caste were also 13.30 per cent.
- In the study area, 86.70 per cent respondents were lived in joint family and 13.30 per cent respondents were lived in nuclear family.
- There was overall average household size 6 in the study area.
- Monthly income of the family was 8,000 to 20,000 Rs in the study area.
- There were all respondents absolutely included in voter list.
- In the study area 26 (86.70%) respondents were included in BPL list.
- There was availability of schools in each village.
- In the study area 26 (86.70%) respondents were included in BPL list.
- There was availability of schools in each village.

- There were 76.70 per cent pakka house found in the study area, whereas, 10.00% houses were mud house and 13.30 per cent houses were mixed house in study area.
- There was 100.00 per cent availability of toilets in study area.
- In the study area 83.33 per cent respondents were had agriculture land.
- There were most of the respondents used well, tube well and river as a source of irrigation in study area.
- Availability of health workers and hospitals was observed 86.70 per cent 80.00 per cent, respectively in the study area.



Map 3.13: Key Map Covering 10 Km. Radius

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Chapter - 4

Anticipated Environmental Impact & Mitigation Measures

4.1 Investigated environmental impacts

The main purpose of identifying and assessing the existing environmental details is to be known previously the relevant features on which environmental impact can be assessed. “Environmental Impact” can be defined as any alteration of environmental conditions, adverse or beneficial, caused or induced by the action or set of actions under consideration. The problem of environmental impacts on land, air water and noise common from the stage of preparation for mining and the problem grows as the activities of extraction of mineral, drilling and blasting operations, creation of dump yards etc. Generally, the environmental impacts can be categorized as either primary or secondary. Primary impacts are those that can be attributed directly to the project. On the other hand, secondary impacts are those that are indirect or induced & typically include the associated investments & changed patterns of social & economic activities likely to be stimulated or induced by the existing & proposed actions.

Sustainable development through appropriate and clan technology involves not only the environmental protection but also issues such as economic prosperity and conservation of natural resources for the future generation to meet their own needs. The present status of Shivpura Red Ochre mining after 8 years of indiscriminate mining has necessitated innovation of an appropriate quarrying technology to reduce further environmental degradation, and ensure optimum utilization of the balance reserves of Red Ochre.Time has come now for companies to adopt an environmental policy and impose self-regulation to create a good public image.

4.2 Anticipated Impact & Mitigation Measures

4.2.A Land Environment

Anticipated Impact on Land

As a result of commencement of mining operation, land degradation will take place due to formation of pits. Similarly, some degradation will also take place due to construction of infrastructure like mine office, approach roads, rest shelter etc.

Table 4.1: Anticipated impact of mining activities on land and proposed mitigation measures

S. No.	Activity	Anticipated Impacts	Mitigation Measures
1.	**Mining activitylike remove over burden,formation of mining pits and stacking of waste dump and minerals**	Land degradation due to remove over burden, Formation of mining pits & waste dumps affecting the causing loss to top soil.	Before opening new pit, whatever top soil will be scrapped out and store/dump on earmarked site for utilizing in plantation. No waste will be generated and no dumps will come to exists. Out of the total mining lease area of 3.9859 Ha.,3.1526 Ha. of area will be excavated up to a depth of 25 meter in the course of mining. The end of the mine life 0.4242 Hect. excavated portion will be backfilled and remaining 2.7284 Hect. excavated portion will be converted in to a water reservoir for storing rain water. The store water can be used for irrigation as well as supporting the life of animals. It will help of recharge the ground water as well.
2.	**Construction of infrastructure like mine office, approach roads, Haulage roads and rest shelter etc.**	Degradation of land affecting the aesthetic beauty. (Since approach roads are already there, no more road construction will be required)	The area of mining lease is 3.9859 Hect. The lease area is situated all most flat land. having little top soil. Adequate plantation along road sides and vacant places. Haulage roads will be kept moist by water sprinkling and plantation on both sides will minimize the propagation of air borne dust.
3.	**waste dumping**	Erosion from west dump and surrounding areas during rainy season. Choking of water courses and siltation of agricultural fields.	Since practically no over burden in the area, no land will be degraded due to dumping. As far as buffer zone is concern, its land will not undergo any type of change because of mining.
4.	**Mining activity**	Choking of watercourses and	Construction of garland drains, catch drains, siltation ponds etc. and desiltation

	and mineral stack	siltation of agricultural fields.	of the siltation ponds from time to time.
5.	**Formation of mining pits and waste dump,**	Loss of Aesthetic Environment	**Reclaimedandrehabilitated of the core zone:** **Waste (Dump) management** **OB/waste will be**generated during plan period, waste will be covered under area of 0.1245 Hect, but th end of the mine life waste will be use in backfilling for the excavated portion(0.4242 Hact.) so no waste will be end of the mine life, so no management will be required. **Excavated Portion (Mining Pit) management** As per Geological reserves and targeted production the anticipated mine life will be approximately 8 years Out of the total mining lease area of 3.9859 Ha., 3.1526 Ha. of area will be excavated up to a depth of 25 meterin the course of mining. 0.8333 Ha. of area will be used in green belt (Statutory Boundary). The out of the total excavated area of 2.7284 Ha. area will be converted in to a water reservoir for storing rain water. The store water can be used for irrigation as well as supporting the life of animals. It will help of recharge the ground water as well.
6.	**Formation of mining pits**	Danger to the man and animal due to formation of mining pits	Erection of proper fencing around the mining pits as per rules.
7.	**Mining activity**	Deposition of dust particles on the agriculture land and top soil nearby area.	Development of the green belt and adequate plantation will be along the haulage roads. 0.8333 Ha. area will be used in green belt (Statutory Boundary).

4.2.B Soil Environment

Soil is the upper weathered layer of earth's crust which supports plants' life and contains many living plant organisms and their dead parts. In the course of mining the soil layer is also likely to be affected up to some extent, whether its layer is thick or thin. In the present study some likely impacts of mining activities on the soil has been identified and mitigation measures suggested. Anticipated impacts on soil due to mining activities and proposed mitigation measures are as below:

Table 4.2: Anticipated impact of mining activities on soil and proposed mitigation measures:

S.No.	Activity	Anticipated Impacts	Mitigation Measures
1	Mining operation [Mine pit development]	Pit development may cause the loose of top soil.	Before the commencement of pit formation the top soil will be removed separately and immediately used for plantation work. However, the surplus top soil, if any will be stored and covered with dry husk of rice or wheat; to maintain its nutrient contents. It will be used for plantation work in future as soon as possible.
2	Dumping of overburden	Dumping of overburden if not removed before hand, the top soil may get buried under the waste dump and lost forever.	The top soil will be removed from the dumping site before commencement of waste dumping over there and immediately used for plantation purpose.
3		The quality of top soil removed from the pitting site and dumping site may deteriorate due to loss in soil microbial community/ soil biota.	It will be used for plantation work as soon as possible after adding organic matter (Compost, animal manure & plant manure).

4	Various mining activities and vehicular movement	Soil contamination may take place if used motor oil (containing metals such as Al, Cr, Cu, Fe, Pb, Mn, Ni, Si and Sn), grease are thrown here & there at the mine site (workshop) and spilling of contaminants such as oil from mining machinery.	Mining machinery will be maintained properly to avoid any spillage of oil. Used motor oil and Grease will be stored in separate containers and sold to the persons / Dealers duly authorized by CPCB/ RPCB.
5		The deposition of contaminated windblown dust may lead to soil contamination and deteriorate the soil fertility as a result of blockage of soil pores of the nearby agricultural fields soils.	Regular water sprinkling will be done on haulage roads and dusty place such as loading and unloading points, mineral stock yard. Green belt will be developed along the approach road/ haulage roads and boundary barriers (statutory boundary).

4.2.C Water Environment

C.1 Topography

Please refer to Chapter No. 2 Clause No. 2.4.1 Physiography/Topography & Geology.

C.2 Drainage

Please refer to Chapter No. 3 Clause No. A.8.

C.3 Water requirement for the project

Including 0.50 KLD of water for drinking purpose a total of 3.50 KLD of water will be required at the mines in the course of mining. The rain water will be accumulated in the existing pit & used for non-drinking purpose like sprinkling, plantation etc. For the purpose of diverting rain water into the pit, a good no. of garland drains, catch drains, siltation ponds etc. will be constructed. 0.50 KLD of water for drinking purpose will be obtaining from a water tanker. In the present case the daily requirement of water is about 3.50 KLD will be required for different activities as stated above.

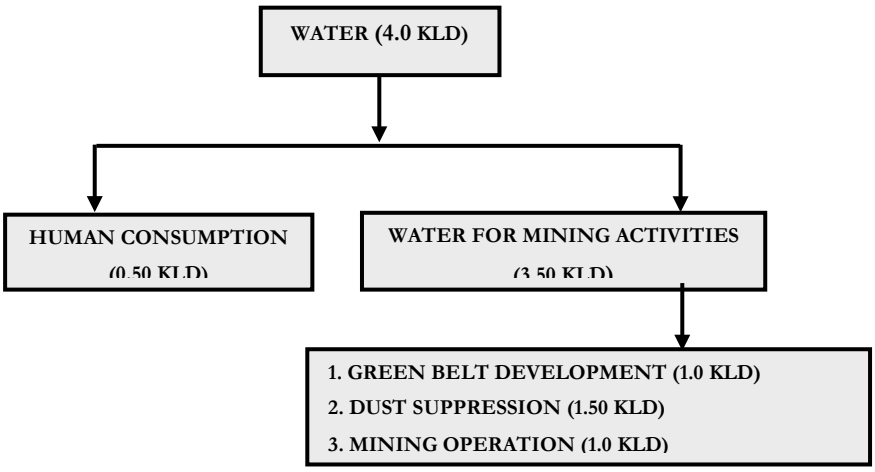


Figure 4.1 Water Consumption Chart

Sprinkling on haul roads	- 1.50 KLD
Plantation	- 1.0 KLD
Mining Operation	- 1.0 KLD
Human consumption	- 0.50 KLD

C.4 Impact of Mining on Surface water regime

The water bodies existing within the buffer zone will get impacted due to-

- Oil & grease spillage from vehicle maintenance.
- Surface runoff from overburden during rains.

- Seepage from sumps created for collection of waste water.

In order to adverse effects, suitable mitigation measures/treatment processes will be used, coupled with the effective periodical monitoring of the discharged water in order to ensure compliance to the regulatory standards. Surrounding surface water quality will also be monitored properly.

C.5 Impact of Mining on Ground water regime

The mining operations will be carried out above the ground water table only. The ground water level is at 463-458 mRL. The ground water level in the lease area varies from 50-55 m BGL above GWT.Mining will be done up to 488 mRL, which is the ultimate pit limit. Hence, no ground water table will be intersected even at the ultimate pit limit and no ground water contamination is expected.

C.6 Management for water harvesting System

1. Rainwater harvesting in Core & Buffer Zone:

a. Catchment area

b. At office Roof Top

c. Deepening of Ponds

Artificial recharge of ground water from rainwater harvesting is proposed on the buildings outside the lease area. Normal rainfall of this area is 856 mm, say 0.856 mts.

Recharge through Office Rooftop

Office area = 150 m^2

Therefore, Recharge (as per CGWB table for availability of rain water through roof top for the normal rain fall of 856 mm = 100 m^3

Ground water recharge will be enhanced by deepening the existing pond at mine by 3 mt. as follows:

Existing volume of the pond = 90 m^3

Proposed Deepening =2.0 Mt

Therefore, new volume of the pond = 90*2.0*0.856= 154.08 m^3

Therefore, Recharge @ 20 % = 31 m^3

Besides this auto-ground water recharge takes place in the mine pit and catchment area as given below:

Recharge through catchment area

Catchment area = 16178 m^2

Water collected = 16178×0.856 =13137 m^3

Therefore, Recharge in the catchment area due to pond deepening @ 10% = 1314 m^3

Recharge at mine sump:

Mine lease area = 3.9859 ha

Annual Rainfall in the lease area = 856 mm

Therefore, rainy water accumulated in the mine sump = 0.856 m x 39859 m^2= 34119.30 m^3.

Annual Losses due to evaporation @ 40% from the sump = 34119.30 m^3 x 0.4= 13648 m^3

Therefore, effective water availability in the sump = 34119.30 – 13648= 47767.3 m^3

Water to be used for mining activity = about 150 m^3

Water likely to be consumed for ground water recharge @ 10% = 4777 m^3

Hence, total ground water recharge per annum within the mine = 100+31+1314+4777= 8818 m^3 (0.008818mcm). This is far more than the water withdrawn for drinking purposes at the mine.

C.7 Waste water generation, treatment and disposal

The waste water generation from the above consumption is mainly from domestic consumption i.e. 0.50 KLD. Waste water generation at mine site is mainly from toilets. This water will be treated by Septic Tank.

The wastewater streams from the toilet will be collected in collection /holding tank. Then with controlled flow wastewater is spread on the Soil Scape Filter bed. In this filtration system, the biodegradable organic matter along with oil (BOD/TSS/color) will be consumed by bacteria present in the specialized top layer of the filter. Treated water shall be pumped from treated water sump for gardening and other purposes as described earlier. The scheme is systematically shown in following diagram –

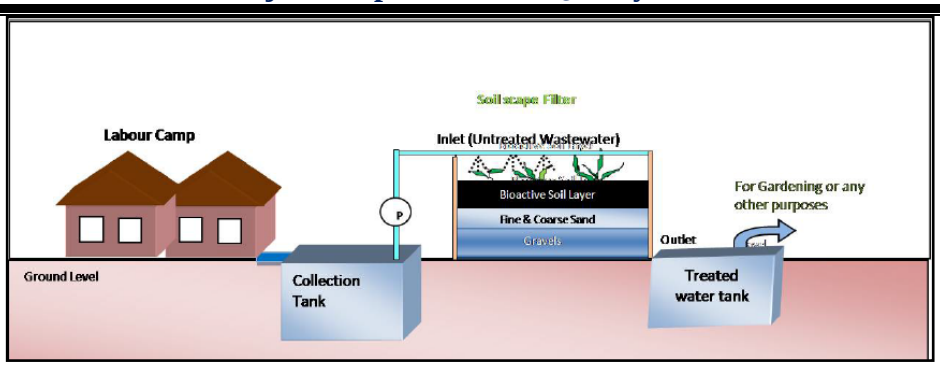
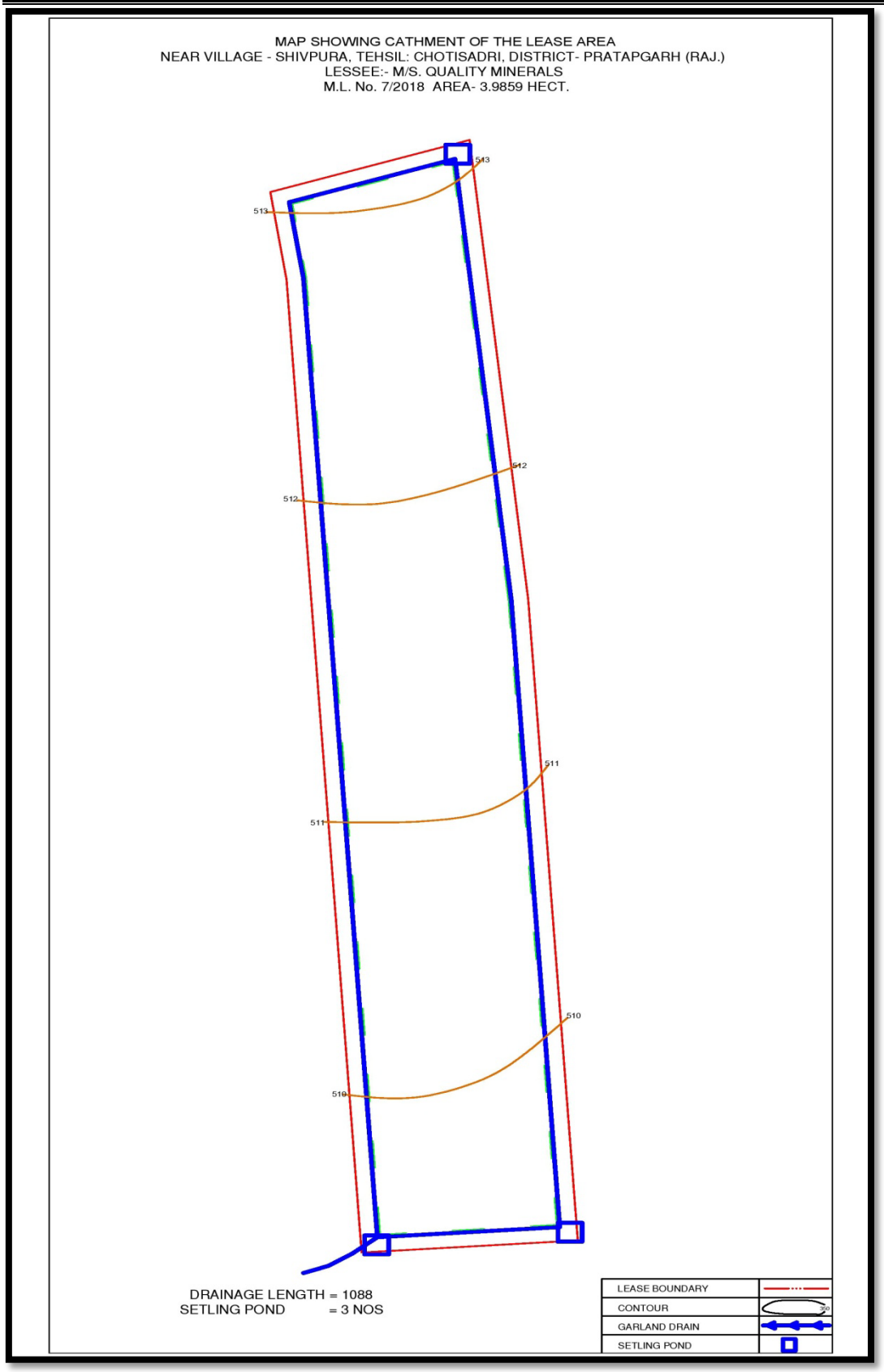


Figure No. 4.2 Biological Treatment Plant

C.8 Water Pollution from mining activities

Various mining activities like drilling, excavation, transportation etc. may also create ground and surface water pollution. Appropriate mitigation steps will be taken to obviate the resulting adverse impacts arising out of the mining activities as described below.



Map 4.1 Showing catchment area

Table 4.3: Anticipated impact of mining activities on Water and proposedmitigation measures

S. No.	Anticipated Impact	Mitigation Measures
1. Impact on Surface water		
i.	**On Surface Water** 1. Contamination of surface water in the buffer zone.	There is no water come from outside the lease area. Only during rainy season water is come into the mines for this we construct proper garland drains (16178 m) will be constructed around the mining pit (UPL).All water from rainy season will be channelized through 9 constructed settling ponds (6*3*3m) and then get collected into mining pits due to natural slope and used for mining activities. If heavy rainfall in the area is occur excess water from settling pond will be drain into natural course after proper siltation by settling pond and discharge into natural drain.
iii.	Surface water contamination due to discharge of mine water	Due to mining activity surface water will not be contaminated due to discharge of mine water because all mine water will be siltation after proper settling pond and discharge into natural drain. So surface water sample taken from buffer zone is under permissible limit as per 2296:1982.
	Impact on surface water due to overburden and top soil handling	In order to control the wash off from the overburden dump proper garland drains and catch drains will be constructed around the waste dump so that the rainwater will be collected at mining pit and used for mining activity.

2.Impact on Ground water		
i.	Contamination of ground water due to water table intersection during proposed mining.	The ground water table varies from 50-55 m BGL i.e. 463-458 mRL and mining will be reached up to 25 m done up to 488 mRL. Hence, during proposed mining ground water table will not be intersected.
ii.	Contamination of ground water	The wastewater generated from the domestic front will be mainly from toilets. The effluent coming out the toilet will be treated with septic tank.
iii.	3. Diminution of water table due to withdrawal of ground water (0.5 m^3/15 Days)	Following measures will be taken to obviate the adverse effect: 1. Rainwater harvesting will be carried out in the core zone. 2. No runoff water from the mining area will be allowed to escape as it will be collected in the pits. Beside its use in the mining, this will also result in the ground water recharge. 3. Due to above measures, ground water recharge per annum will be 8818 m^3 (0.008818mcm),whichis much more than the water withdrawn for drinking purposes at the mine. Consequently, there will not be any effect on the water table of this area due to proposed water withdrawal.

4.2.D Air Environment

The opencast semi-mechanized mining operations here will generate some dusts due to loading and unloading in truck/tippers.

D.1 Anticipated Impact and Mitigation measure due to mining activity on Air pollution

Mining operations carried out by semi-mechanizedopencast method generate dust particles due to various activities loading & unloading of mineral, overburden waste and transportation by trucks and dumpers. However, the buffer zone is not likely to be affected by dust problems, as proper dust suppression measures are taken. Following measures are being/will be adopted to mitigate air pollution generated due to the mining activities:

Table 4.4: Anticipated impact of mining activities on Air and proposedmitigation measures

S. No.	Activity	Impact	Mitigation measures
1.	Formation of mining pits and waste dump	Generation of airborne dust during excavation (pit formation) and other operational stages of the mine, exposure to which may affect adversely the healthof operators/workers of nearby villagers.	Moisture content of the exposed area will be increased by water sprinkling to control the dust emissions and contain silt formation. Dust emissions will be checked at each stage of mine operation. Ambient Air Quality Monitoring will be done regularly as per regulatory schedule.
2.	Particulate Matter (Dust) from mineral loading & unloading	The manual mining operations will generate some dust due to loading & unloading in truck/tippers.	Secured covering the mineral loaded trucks by tarpaulin sheet before moving out from the mines. A helper will be deployed for instruction to the excavator's operator, which the heights from which material are dropped, should be reduce to a

			practical minimum height to control to fugitive dust emission arising during materials handling.
2.	Transportation	Dust generated due to plying of trucks, loaded with mineral transportation may produce adverse effect on health as like loss of visualization of workers which engaged in near operational phase and also affected to plants which is growing near the road	Adequate plantation along road sides and vacant places. Haulage roads will be kept moist by water sprinkling and plantation on both sides will minimize the propagation of air borne dust. The speed of dumpers/ tippers plying on haul road will be controlled. Proper maintenance, oiling and greasing of vehicles and machines at regular intervals. Contracting only those vehicles to ply who have valid PUC certificate. Regular monitoring of AAQ will be done to assess the effectiveness of mitigation measures.
3.	Overburden Dumping	Adverse effect on the health of mine workers, due to dust emissions from the stacking of mine over burden.	At the end of mine life, about 3.1526 Ha., area will be excavated. About 0.4242 Ha., of area will be backfilledand 2.7284 Ha., will be converted into water reservoir. And about 0.8333 Ha., of statutory boundary area will be developed as green belt by plantation over it.
4.	Mining activity	Dust generates due to loading, unloading, handling materials.	Development of the green belt and adequate plantation will be along the haulage roads.

4.2.E Noise Environment

E.1 Impact on Noise Level

Noise generation during the construction and operations phases fall into three categories including instant, intermittent, or continuous period; with levels that vary from low to high. The mining operation, including plying of trucks for transportation of mineral etc is anticipated to be the main source of instant or intermittent noise.

Potential Direct Project Effects on Noise and Vibration-

S. No.	Sources which generate noise and vibrations
1.	Road traffic
2.	Impact equipment (JCB)
3.	Earth moving equipment (trucks, loaders)

In the mine site due to the deployment of machinery, excavation and transportation of Red Ochre, it is imperative that noise would be there. As the working will have occasional secondary blasting, therefore occasional little noise generation will be there.

E.2 Estimating cumulative impact of noise generation by mathematical modelling as a result of deployment of mining machinery at the mine

Proponent is operating the mine by forming bench of 3 m. height each. Since the mining operations carried out in a staggered manner, cumulative effective minimize.

It is necessary to assess the noise level in the mine under a situation when all the mining machinery operates simultaneously.

E.3 Noise Impact Analysis on Working Environment

In the mine site due to the deployment of machinery, excavation and transportation of Red ochre, it is imperative that noise levels would be increased.

As the working will be mainly concentrated beyond 500 m. distance from the nearest settlement, the expected noise level will get reduced with the distance and will have insignificant impact on the existing ambient noise levels in the residential areas and will have no effect on the health of the villagers.

E.4 Noise Generated due to Excavation and Transportation operations

Details of noise generated due to excavation and transportation operation are as follows:

Table 4.5: Typical Noise Generating Sources

S. No.	Name of machinery	Noise level dB (A)	Number	At one bench	Measurement Location
1.	Water tanker	62-66	01	1	Driver's position with load at a 12m distance
2.	Dumpers/Tippers	65-70	03	1	Driver's position with load at a 12m distance
4.	Hydraulic excavator	72-75	02	1	At a distance of 20 mts.

Cumulative effect at observer is calculated by the equation.

Leq = 10 log ($10^{L1/10} + 10^{L2/10} + 10^{L3/10}$.....)

Where

Leq = The equivalent sound pressure in dB (A)

The maximum of mining machinery at a place will be as under:

The cumulative generated noise will be in the range of 73.3-85.1 dB (A), on an average 79.2 dB (A) as given in **Table 4.5**. The noise levels in the working environment are compared with the standards prescribed by Occupational Safety and Health Administration (OSHA) which in-turn is being enforced by Government of India through DGMS.

E.5 Noise Comparison

The noise levels in the working environment are compared with the standards prescribed by Occupational Safety and Health Administration (OSHA) which in-turn is being enforced by Government of India through DGMS.

Equivalent noise level exposure during the shift is 79.2 dB(A) and as per WHO standard the permissible exposure for 8 hrs. is 90 dB(A).

E.6 Noise dispersion from the mine

For the purpose of noise dispersion, it is assumed that all the noise generating sources from the quarry as one source. The cumulative noise generation from the working of mine is computed by using the model.

E.7 Mathematical Model for Sound Wave Propagation during Operation

For an approximate estimation of dispersion of noise in the ambient from the source point, a standard mathematical model for sound wave propagation is used. The sound pressure level generated, by noise sources, decreases with increasing distance from the source due to wave divergence. An additional decrease in sound pressure level with distance from the source is expected due to atmospheric effect or its interaction with objects in the transmission path.

For hemispherical sound wave propagation through homogenous loss free medium, one can estimate noise levels at various locations, due to different sources using model based on first principles, as per the following equation:

$LP_2 = Lp_1 - 20 \text{ Log } (r_2/r_1)$ ..... (1)

Where Lp_2 are Sound Pressure Levels (SPLs) at point located at distance r_2 from the source. The combined effect of all the sources then can be determined at various locations by the following equation.

Where, Lp_1 are noise pressure levels at a point due to different sources.

Based on the above equations noise level can be predicted at a certain distance.

Major noise sources as cumulative noise source has been identified and noise levels expected are presented in **Table-4.6.**

Table 4.6: Cumulative Noise Level

Distance (in m)	20	50	100	200	400
Noise dB(A)	79.2	71.2	65.1	59.0	53.0

Table 4.7: Anticipated Impacts of Mining activity on Noise Environment andproposed Mitigation Measures

S. No.	Source	Project Impacts	Mitigation measures
1.	JCB/Earth moving machines/Hydraulic excavator Mining will be carried out by semi mechanised method, thus earth moving machines will come into play.	Sound level of 86 dB measure at 20 m distance and is an unavoidable source. However the pressure of 79.2 dB is low for mining activity and since the machine will mostly works in pits its impact will not make any significant difference beyond 50 m.	i) No such mitigation measures will be required, for people working near, 79.2 dB is safe noise level for continuous noise dose for 8 hrs. ii) Providing Sound proof operator's cabin for equipment's like dumpers, shovel, tippers, etc. iii) Planting trees at various places within the lease area and haul road to act as acoustic barriers. iv) Providing workers with earmuffs & earplugs, as a protection from exposed to higher noise level.
2.	Jackhammer cause extremely high noise levels of upto 72-75 dB at a distance of 20 m because of the impact of the tool onto the rock/ground and also because of its pneumatic operation	High noise levels within the distance of up to 500 meter from the project site	There is no mitigation possible for this source of noise, as the rock/ground id broken using an impact which generates noise which cannot be reduced. Regular oiling and maintenance to be conducted on the jackhammer in order to reduce noise generated due to its pneumatic operation. The inlet air lubricator to be used for smooth operation of this machine. Operator and the people in the vicinity of this machine to wear earmuff of noise reduction rating at least 20 dB in order to protect themselves from this noise.

4.2.F Ecology & Bio Diversity

Environmental Impacts arising out of mining operations may be defined as an alteration of environmental conditions or induced by the mining operations. The purpose of identifying and assessing the existing environmental parameters is to know.

The basic conditions prevailing before getting the targeted production. The environmental impact on Land, Air, Water, Noise, Climate, Flora and Fauna and Socioeconomic conditions arising out of mining operations need be assessed and thereafter mitigation measures are to be adopted. The environmental impacts can be categorized as either primary or secondary. Primary impacts can be attributed directly to the project. The secondary impacts due to mining project are indirect or induced and typically include changed patterns of social and economic activities likely to be stimulated or induced by the improvement in economy of the region caused by increased money circulation amongst the population.

Sustainable development through appropriate and clean technology involves not only the environmental protection but also issues such as economic prosperity and conservation of natural resources for the future generation to meet their own needs. Now, an environmental policy is required to be adopted by the ShivpuraRed Ochre mine producers for maintaining clean environment and generating minimum waste.

Table 4.8: Impact and Mitigation measure of flora & fauna

S.No.	Activity	Anticipated Impacts	Mitigation Measures
1	Mine pit development & waste dumping	Clearance of Herbs, Shrubs and Grass from core zone in the course of mine pit development & waste dumping.	✓ The mining lease area is sparsely vegetated, dominated by few Herbs, Shrubs and Grass. Herbs and Grass were seen after rainy season but they dried after some time. Thus there will be no significant impact. But plantation will be carried out along both the sides of the approach route/ haulage road and over inactive dumps.
2		During the extraction of minerals from the mine pit, dust may be deposited on the vegetation of the forest area and crops of the nearby agricultural field. Deposited dust decrease the (i) Light availability for photosynthesis (ii) and affects gaseous exchange.	Dust suppression will be affected by regular sprinkling of water at the source of formation like haulage roads and loading & unloading points (Stock yard) etc. resulting in minimized damage to crops and flora (Wild plants). Adequate green belt will be developed along the statutory boundary, both sides of the approach road/ haulage roads of the lease area, in order to restrict spreading of dust. Proper maintenance of the mining machinery and machine efficiency to ensure reduction in the generation of dust and gases (CO_2, SO_2& NOx) during various mining operations. This would reduce adverse impact on vegetation and human life.
3	Various other mining activities and vehicular movement	Disturbance (like behavioral effects) may be caused to the local fauna (Birds & Mammals) due to movement of mining machinery like Dumpers, Tippers and Excavators (increase in noise level).	✓ Regular maintenance of mining machinery in order to have a check on their noise level. ✓ Avoiding overloading of Transport vehicles. ✓ Transport of material will be avoided during the night time. ✓ Orientation training will be imparted to the mine employees to develop a sense of sympathy towards fauna. ✓ Special care will be taken for fauna during reproductive (e.g., courtship, nesting) seasons. ✓ Dense plantation will be carried out along the approach route/ haulage roads and in safety **barrier** zone of **7.5 m.** along lease boundary. ✓ Instructing the drivers of transport vehicles to allow the fauna to cross the road by slowing down the speed of the vehicle.

F.1 Green belt development

The main objective of the green belt is to provide a barrier between the source of pollution and the surrounding areas. The green belt helps to capture the fugitive emission and to attenuate the noise generated, apart from improving the aesthetics. Development of green belt and other forms of greenery shall also prevent soil erosion and washing away of topsoil besides helping in stabilizing the functional ecosystem and further, to make the climate more conducive and to restore water balance.

It plays a critical role in restoring productivity, ecosystem stability and biological diversity of degraded areas. Plantation play an important role in protecting the soil surface from erosion and allowing the accumulation of fine particles. Trees are highly suitable for the detection and monitoring of the air pollutants and have been effectively used at various places. Each tree works as a small purifying, dust absorption device and at the same time acts as an oxygen generator. Trees act as natural filters as they remove pollutants from the atmosphere and improve air quality. They act as sinks for the pollutants. Various researches have shown that vegetation removes large quantities of pollutants which has supported idea of using green belts around industrial units.

The dust laden wind blows into the vegetation and the dust is deposited on the leaves, branches and stems of the plants which act as barrier. The trees also fulfill the oxygen need of the humans as well as animals by providing oxygen. Planting of trees and shrubs for abatement of pollution and improvement of the environment is an effective and well recognized way.

By planting trees we can achieve the dual purpose of bio-aesthetics as well as mitigation of pollution. Proper planning and plantation scheme depends upon the magnitude and type of pollution, selection of pollution tolerant and dust capturing plants.

F.2 Road side plantation has following objectives

- ♣ Plants help in scavenging dust particles.
- ♣ They provide shelter space for birds & other biota.
- ♣ The plant should be evergreen, large leaved, with rough bark, ecologically compatible, with low water requirement, requiring minimum care, capable to absorb pollutants, pollutant resistant, grow climatically suitable, fast growing, free from wind throw and breakage and with high pollution tolerance index.

- ♣ The species should be suitable to the climate, topography and soil. The species should not be grazed or browsed by the animals.
- ♣ The selection of plant species for green belt would be done carefully and as far as possible native plants would be used.

F.3 Plantation Technique

A green belt with a minimum width of 3.5 meter will be developed along the periphery of the cluster. The density of plantation will be kept at 1000 trees / Hectare. Plantation will be done in such a way that plants of the 2nd row are staggered between the plants of Ist row. This would attenuate the pollutants level.

In addition, plantation will be done at the following places.

i. In safety **barrier** zone of **7.5 m.** along lease boundary.

ii. Along both the sides of the approach route/ haulage road.

iii. At other suitable public places.

Plantation will be carried out with the onset of rains or preferably one or two weeks after the rain starts. Planting of trees during summers would be avoided which otherwise will require heavy watering.

In addition, plantation will be done at the following places.

- ♣ In safety barrier zone of 7.5 m. along lease boundary
- ♣ On backfilled area
- ♣ Along both the sides of the approach route/haulage road
- ♣ Plantation will be carried out with the onset of rains.

Preparation of Pits

- ✓ A standard pit size measuring 2'× 2'×2' will be dug.
- ✓ Pits would be filled with soil from agricultural field and FYM in the ratio of 3:1.
- ✓ Pits would be watered prior to plantation of saplings.
- ✓ Care would be taken regarding location of the trees in relation to road formation. Trees will not be planted close to the inside of curves or near road junctions. There they may obscure vision and create a driving hazard.
- ✓ As tree trunks don't have any leaves up to a height of 8-10 ft. it would be appropriate to plant a shrub in front of such trees to give a coverage to this portion.

- ✓ Trees which have compact branching, thick foliage and broad hairy, shiny or wax laden leaves would be planted.

F.4 Recommended plant species for Greenbelt

Careful attention could be devoted to the selection of plant species (Beckett et al.1998 and Nowak and Dwyer, 2000). Selection of the appropriate plant species, which are tolerant to the particular pollutants of that area, can be done on the basis of climatological conditions and ecological status of that region. An ideal tree for planting in the GB should have the following characteristics (Sharma et al. 1991 and Sharma et al.1994):

The following characteristics are kept in view while selecting plant species for green belt development:

i. They should have fast growth rate for quick development of canopy (Nowak et al.2002).

ii. They should have strong branches, thick and durable canopy which can withstand storm.

iii. They should have large leaf size/ area for greater retention of pollutants.

iv. They should have dense foliage for better trapping of pollutants.

vi. The species should be Indigenous.

vii. Resistant to specific air pollutants, diseases and insects.

viii. Able to maintain the ecological and hydrological balance of the region (Whitlow and Bassuk,1988 and Whitlow et al. 1992).

ix. Leaves with hairy, resinous, scaly, and coarse surfaces could capture more particles than smooth leaf (Beckett et al. 1998; Beckett et al. 2000a and Beckett et al. 2000b).

x. Plant species have long life span in green belts.

F.5 Suggested Plant Species for Greenbelt development:

The details of suggested plant species (Shrub, Trees and Grass) are furnished in **Table 4.8,** indicating their botanical name, common name, family and their effectiveness in pollution control. Soil binder plant species also suggested.

Table 4.9: Following plant species will be planted

S.No.	Botanical Name	Family	Common Name
Shrub			
1.	*Tabernaemontana divaricata* (L.) R. Br. Ex Roem. & Schult.	Apocynaceae	Chandni
2.	*Nerium indicum* Mill.	Apocynaceae	Kaner
3.	*Thevetia peruviana* (Pers.) Merr.	Apocynaceae	Pili Kaner
Tree			
4.	*Terminalia cattapa* L.	Combretaceae	Jangli badam
5.	*Pterospermum acerifolium* Willd.	Sterculiaceae	Kanak Champa
6.	*Tectona grandis* L.f.	Verbenaceae	Sagwan
7.	*Dalbergia sissoo* Roxb.	Fabaceae	Shisham
8.	**Nyctanthes arbor-tristis *L.***	Nyctaginaceae	Harsinger
9.	*Alastonia scholaris* (L.)R.Br.	Apocynaceae	Chatwan
10.	*Azadirachta indica* A. Juss.	Meliaceae	Neem
11.	*Thespesia populnea* (L.) Soland & Corr.	Malvaceae	Paras Peepal
12.	*Mangifera indica* L.	Anacardiaceae	Am
13.	*Cassia fistula* L.	Caesalpiniaceae	Amaltas
14.	*Ficus benghalensis* L.	Moraceae	Bar
15.	*Lagerstroemia speciosa* (L.) Pers.	Lythraceae	Jarul
Grass			
16.	*Arundo donax* L.	Poaceae	Elephant grass/ Wild cane
17.	*Cynodon dactylon* (L.) Pers.	Poaceae	Doob

After care and Monitoring:

Adequate and timely after care such as soil working, weeding, fertilization and proper irrigation of the planted saplings would be made. The area would be protected from animals until the plants are above the level of damage. Proper monitoring of the plantation will be made.

Protection of Trees/ Plants from Animals and Sun Burn:

Protection of planted shrubs and trees is the greatest challenge, as villagers and their cattle are likely to damage the plantation before they are established. Hence protection of plantation is of paramount importance. Proper guards will be provided and maintained for two to three years. In order to protect the plants from sun burn during summer, jute bags and agro net will be used.

F.6 Program of Plantation

The area of lease being 3.9859 Hectares, 1.315 Hectare of area (33% of the lease hold) will be covered under plantation. The details of existing as well as proposed plantation are furnished below in tabular form and on conceptual map.

Table 4.10: Showing the details of Existing and Proposed Plantation

Year	Green Belt on Statutory Boundary		Outside the lease area (Near Village Shivpura and Chhotti Sadri)		Total		Budget allocation
	Area (Ha.)	No.of plants	Area (Ha.)	No.of plants	Area (Ha.)	No.of plants	
1st	0.8333	830.00	0.0	0	0.83	830	2,07,500
2nd	-	-	0.30	300	0.30	300	1,50,000
3rd	-	-	0.20	200	0.20	200	1,00,000
Total	**0.8333**	**830.00**	**0.50**	**500**	**1.3333**	**1330**	**4,57,500**

4.2.G Social Economic Environment

As a result of opening of any industry in a locality, the socio-environment is bound to change. The changes may be beneficial or adverse. But in case of opening of a mine in the area, the beneficial impacts will outweigh the adverse impacts.

New job opportunities will be created, improving the economic condition of the nearby villages. In addition to direct employment opportunity to the mine workers, some indirect employment potential to the petty trader like ESRs, tea stalls, etc., will also be created.

G.1 Anticipated Impact

There are many socio-economic impacts of mining on surrounding villagers. The adverse impacts attribute to physical displacement due to land acquisition, which is followed by loss of livelihood, mental agony, changes in social structure, and risk to food security etc People are also directly affected due to pollution caused by the mining activities. Social Impact Assessment (SIA) is a process of analysis, monitoring and managing the social consequences of a project.

Based on the social survey primary and secondary data collected by the EIA team, the likely impacts on the socio-economic scenario of the buffer zone that is, the surrounding villages falling within 10 km from the mine site, have been worked out and given in the following Table No 4.12.

Table 4.11: Impacts and Mitigation Measures

S. No.	Activity	Impacts	Mitigation Measures
1.	Mining activity	Deposition of dust particles on the agriculture land top soil nearby area.	Development of the green belt and adequate plantation will be along the haulage road.
2.	Mining activity	Possibility of conflict between miners and communities	As a result of various welfare measures to be implemented by the project proponent availability and quality of clean water to the local inhabitants will be ensured.
3.	Mining activity	Changing aesthetic beauty for greenery.	Plantation will be done around the mining area. Trees will be planted around school boundary, road sites and at near villages.
4.	Mining activity	Improved health care and sanitation in and around the mine area and nearby villages.	Time to time health check-up and health awareness camps conducted by the project proponent will enhance the health scenario of the area. Special camps for maternal health and eyes health will be beneficial to the people.
5.	Mining activity	The waste coming out of the OB/waste dump may choke the water course and may get deposited over agriculture field, affecting their	Garland drain and catch drains will construct around the waste dumps and the waste will be channelized in to settling ponds. The ponds will be desalted from time to time. Well efforts will be done to same nearby agriculture field from

		fertility any negative impact on fertility of land will have negative economic impact on local residents who mainly depend upon agriculture for their subsistence.	getting affected by air and water pollution, so the fertility of soil is protected and no negative impact is there on the health of the local people.
6.	Mining operations (construction, mine, pit formation and waste dump operation)	Deleterious effects on public health.	Likely contamination/pollution resulting from the various activities will be contained by taking appropriate remediation measures as described under management of air, water, soil, wastes and biodiversity sections.
7.	Mining activity	Economic impact.	Increase in economic activities, economic diversity and empowerment of infrastructural facilities. Some indirect employment potential to the petty trader like grocers, tea stalls, etc., will also be created
8.	Mining activity	Resettlement and conflict among the affected communities	Well designed displacement/R & R plans have been chalked out for minimizing the adverse impacts (to be given only, when applicable)
9.	Mining activity	General well-being and health.	Employment generation will result in general well-being of the people.

			Economic change will also bring about social and cultural change particularly with regard to female literacy which is very low (50.16%) as compare to male literacy (70.83%). Providing better drinking water facilities. As per results of various welfare measures be implements by project proponent.
10.	Mining activity	Dust and sound pollution due to quarrying activities	Modern technique should be adopted while quarrying to reduce pollution like dust and sound which are the main problems faced to the inhabitants.

G.2 Need Identification

In order to address their aspirations and identify the needs & areas for planning/initiating the welfare activitiesfor the locals,EIA team contacted, interacted & interrogated various members of 30 families living in the surrounding villages of the mine through verbal discussions and using the prescribed standard questionnaires. During the survey different people expressed need for developments in various areas in their vicinity. Photograph 1 is showing the social survey at Shasakiya Primary School Shivpura. Therefore, Photograph 2 and photograph 3 are showing the personal interaction with villagers at Shivpura village. The outcome of the survey points, including those points raised by the locals during the public hearing conducted for this mine, specifies the following explicit needs of local people:

There is need to improvement in the amenities in the village school (particular village name, furniture, drinking water, approach roads etc.)

- Poor condition of roads of in the villages.
- Lack of the portable drinking water facilities in the villages.
- Lack of the Better medical facilities & health check up programmes.
- There is need of the library in the school.
- There is rate of literacy of females very low as compared to males.
- There is insufficient employment, lack of better economic condition of local villagers.
- Lack of the Sports equipment in Aaganwadi centre and schools.
- There is lack of the facilities of portable drinking water in the school.
- Requirement of the furniture in the school.
- There is need to of a hall with furniture in the school.
- There is need of the stationeries in the school.
- There are the serious problems of dust in the nearby villages due to mining activities and transportation.

Photograph 4.1: **Social survey at Shasakiya Primary School Shivpura**

Photograph 4.2: Showing the personal interaction with villager at Shivpura

Photograph 3: Showing the personal interaction with villager at Shivpura

G.3 Programme of lessee

Corporate Environmental Responsibility

Accordingly, based on above assessment & identification of the actual needs of thepopulation of the surrounding villages, the lessee has planned his CER activities in the concerned area as given below.

- Supplementing Govt. efforts in health monitoring camps, social welfare and various awareness programmes for the surrounding population.
- Augmentation & development in the village school (particular village name, furniture, drinking water, approach roads etc.)
- Skill generation and skill up gradation programs for the females and youths and creation ofself help groups (SHGs) for making them economically self reliant.
- Employment for the locals, particularly the under privileged villagers.
- Better provision of medical facilities, educational facilities, recreational amenities for the employees as well as for nearby villagers.
- Providing pen, pencils, school uniforms, shoes and notebooks to students in the schools nearby lease area.
- Making available of fans, tables and blackboards in schools and Anganwadi centre.
- Making the availability of water filter in the school.
- Providing sports equipments for students in nearby schools.
- Get the paint on the walls of the schools.
- Roads construction/repairs in the remote villages for better transportation.
- Special efforts for female literacy and health.
- Promotion of small scale savings amongst the villagers through awareness camps

There is 2.0 per cent of the project cost goes to ESR/CER activities. So tentatively Rs. 1.30 Lac expenditure for the ESR works. Local people will be taken into confidence in implementing the welfare works. Proposed CER activities schedule, which will commence after the mine comes into operation, is given in the Table 4.13.

Table 4.12: ESR Activity

S. No.	Proposed activity	Annual recurring expenses in Rs.
1.	Providing pen, pencils, school uniforms, shoes and notebooks to students in the schools nearby lease area.	30,000/-
2.	Making the availability of water filter in the school	30,000/-
3.	Making available of fans, tables and blackboards in schools and Anganwadi centre.	40,000/-
4.	Providing sports equipments for students in nearby schools.	30,000/-
5.	Get the paint on the walls of the schools	
	Total	**1,50,000/-**

G.4 Conclusion

- Based on the foregoing discussions, it becomes apparent that this project is not expected to generate any harmful socio-economic impacts.
- On the contrary, it will create positive impacts and will be conducive for the overall prosperity of the area, besides improving considerably the living standards of the local inhabitants.
- Likely adverse impacts caused by the mine operations by way of contamination of land, surface & ground water, diminution of ground water table, deterioration of health of the workers & surrounding villagers etc., will be taken care of by meticulously implementing the proposed mitigation measures as given briefly in the above Table No 4.11., for which details have been given under individual sections.
- Hence, it may be concluded that no harmful socio-economic impacts will emanate from this mine operation.

The most significant impacts of the mining project on the people:

Economic impact: - Provision of job opportunities, business, transport and communication, labourer etc is the major ones. Thus, this unit is a highly favoured poor and landless people. This impact will help to increase in economic activities, economic diversity and empowerment of infrastructural facilities. Some indirect employment potential to the petty trader like grocers, tea stalls, etc., will also be created

Changing aesthetic beauty for greenery: - Plantation will be done in and around the mining area. Trees will be planted around the school boundaries, road sites and at near villages.

Occupational choices for women: - More opportunities for women in the area to work in mining activities rather than agriculture and other household. Occupational choices for local women will be available to find work near their residence so they will not have to more out of their villages and so far away in search of work. The project proponent will give priority to women workers in the mining activities. It will increase their household income.

Use of Red ochre: - there are so many uses of it like as paint, in artwork, in cement and industries.

Negative impacts of mine:

Sound problem: -The main problem of sound arises during the time of blasting of rocks. Unlike dust,sound is distributed on all the sides irrespective of wind direction. The inhabitants living nearer to quarry, suffer from more sound pollution.

Dust problem: - There are problems of dust due the mining operation and transporting the products. It can be reduced by the water sprinkling on the roads and terminating the work for some time if wind speed is high toward the populated area.

Negative impacts can be reduced by

- ❖ Use of advanced technology.
- ❖ Discarding unscientific methods like blasting, rope and bucket.

4.2.H Overburden & Waste Generation

A total of 207506.56 cu.m. (Insitu) waste will be generated in the life of mine& this waste will be used for backfilling over an area of 0.4242 Ha.

H.1 Proposal for Disposal of Waste

This waste generated during the course of mining will be used to backfilling the pits. Approximately an area covered under backfilling will be 0.4242 hectares.

4.2.I Geology

The likely impact of mining on the Geology is furnished below

Table 4.13: Impacts and Mitigation Measures

S.No.	Activity	Impact	Mitigation Measures
1	Excavation for pit formation Mining	Loss of top soil	Top soil has been scraped and stacked separately before creation of new pits and top soil has been used for plantation purpose.
2		Change in formation of lithology may takes place due to excavation of mineral	Total excavated area will be 3.1526 Ha.,out of which about an area of 2.7284 Ha., will be converted into water reservoir for use of local people and remaining 0.4242 Ha., of area will be

			backfilled through waste generated during the course of mining and will be done plantation over it.

4.2.J Mine Closure

Mine closure is one of the environmental requirements. The mine closure plan covers technical, environmental, social, legal and financial aspects of progressive mine closure. The criteria involved in mine closure are as below:

Physical Stability: All anthropogenic structures, which include mine workings, waste dumps, buildings, etc., remaining after mine decommissioning would be physically stable. They would not cause any hazard to public health and safety as a result of failure or physical deterioration.

Re-vegetation and plantation: Plantation and their preservation as per the scheduled plan will be done. Post plantation status would also be regularly checked every season. Following plantation related data/information will be kept and compiled every year.

(a) Area under plantation / vegetation

(b) Period of plantation

(c) Type of plantation

(i) Tree species

(ii) Grass

(iii) Any others

(d) Distance between plants (Different Areas)

(e) Type & amount of fertilizer used.

(f) Interval of watering.

(g) Method and period of post plantation care

(h) Survival rate

(i) Density of afforested area

(j) Pre-mining condition

(k) Post-mining conditions.

4.2.K Solid Waste

Not required.

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Chapter -5

Analysis of Alternative (Technology & site)

5.1 Introduction

The basic purpose of Analysis of Alternatives is to explore a place of work and /or a method of work which proves to be less harmful to the environment as a whole.

5.2 Site Alternatives

Occurrence of economic minerals is a gift of nature and it is site specific and therefore the site for mining ofRed Ochre is non-changeable. This project is already an operating mine preparing to achieve the targeted production.

5.3 Technology Alternatives

The technology alternatives related to mining activities will be considered in accordance with approved Mining Plan.However, changes if any, will be enforced only after getting consent of the Director General Mines Safety, Indian Bureau of Mines, Government of India and due care will be taken of the guidelines issued by Department of Geology & Mining, Government of Rajasthan, State Pollution Control Board, Government of Rajasthan.

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Chapter -6

Environment Monitoring Programme

6.1 Introduction

With a view to assessing the impact of mining on the environment regular monitoring of environmental parameters is essential. With the help of baseline data, the monitoring results will reveal the deterioration, if any, taking place in the environment due to mining. Based on this, necessary mitigation measures can be devised. The objectives of monitoring are as under-

i. To verify effectiveness of planning.

ii. To verify effectiveness of operational procedures.

iii. To ensure that required statutory provisions are complied with.

iv. To detected unexpected changes.

6.2 Environmental Monitoring Schedule

Monitoring for the following parameters will be done twice in year after the commencement of mining operation.

I. Ambient Air Quality:

Ambient Air Quality will be done for PM_{10}, $PM_{2.5}$, SO_2 and NO_x as per the following method-

Table 6.1: Methods adopted for PM_{10}, $PM_{2.5}$, SO_2& NO_x determination

S.No.	Parameters	Type of Method
1	PM_{10}	BIS 5182 Part 23 2006
2.	$PM_{2.5}$	As per CPCB Guidelines
3.	Sulphur Dioxide	BIS 5182 Part 2-2001 Improved West & Gaeke method (Pararosaniline method)
4.	Nitrogen Oxides	BIS 5182 Part 6- 2006 Jacob & Hochheiser modified (Sodium-Arsentine method)

II. Water Analysis:

Water analysis will be done for the following parameters as per IS-10500-2012.

pH, Turbidity (NTU), Conductivity at 25°C (µs/cm), Total Hardness ($CaCO_3$) (mg/L), Chlorides as Cl (mg/L), Total dissolved solids (mg/L), Sulphates as SO_4 (mg/L), Alkalinity as $CaCO_3$ (mg/L), Fluoride as F (mg/L), Nitrates as NO_3(mg/L), Magnesium as Mg (mg/L), Calcium as Ca (mg/L), Sodium as Na(mg/L), Potassium as K (mg/L), Na%, RSC, SAR.

III. Noise:

Noise Levels will be check during day and night time.

VI. Soil Analysis:

Soil analysis will be done for the following parameters – Soil Color, Bulk density (g/ cm^3), Water retention Capacity (%), Soil pH, Calcium as $CaCO_3$(%), Nitrate as NO_3 (%), Available Phosphorus as P (%), Available Sodium as Na (%), Available Potassium as K (%), Conductivity (µs/cm), Sulphate as SO_4(%), Organic Carbon (%) and Organic Matter (%).

6.2.1 Constitution of Environmental Monitoring Cell

The proponent will set up an independent environmental management team headed by a manger. The manager will be responsible for maintaining good environmental conditions and if there is some issue related to the environment he should directly report it to the project proponent and if it is not solved and is a major issue then it should be informed to the association. He will also be responsible for maintaining all the parameters within the prescribed limit. The environment team of mines will be responsible for the regular monitoring & implementation of control measures.

6.2.2 Duties & Responsibility of the Environmental Monitoring Cell

i. Routine monitoring of the environmental parameters.

ii. Ensuring maintenance of pollution standard.

iii. Proper development of greenbelt and its maintenance.

iv, Conservation of water & energy.

v. Studies implementation of Environmental Management Plan.

vi. Organising meeting of the environmental committee.

vii. The team will be responsible for sending for periodically compliance reports to the concerned authorities.

viii. The team will ensure that personal protective equipmentare issued to all the concerned persons and are used by them.

6.3 Budgetary Allocation for Environmental Protection

The details of investment for efficient control and monitoring of environment and the annual recurring cost (twice in a year)are given below (Table 6.2 & 6.3):

Table 6.2: Cost of Environmental Protection Measures

S.No.	Particulars	Capital Cost	Annual Cost
1.	**Pollution Monitoring**: Air, Water, Noise and Soil twice in a year Air: 2*5000 Water: 2*1500 Noise: 2*1000 Soil: 2*15000s	-	18,000
2.	**Pollution control:** Water sprinkling for dust depression for overhead water sprinkling facility	50,000	10,000
3.	Plantation 212 x 250 inside, 440x500 outside	2,73,000	30,000
4.	Vehicle Maintenance + PUC Certification	3000	5,000
5.	**Solid Waste Management (no solid waste will be generated)**	-	3,000
	Bins 2 Nos Rs @ 750 each	-	
	Pit and Composed	-	
	Transport of Waste	-	
	Total	**3,26,000**	**66,000**

To do the work of maintaining the environment cell, maintenance of catch and garland drain for whole cluster and plantation work for cluster, maintenance of approach road and maintaining good environmental conditions in nearby areas, we will spend a sum of **Rs2,00,000 Capital cost and 42,000 Annual cost**.

Table 6.3: Cost of Environmental Protection Measures

S. No.	Particulars	Capital Cost (Rs.)	Annual Cost (Rs.)
1.	Construction of garland drain, catch drain and settling ponds	69,000	30,000
2.	Maintenance of approach road 180meter	55,000	6000
3.	Wire Fence (450 meter)	75000	6000
4.	Signage & Caution Board	1000	-
	Total	**2,00,000**	**42,000**

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Chapter -7

Additional Studies

7.1 Public Hearing

In compliance of the direction given by the MoEF&CC, NewDelhi, vide its Notification No.S.O. 1533(E) dated 14th September, 2006 and its subsequent amendments, we are submitting a draft EIA/EMP for conducting a fresh public hearing.

7.2 Risk Analysis

Risk Assessment is mainly aimed at preventing accident from taking place. Ranking risk to health, safety & the environment is important because we have limited resources managing them. It would be ideal to regularly review our priorities in order to decide which risk deserves more attention.

Ranking risks is a critical step in effective risk management. Ordering risks by their importance allows policy makers to focus on those issues that matter the most. It is required to ascertain:

- √ What can go wrong?
- √ How likely is it to occur?
- √ What could be the consequences?
- √ What factors could influence?

Risk Analysis is the science of risks & their probability & their evaluations. Every project manager needs to be aware of the practices & the principles of effective management. The main objectives of preparing a disaster management plan at a mining project includes:

1. Preventing workers at mines from accidents.
2. Preventing incidents or reducing the severity of injuries during the mining operation.
3. Responding immediately & adequately in case of serious accidents.

7.2.1 Health & Safety Management System

The IXth& Xth conference on Safety in Mines recommended adopting risk assessment as a tool for development of appropriate health and safety management system in Indian Mines. The XIth conference further recommended that the management of every mining company should adopt process of safety management system & commit itself to proper formulation & implementation of the same in totality.

Risk assessment at the project under reference has been carried out on the basis of DGMS circular No. 13 of 2002 & Circular No. 02 of 2011.

Normally the following hazardous operations will have to be carried out at a mining project:

1. Storage and handling of diesel, oil & lubricant.
2. Storage and handling of explosives.
3. Drilling of blast holes.
4. Blasting of explosives.
5. Loading & unloading of blasted material.
6. Transport of minerals & waste.
7. Formation of waste dumps.
8. Maintenance at workshop.

In the process of all the above mining operations, the following risks are involved.

7.2.2 Storage and handling of oil, diesel & lubricant

1. Fire hazard may take place.
2. Workers make slip down on places where the oil is spilled.
3. As a result of spillage of oil, it may flow into water course and pollute the water.

7.2.2.1 Precautions to be taken

1. The room where oil and lubricant are stored will be properly fenced off.
2. Inflammable material will be displayed near the room.
3. Firefightingequipment like sand, spades and fire extinguishers will be provided.
4. It will be ensured that no dry grass and combustible material are allowed to accumulate around the oil room.

Note: Only Diesel will be used for mining operations and its will be stored in drums under shed at the mine site. Not more 2,500 liters of diesel will be stored at a time; hence there is no need to take additional permission under the Petroleum Rules, 1976.

7.2.3 Storage & handling of explosives

1. Explosive may fall into the hands of anti-social elements if proper care is not taken.
2. Explosion may take place at explosive magazine during lightning.
3. Accidents may take place while carrying the explosive to the magazine to the mine working faces.
4. Accident may take place while charging the blast holes with explosives.
5. Accidents due to misfire.
6. Accident due to fall of projectile material over men and animals present within the danger zone at the time of blasting.

7.2.3.1 Precautions

1. Only suitably qualified personnel shall handle or use the explosives.
2. The explosive should be handled as per the manufacturer's instructions.
3. Containers used for the carriage of detonators for daily/weekly/monthly use shall be made of steel or wood. Detonators inside the containers shall be in the original packing or in some other packaging that prevents movement of the detonators.
4. Detonators shall never be transported loose.
5. A general danger warning sign shall be posted outside of the explosives storage unit for people to keep away.
6. "No smoking and no naked light" poster will be displayed near the explosive magazine.
7. Explosive shall be kept dry, well ventilated, protected from the direct sunlight, and free from excessive and constant vibration.

Note: In this project no drilling and blasting has been proposed due to mineral is soft in nature, hence there is no requirement of storing and handling of explosives.

7.2.4 Drilling of blast holes

1. In case of manual drilling with jack hammers, accidents may take place due to sudden breakage of drill steels.
2. The drill man may fall into the pit while moving backwards carelessly.
3. If the drill rod is inserted into a misfired hole, accident may take place.
4. In case of drilling with wagon drills, the machine may topple down into the pit.

7.2.4.1 Precautions

1. Before commencing the drilling operation the drill steels should be examined to ensure that no cracks are developed on them.
2. Only trained persons should be engaged on drilling operations.
3. Before commencing drilling operation the face should be properly cleaned and washed to check against the presence of misfire holes.
4. Before drilling with a wagon drill care should be taken to ensure that no major breaks/cracks exist at the working face.

Note: In this project no drilling and blasting has been proposed due to mineral is soft in nature.

7.2.5 Blasting of Explosives

1. Accidents may take place while charging of blast holes.
2. After blasting the projectile materials may be hit men and animals present within the danger zone.
3. The blaster may be hit by the projectile while running to the blaster shelter after blasting.

7.2.5.1 Precautions

1. While charging the explosive into the blast holes it should be ensure that the holes are neither over-charged or under-charged.
2. Before commencing blasting operations, guard should be posted at all the entry points within the danger zone.
3. A proper siren should be hooted well before blasting the holes.
4. Proper shelter to be constructed for the blaster.
5. After blasting, the blaster checked for misfires, if any.

Note: In this project no drilling and blasting has been proposed due to mineral is soft in nature.

7.2.6 Loading & Unloading

The main hazards associated with loading are as under:

1. Rock falling over the dumper operator or the persons working at the face.
2. Toppling of the dumper due to unevenness of the ground.
3. Failure of hydraulic system.
4. Fire due to various causes
5. Falling while trying to enter into the operator cabin.
6. Electrocution.
7. Failure of wire ropes.

7.2.6.1 Precautions

1. Immediately after blasting a competent person should inspect the working face and ensure that all the loose materials are properly dressed before allowing anybody to work at the face.
2. In case of mechanical loading the boom height of the loading machine should in no case be less than the height of the face.
3. Only trained operators should be allowed to operate the loading machine.

4. The enclosures for the loader operator should be properly designed and maintained.
5. Access to the cabins must be safe & well designed.
6. The cabin should be of sufficient strength, capable of protecting drives in case of fall of rocks.
7. The loading machine should be well maintained.
8. Unnecessary persons should not be allowed to stay near the loading points.

7.2.7 Transport of minerals & waste

Mainly tipping trucks or dumpers are deployed for this purpose. The main hazards arising from the use of large earth moving vehicles are:

1. Engaging of incompetent persons.
2. Brake failure.
3. Lack of all-round visibility from the driver's position.
4. Defective access to the cab.
5. Vehicle movement particularly reversing.
6. Rolling over.
7. Vibrations.
8. Dust.
9. Lack of maintenance.

The drivers and the pedestrians are mainly exposed to the risk. Even the drivers of smaller vehicles face the risk of getting hit by the large vehicles.

7.2.7.1 Precautions

1. Visibility defects can be eliminated by the use of visibility aids such as CC TV, Rear view camera with monitors located in the driver's cab, radar and suitable mirror. Close circuit camera is particularly helpful while reversing towards the edge of the working bench or tipping into primary crushers. Edge protection is necessary to check inadvertent movement over the edge of the road way, bench or into crusher hopper.
2. Seatbelts should be provided for the drivers.
3. The risk of drivers likely to fall while trying access to an egress from the cabs can be eliminated by providing a good means of access & its proper maintenance.

7.2.8 Formation of waste dumps

Boulders may run down the waste dump and hit the men and animals.

The wash-off from the dump may clog the water courses during rainy season.

7.2.8.1 Precautions

1. Proper terracing of the waste dump should be done.
2. Proper type of retaining walls should be constructed around the toe of the waste dumps.
3. Proper garland drains should be constructed around the waste dump to channelize the rain water and to ensure that no wash-off are transported into the natural water courses.
4. Proper siltation ponds also will be constructed.

7.2.9 Maintenance at workshop

As a result of washing and cleaning of vehicles at the workshop oil and grease may flow with water and join the natural water course, which may pollute the water.

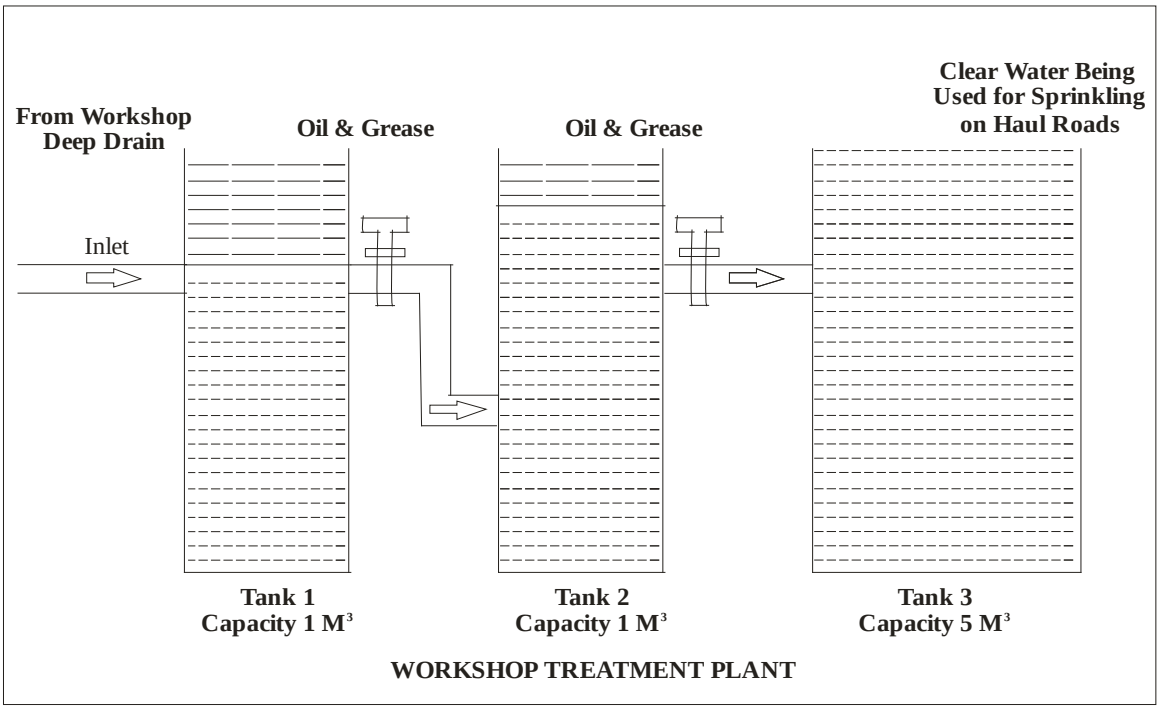

Figure 7.1 Showing Workshop Treatment Plant

7.2.9.1 Precautions

The effluent comings out of the workshop in the form of oil/laden and water will be treated in a treatment plant at the workshop before allowing it to flow into the water course. A design of the treatment plant is given below:

One-meter-deep drain is constructed from workshop to tank No. 1 (Capacity 1 cum.m.). The water from tank No. 1 will be allowed to flow tank No. 2 (Capacity 1 cum.m.).Here oil & grease floating on the tank is removed & stored in oil drums for sale. Water flowing into tank

3 (Capacity 5 cum.m.) will be free from oil & grease and can be used free & this water can be used for sprinkling on haul roads and plantation. Tank 1 & 2 will be cleaned from time to time for removing settled grits.

7.2.10 In addition the following hazards are also possible at the mine.

1. Hazards due to inundation at the mine.

In case of sudden heavy down pour, there are chances of deep pits getting inundated, trapping men and machinery therein.

Precautions

Deep drains will be constructed around the mining pit to ensure that the rain water flows into the natural water courses. However, in case of continuous heavy rains the men and machinery should be withdrawn from the pit bottom.

2. Fall of men and animals into water storage tanks

Men and animals may fall into water storage tanks and other closed pits.

Precautions

All the pits will be proper fenced off as per rules.

The fencing shall be properly maintained.

3. After closure of the mine it may be a source of danger to men and animals

After the closure of the mine, normally no mine officials will be present at the mine. Therefore, there are changes of fall of men and animals into the excavated pits.

Precautions

1. The mine will be properly reclaimed and rehabilitated as per the provisions in the final mine closure plan.
2. All the deep pits will be properly fenced off as per rules.

4. Fire Hazard

1. Combust able materials like dry leaves, grass and fire wood may catch fire, if proper care is not taken.
2. The mining machinery may catch fire due to overheating.
3. Fire may take place like office room etc.

Precaution

1. The mining machinery will be maintained properly.
2. Firefighting equipment will be provided as per rules.

7.3 Occupational Health and Safety

In reality no mining is possible without creating hazard to health and safety, but the hazard can be minimized/controlled up to a great extent by taking proper measures. Necessary steps will be taken to minimize the impacts of mining activities on occupational health and safety.

7.3.1 Dust Hazard

This isRed Ochre mine where the following occupation health impacts may be anticipated.

Physical contact of dust with the eyes, nose, mucous membranes and skin may cause irritation. Redness may develop in the eyes causing pain and inflammation. Exposure to large amounts of the dust ofRed Ochremay cause coughing, sneezing and nasal irritation.

Since the content of free silica in Red Ochre is less than permissible limit, there are no chances of occurrence of silicosis. However, long exposure to Red Ochredust may cause pneumoconiosis.

Deposition of dust on the leaves of plants may retard the growth of plants.

7.3.1.1 Precautions against Dust Hazard

It will be ensuring that either wet drilling or drilling with dust exactor will be practiced at the mine. Arrangement will be made for regular and adequate water sprinkling on the haul roads. The person expose to dust hazard will be provided with personal protective equipment. The workers engage on drilling operation will be encourage were full sleeve cloths. The driller will be engage on rotation. Adequate plantation will be done to check the spread of dust. Medical examination of the persons working at the mine will be carried out at regular intervals as mentioned below, to access the impact of dust on their health.

The following steps are proposed to be taken-

1. Medical exanimation of the persons just before their recruitment.
2. Periodical examination of workmen as per following programme.

Workmen	Periodicity of medical examination
Initial	Before giving employment in the project each person will be examined
Workmen+45 years age and all drivers and all workmen working in dusty atmosphere	Every 12 months
33% of worker	Each year

7.3.2 Noise hazard

The noise level higher than the permissible limit may develop deafness in the long run. Due to higher ambient level of noise the wild animals may be driven away from the locality. Drilling operations will be done either by wet process or by using dust extractors. Medical examination of the persons working at the mine will be carried out at regular intervals to access the impact of dust on their health.

7.3.2.1 Precautions against Noise hazard

All the mining machinery will be properly maintained. Overloading of dumpers & tracts will be avoided. Adequate plantation will be taken to contained noise. Personal protective equipment will be provided to the persons working at noisy places. As a result of medical examination of the workers as mentioned above the loss of hearing power can be accessed, if any.

7.3.3 Risk assessment with respect to high accidents like landslides, subsidence, flood, inundation, fire seismic activities, tailing dam failure etc.

Disaster Management:

The mine has appointed all the competent persons/ qualified and experienced personnel as provided under various statutory provisions and has the resources and facilities required and therefore the mine management is capable and equipped to deal with efficiently any situation or hazard arising due to an unexpected, sudden occurrence resulting to abnormalities in the course of mining activity leading to a serious danger to workers or any machinery or the environment. Cordial relation with government officials and other social service organizations and working groups are kept to liaison with representatives of the mine to ameliorate the situation of panic, tension, sentiments, grievances and misgivings created by any disaster. To ameliorate the injured, survivors and family members of affected persons by providing material, moral support and establishing contact with relatives of victims.

1. **System of communication**

The mine management has in place an internal communication system with landline/mobile or phone, internet communication through what's app or email or voice call. The telephone/ mobile phone numbers and addresses of nearest First Aid Station/dispensary/Hospital, Police Station, and Fire Service are displayed prominently on notice board.

2. Consultative committee

A standing consultative committee is in place and functioning under the Chairmanship of Agent with Mines Manager, Safety Officer/ Medical Officer/ Asst. Mine Manager/Mine Foreman as members.

3. First Aid & Medical Facilities & Accommodation

Accommodation and facilities for primary health center are existing/ functioning at mine. Each competent person carries a first aid kit with him during duty hours.

All accidents are registered and immediately given first aid. The facilities of transport of seriously injured person are available. Quick communication facility with medical dispensaries/hospitals is exists. A list of equipment available with its type & capacity and items is maintained.

4. Security

Security posts at all critical places exist with security guards in attendance.

5. Risk Assessment

Risk assessment is a continuous process whereby risks are analyzed, assessed and risk management priorities are evaluated. The risks involved and their management are as tabulated as-

Table 7.1 Showing Causes of Risk and its Control measures

S. No.	Factors	Causes of risks	Control measures
1	Fall of sides of benches	Due to movement of vehicles on the mine benches.	The bench height is kept within prescribed limits; the operations are manual. The back slope of the pit is kept moderately flat and the workings remain safe at all times
2	Excavation or raisingof Red Ochre	a) Hauling and loading equipment are in close proximity while excavation. b) Swinging of bucket over the body of cabin of dumper/tipper c) Driving byunauthorized person	Mines vocational training both initial and periodical are being imparted to all the persons working in the mines so as to eliminate possibilities of such incidents. No unauthorized per is allowed to enter the mining pits / mines area and unauthorized driving or driving by unauthorized persons is not permitted in this mine.

3	Haulage of Red Ochre	a) Overloading of wasteoverburden/ mineral Barite in dumpers b) Reversal of dumper/ overtaking other loaded dumper/ Crossing of dumper moving from opposite direction c) Dumper Operator leaving the dumper during loading by excavator	Mines vocational training both initial and periodical are being imparted to all the persons working in the mines so as to eliminate possibilities of such incidents Proper training being given to the operators to nullify the said causes. Audio visualhorn are fitted in dumpers
4	Fire due to electricity and Oil	No electricity is used in the mine except for illumination during dark hours. Mine is working in two shifts. Due to the leakage or spillage of inflammable fluidslike diesel, lubricating oils etc.,	Proper training to persons employed , due care while repairing andstrict supervision are preventing such happenings
5	Water inundation	Inrush of storm water due to heavy rain	Hilly terrain, rapid flow of rain water down the hillsis there and therefore adequate number and length of garland drainsexist andkept cleaned for rapid flow of water
6	Natural calamities	Unexpected happenings	The mine has appointed all the competent personsand qualified and experiencedpersonnel as provided under various statutory provisions and has the resources and facilities required and therefore the mine management is capable and equipped to deal withefficiently any situation or hazardarisingdue to an unexpected, sudden occurrences

7.3.4 Care and maintenance during temporary discontinuance

Not applicable being active mine. In the event of mine being closed or mining being discontinued temporarily, due notice will be given 30 days before the date of such discontinuance to the concerned statutory authorities. During discontinuance period safety arrangement and secured fencing will be provided to avoid the inadvertent entry by any unauthorized person(s) in the mine area.

7.3.5 Emergency Preparedness plan

1. On realizing that anything serious may be about to happen anywhere in the mine, the person concerned will immediately inform the nearest mining official that is competent person working in the mine.
2. On being informed about the emergency, it will be verified for the correctness of the information with telephone in particular to the Manager and other part of the mine so that persons may be withdrawn from working places.
3. On receiving information of emergency intimation will be sent to the consultative committee which is already formed. Shift in-charge will ensure that all the materials and transport system to deal with emergency situation are available in place.
4. First aid facilities are kept ready to receive the injured, if any.
5. The consultative committee will meet at the earliest and discuss and analyse the repercussions of the emergent happening.

7.4 Risk Assessment and its Ranking

Sound Risk ranking is essential to effective risk management. In the absence of it, small risks may receive unwanted attention while large ones are neglected.

Risk is a function of likelihood & consequence. Likelihood is the chance that the hazard might occur. Since the risk of any hazard is dependent upon the chance that it will occur (likelihood) & the impact of an occurrence (consequence).

Risk Score= Likelihood x consequence

In some cases, the persons are required to be exposed to a hazard only for a fraction of time. Therefore, a more accurate analysis of the risk ranking can be carried out by taking exposure (Percentage of time personnel are required to be present) & probability (chance that they may be injured) into account.

Therefore, risk score = (Probability x exposure) x consequence.

The values of probability, exposure & consequence will have to be determined after arriving at consensus among the members of the risk assessment team.

7.4.1 Risk Ranking

Risk ranking can be done by qualitative as well as quantitative method. The choice of method will depend upon the circumstances prevalent at the mine. The tables showing risk ranking criteria have been furnished below.

Risk Assessment has been done as per guideline supplied by DGMS through its circular No. 13 of 2002 dated 31st December, 2002.

7.4.2 Process

The risk score may be calculated as under:

Risk score = Consequence x Likelihood

Risk score = Consequence x Probability x Exposure

7.4.3 Scale for Consequence

Table 7.2: Showing Risk Ranking Criteria

Several dead	5
One dead	1
Significant chance of fatality	0.3
One permanent disability/ less chance of fatality	0.1
Many lost time injuries	0.01
One lost time injury	0.001
Small injury	0.0001

7.4.4 Scale for Exposure

Table 7.3: Showing Risk Ranking Criteria

Continuous	10
Frequent (daily)	5
Seldom (Weekly)	3
Unusual (Monthly)	2.5
Occasional (Yearly)	2
Once in 5 years	1.5
Once in 10 years	0.5
Once in 100 years	0.02

7.4.5 Scale of Probability

Table 7.4: Showing Risk Ranking Criteria

May well be expected	10
Quite possible	7
Unusual but possible	3
Only remotely possible	2
Conceivable but unlikely	1
Practically impossible	0.5
Virtually impossible	0.1

Level 1: > 15; i.e. requiring immediate action.

Level 2: <15 but >5; i.e. requiring management action.

Level 3: <5; i.e. Low risks requiring periodic review.

Based on the information gathered from other mines in the region risk assessment has been done. The result of the risk assessment is given in the following table:

Table 7.5: Hazards faced in Red Ochre Mining Operations

S. No	Activity	Hazard Description (Risk)	Score				
			Consequences	Exposure	Probability	Risk Score	Risk Level
1.	Site planning and layout	Travel in moving vehicle in uneven terrain	0.1	5	7	12.1	Level 2
2.	Drilling	Breaking of dill steel and fall while drilling	0.01	0.5	0.5	1.01	Level 3
3.	Blasting	Premature of explosion of blast holes and fall of projectiles.	0.01	0.5	0.5	1.01	Level 3
4.	Bench Formation	Rock falls or slide from the bench face(bodily injuries)	1.0	2	3	6	Level 2
5.	Loading of material into dumpers	Uncontrolled movement of shovels	0.3	3	7	10.3	Level 2
6.	Unloading of material	Rolling of the dumper from waste dump	0.3	3	7	10.3	Level 2
7.	Sorting of material	Injurious caused by hand tools	0.01	3	1	4.01	Level 3
8.	Transportation of minerals	Accident caused by Vehicle (bodily injuries)	1	3	7	11	Level 2
9.	Transportation of overburden	Accident caused by Vehicle (bodily injuries)	1	3	7	11	Level 2

Thus, it is seen that bench formation, transportation, loading and unloading of materialare the most hazarded operations requiring top most attention.

7.5 Conclusion

The risk assessment table shows that the maximum risk is involved inbench formation and transportation of material.

Precaution required to be taken while bench formation, transportation, loading and unloading of material:

Precautions as mentioned under Para No. 7.2 will be taken.

***

Chapter -8

Project Benefits

8.1 Introduction

In the present fast progressing world of industrialization, no country can survive without running industries in a cost effective manner. Industries and associated environmental pollution are hand and gloves to each other. However, every industrial/mining set up, besides benefitting the owner, also accrues both tangible and intangible benefits to the local community, the State & Central Governmental agencies, middle men/traders, manufactures, transporters, consumers etc. A brief description of the present project benefits is described below.

8.2. Project Proponents

Undoubtedly, the primary aim of every project proponent is to earn some profit out of the investment made in the project. However, the project needs to be established and operated professionally in a sustainable manner. The extent of benefit accrued to the proponent will depend upon the nature of the mineral to be extracted and the extent of investment made by him. Normally, more the investment, more the likelihood of earning profit. Honestly speaking, every proponent desires to get at least a return of around 10% on the investment made by him. The targeted production of the present mining lease is 2,33,445TPA of Red Ochre.

i. Employees

The employees involved in the project are directly benefited by the salary/wages and other amenities/fringe benefits. There are 33 persons deployed at the mine, who will get directly benefitted from this project.

ii. The Local People

The local people will benefit under the various ESR programs proposed by the project proponent in the following manner:

Table. 8.1: Details of Proposed E.S.R Activities

S. No.	Proposed activity	Annual recurring expensesin Rs.
1.	Providing pen, pencils, school uniforms, shoes and notebooks to students in the schools nearby lease area.	30,000/-
2.	Making the availability of water filter in the school	30,000/-
3.	Making available of fans, tables and blackboards in schools and Anganwadi centre.	40,000/-
4.	Providing sports equipments for students in nearby schools.	30,000/-
5.	Get the paint on the walls of the schools	
	Total	**1,50,000/-**

Note: That quantities distribution can be redistributed according to need of requirements.

iii. People Engaged in Ancillary Activities

People engaged in various ancillary activities like transportation of the mineral from the project site to the end, consumers, shopkeepers, and other small establishments will be benefitted indirectly from the proposed upcoming project. Under the proposed welfare program condition of the schools, hospitals and the public roads of the area will improve considerably.

iv. Development of Greenbelt/ Afforestation

The area of lease being 3.9859 Hectares, 1.315 Hectare of area (33% of the lease hold) will be covered under plantation. The details of existing as well as proposed plantation are furnished below in tabular form and on conceptual map.

Table 8.2 Showing the details of Existing and Proposed Plantation

Year	Green Belt on Statutory Boundary		Outside the lease area (Near Village Shivpura and Chhotti Sadri)		Total		Budget allocation
	Area (Ha.)	No.of plants	Area (Ha.)	No.of plants	Area (Ha.)	No.of plants	
1st	0.8333	830.00	0.0	0	0.83	830	2,07,500
2nd	-	-	0.30	300	0.30	300	1,50,000
3rd	-	-	0.20	200	0.20	200	1,00,000
Total	**0.8333**	**830.00**	**0.50**	**500**	**1.3333**	**1330**	**4,57,500**

v. Creation of water reservoir

At the end of the mine life, about 3.1526 Ha., of area will be excavated. Out oftotal excavated portion 2.7284 Ha., of area will be converted into water reservoir for storage of rain water, which will be used by local people and remaining 0.4242 Ha., will be reclaimed and backfilled by the waste dump/overburden and done plantation it.

vi. The State & Central Governments

The State & Central Government will benefit through various types of direct/indirect taxes from the project.

vii. Middle Men/Traders in the Supply Chain

Since, the mineral is consumed in nook and corner of the country, a number of middle men in this supply chain will be benefited by it.

viii. Consumers

The project is for mining of Red Ochre mineral. These minerals are mostly utilized in various forms in various industries like, Cement, Paints, Rubber, Glasses, Plastic industries, foundries, Lacquers colours.

8.3 Proposed expenditure for welfare of (33 employees) engaged at the mine

The budgetary provisions for expenditure on the welfare of the mine's employees have been given below:

Table 8.3:Details of Proposed Expenditure for Welfare of Workmen

S. No	Particulars	Annual expenditure in Rs.
1.	First Aid facility	66,000
2.	Food, snacks, tea, drinking water etc	1,34,000
3.	Separate toilets for Male & females	20,000
Total		**2,20,000**

8.4 Expenditure to Meet Statutory Requirements

The budgetary provisions for incurring expenditure to meet the statutory requirements are given below:

Table 8.4:Details of Expenditure to meet Statutory Requirements

S. No	Particulars	Annual expenditure in Rs.
1.	Personal protective equipment to Personnel (like helmets, shoes, gloves, goggle, ear muffs, masks etc.)	49,500
2.	Vocational Training Programs	75,000
3.	Occupational Medical examination (initial and periodical) of employees.	75,000
Total		**1,99,500**

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Chapter -9

Environmental Cost Benefit Analysis

9.1 Introduction

The scope for environmental cost benefit analysis does not required for the current project.

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Chapter -10

Environment Management Plan

10.1 Organization

This chapter describes the administrative structure to be adopted in this mine for both complying the provisions under Mine Act, 1952 and ensuring the implementation and monitoring the effectiveness of the mitigation measures suggested in Chapter 4, after approval of the EIA.Under the provisions of the Mines Act, 1952 the mine will be under the direct control of the Mines Manager. He will be assisted by Assistant Managers including Environment Manager, Mine Foremen and Mining Mates. The Mine Manager will be made responsible for the proper implementation of the proposals made for the protection of the Environment and also regular monitoring of the pollution level.

The Assistant Manager (Environment) will be responsible for sending the compliance reports to the SPCB/MoEF&CC through the Mines Manager. He will be also made responsible for developing good liaison with the concerned State Government Departments and SPCB. The proposed management structure is given below:

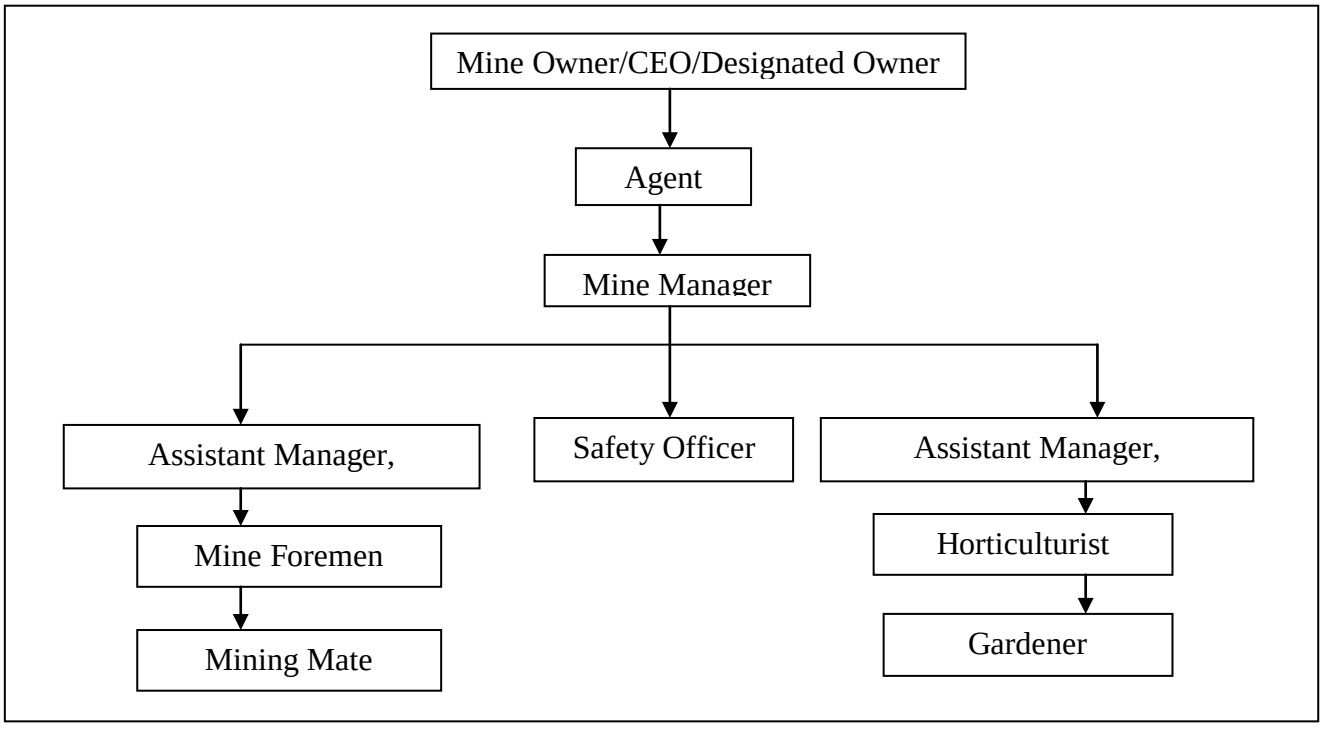

Figure 10.1: Showing the Proposed Management Structure

10.2 Constitution of Environmental Monitoring Cell

The proponent will setup an independent environmental management team headed by a manger. The manager will report directly to the unit head. He will be responsible for maintaining all the parameters within the prescribed limit. The team will be responsible for regular monitoring & implementation of proposed control/mitigation measures.

10.2.1 Duties & Responsibility of the Environmental Monitoring Cell

a. Routine monitoring of the environmental parameters.
b. Ensuring maintenance of pollution standard.
c. Proper development of greenbelt and its maintenance.
d. Conservation of water & energy.
e. Studies implementation of Environmental Management Plan.
f. Organising meeting of the environmental committee.

The team will be responsible for sending for periodically compliance reports to the concerned authorities.

The team will ensure that personal protective equipmentare issued to all the concerned persons and are used by them.

10.3 Environment Policy

The top management, the middle management, executives and the workers of M/s Quality Minerals (lessee) of Shivpura Red Ochre Mine situated near village Shivpura, Tehsil Chhotti Sadari &DistrictPratapgarh engaged in producing Red Ochre, are fully committed to:

a. Maintain healthy environment at the mine by adopting proven, feasible and eco-friendly technology and practices.
b. Ensure strict compliance of the all the related statutory provisions.
c. Carry out routine monitoring of the environmental parameters.
d. Submit compliance reports regularly to the regulatory authorities.
e. Operate the mine in a professional manner with the help of qualified and experienced officials.
f. Adopt all the measures for protecting the mine environment within the study area.
g. Ensure accident free operations.
h. Undertake plantation along road sides, around the boundary barriers and other available places.
i. Create awareness among the people about the important of environment.

j. Ensure conservation of water and energy.

10.4 Procedure adopted by the Mine Administration to address Environmental Non-conformances/Complaints

1. After receiving complaints by the mine manager, first of all the mine manager will try to address the problem at his own level with the help of environment manager. If it is beyond his control he will inform the higher authorities.
2. The mine manager will send an action taken-report to the higher authorities and/or regulatory authorities.
3. A thorough enquiry will be conducted to ensure that such non-conformances don't take place in future.
4. Disciplinary action will be taken against the personnel responsible for the compliance of conditions imposed through the EC.

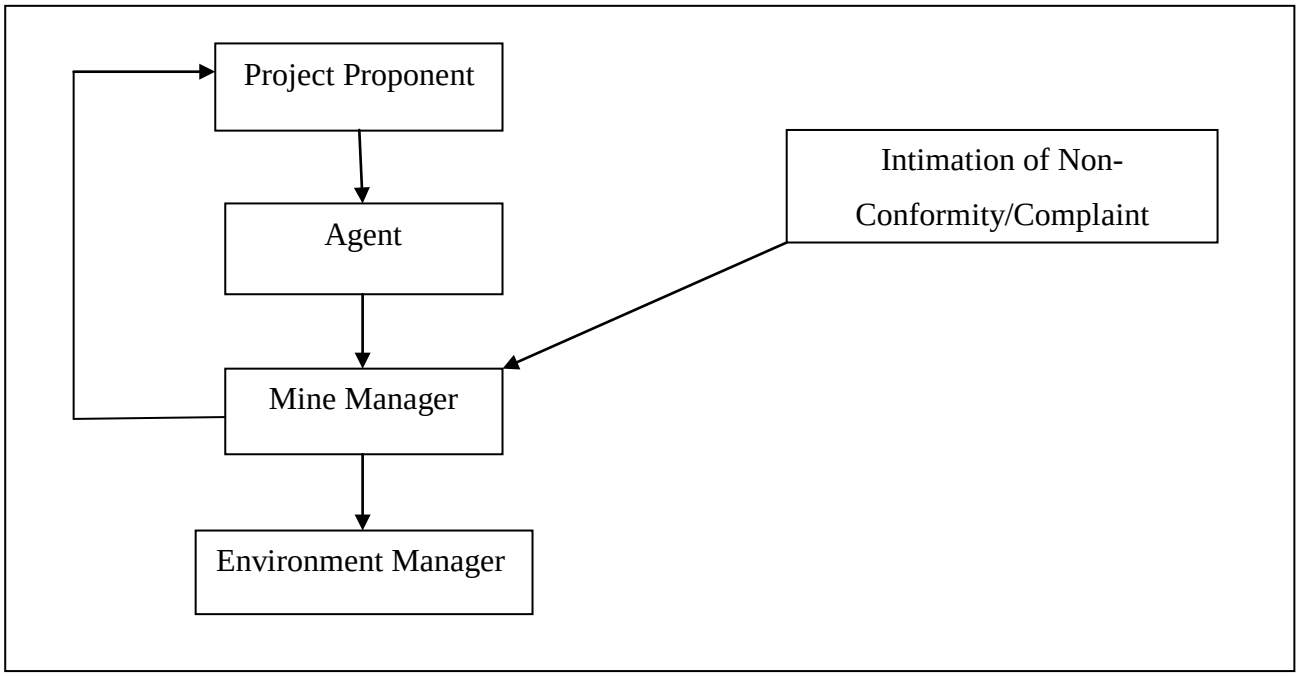

Figure 10.2: Showing the Hierarchal system noncompliance/complaint redressed mechanism at the mine

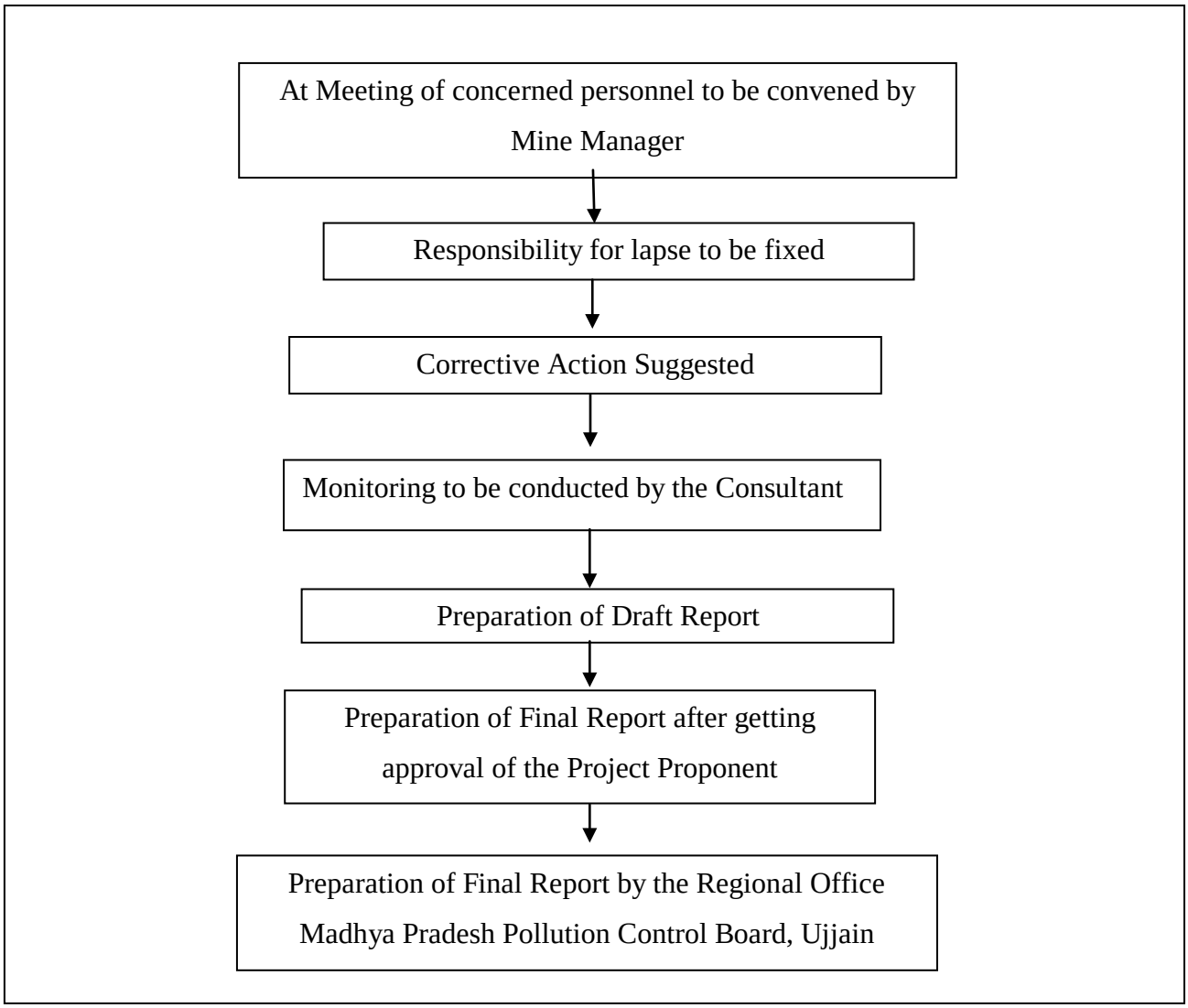

Figure 10.3: Line of Action for the redressal of Non-compliance/Complaints

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Chapter -11

Summary and Conclusions

11.1 Project Proponent

M/s Quality Minerals has proposed mining and trading of Red Ochre produced from ShivpuraRed Ochre Mine situated near village Shivpura, 48.00 Km from the District Headquarter Pratapgarh (Rajasthan). After getting Environmental Clearance from the local Government, the Red Ochre mine will be working with a production capacity of 2,33,445 TPA of Red Ochre. Expected life of mine is 8 years from the commencement date. The estimated capital cost for the mining project including utilities off site, auxiliary services etc is about Rs. 40.00Lakh.

Registered Address of Project Proponent

M/s Quality Minerals

Partner- Shri Nehul Patidar S/o Shri Pushkar Patidar

R/o 9A, Arihant Vihar, Near Power House, 100 feet Road, Kankroli

District Rajsamand, Rajasthan

Contact No. +9414012490

E-mail: singhbp1983@gmail.com

11.2 Project Description

Initially, the Letter of Intent was granted in favour of M/s Quality Minerals R/o 9A, Arihant Vihar, Near Power House, 100 feet Road, Kankroli (Raj.)for mineral Red Ochre M.L.No. 07/2018 over an area of 3.9859 Ha., situated near village Shivpura, Tehsil Chhoti Sadri, District Pratapgarh. The state Government has issued Letter of Intent (LOI), vide Letter No. Ni Kha. Bhu/ Pratap/CC-I/F-1 (1)7/2018/4498 dated 21.12.2018 by Directorate of Mines and Geology Department Udaipur (Raj.).

Mining Plan with progressive mine closure plan was approved by Suptdg. Mining Engineer, Udaipur Circle, Udaipur, Vide his letter No. SME/UD-Cir/Mine Plan/ Pratap/F-19/18/10654-58 dated 20.02.2019.

11.3 Method of Mining

Mining of Red Ochre is generally done manually to remove the impurities associated with it. At the first stage, the overburden is removed by excavator/JCB. The mineral & Overburden is soft & easily mineable, since no drilling & blasting will be required. The mining method will be opencast mechanized. The benches shall be taken 6-meter height. Haul road & bench to

Bench ramp shall be done by excavator in the tipper. This will help in better utilization of the resources and systematic development of the mine. The mineral is soft in nature & directly dig gable, since no drilling & blasting will be required.

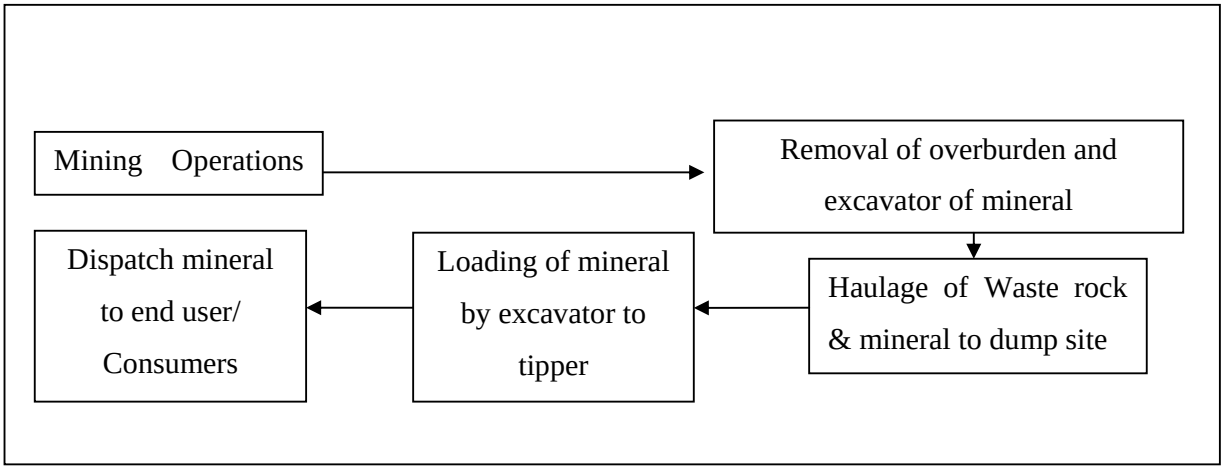

Figure 11.1 Showing flow diagram of mineral production

11.3.1 Manpower/Machinery Requirement

A total number of 33 persons (including supervisors and labour) to be employed at the mine. The details of mine personnel are given below:

Table 11.1: Details of Manpower

High-Skilled	Mining Engineer	1 full time	As per rule 42 of MCDR, 1988 as per rule
	Geologist	1 Part time	
	Mines Manager	1 full time	
Semi- Skilled	Mines Mate/Mines Foreman	1 full time	Per shifts
	Skilled Labours/Operators	20 full time	
	Unskilled Labours	8 full time	
Unskilled	Watchman	1 full time	

Source: Approved Mining Plan vide letter no. SME/UD-Cir/Mine Plan/Pratap/F-19/18/10656, dated 20.02.2019.

The planned annual mineral Red Ochre production is 2,33,445 tonnes per annum. The average number of working days per annum will be 300. Mining will be done during day light hours only. The listof theminingmachineryproposed to beused atthe mineare givenbelow:

Table 11.2: List of Machinery

S. No.	Equipments/ Machine	Nos.
i.	Hydraulic Excavator	2
ii.	Water tanker with sprinkler arrangement with tractor	1
iii.	Tippers/dumper 20 Tonner	6

Source: Approved Mining Plan vide letter no. SME/UD-Cir/Mine Plan/Pratap/F-19/18/10656, dated 20.02.2019.

11.3.2 Resource Requirement

Land Requirement

The proposed mining project will be carried out within the existing 3.9859 Ha., of area, which is Private Land. Consequently, there will not be any additional land requirement for the proposed this mining project.

11.3.3 Fuel Requirement

HSD/FO requirement for the proposed mine will be 500 litres per day consumption.

11.3.4 Water Requirement

Including 0.50 KLD of water for drinking purpose a total of 3.50 KLD of water will be required at the mines in the course of mining. The rain water will be accumulated in the existing pit & used for non-drinking purpose like sprinkling, plantation etc. For the purpose of diverting rain water into the pit, a good no. of garland drains, catch drains, siltation ponds etc. will be constructed. 0.50 KLD of water for drinking purpose will be obtaining from a water tanker. In the present case the daily requirement of water is about 3.50 KLD will be required for different activities as stated above.

11.4 Description of the Environment

TORs & Scope of the Study

Necessary ToRs for this project were issued by the SEAC, Rajasthan issued Terms of Reference vide its letter No. SEIAA/SEAC-Raj/Sectt/Project /Cat. 1(a) B1 (16655)/2019-20/11968 dated 27.02.2020. (Annexure 1 of the EIA report).

In the light of above TORs issued by the Government, details on regulatory scoping were worked out to carry out base line studies of both core (mining lease area of 3.9859 Ha.)

&buffer (area falling within 10 km radial distance from periphery of the mining lease area) zones. In the addition, studies on Risk Assessment (RA) and on-site Disaster Management Plan (DMP) were also included in this scope.

The Project Proponent has availed the services of M/s. Apex Mintech Consultants Udaipur for generating base line data in preparing this EIA report. The field studies for environmental attributes have been carried out during the period October, 2019 to December, 2019 representing the winter season, as per the guideline issued by the MoEF&CC. In order to assess & established the environmental sustainability of the project, various environmental attributes and likely adverse impacts resulting from the present mining operations have been identified and quantified to the feasible extent. Appropriate remediation measures for mitigating the observed adverse impacts on the environment have been evolved & included in these studies.

In compliance of the direction given by the MoEF&CC, NewDelhi, vide its letter no S.O. 1533(E) dated 14th September, 2006 and its subsequent amendments, we are submitting a draft EIA/EMP for conducting a fresh public hearing.

Details onRisk Analysis and Risk Assessment & its Ranking have also been worked out and included in the studies along with Occupational Health and Disaster Management Plan.

Comprehensive details on all these prescribed additional studies are given in the chapter 7 of this EIA report.

11.5 Project Benefits

The proposed project is likely to generate many tangible and intangible benefits to the employees, society, region, State and Central Governments and consumers.

The targeted production from the present mining project is 2,33,445 TPA of Red Ochre. Besides, 33 employees deployed in the project will be directly benefited by the salary/wages and other amenities/fringe benefits accrued to them. The local people will benefit under the various ESR programs proposed by the project proponent. Consequently, condition of the schools, hospitals and the public roads of the area will improve considerably. People engaged in various ancillary activities like transportation of the mineral from the project site to the end, consumers, shopkeepers, and other small establishments will be benefitted indirectly from the proposed upcoming project.

At the end of mine life about 3.9859 Ha., of area will be excavated during the course of mining, out of which about 2.7284 Ha., of area will be converted into water reservoir for

storing rain water which will be used by the local people. And remaining area about 0.4242 Ha., of area backfilled by overburden/waste dump and done plantation over it, which increase the aesthetic beauty of the area.

The State & Central Government will be benefitted through various types of direct/indirect taxes generated from the project.

Since, the mineral is consumed in nook and corner of the country, a number of middle men in this supply chain will be benefited by it.

This project will also be highly beneficial for the consumers. There are number of both existing and upcoming construction projects are in the region. These minerals are mostly utilized in various forms in various industries like, Cement, Paints, Rubber, Glasses, Plastic industries, foundries, Lacquers colours.

. This mining under reference is quite beneficial and essential for this region.

11.6 Environment Management Plan

Administrative structure to be adopted in this mine for both complying the provisions under Mine Act, 1952 and ensuring the implementation and monitoring the effectiveness of the mitigation measures suggested in Chapter 4, after approval of the EIA are described under Environment Management Plan.

Under the provisions of the Mines Act, 1952 the mine will be under the direct control of the Mines Manager. He will be assisted by Assistant Managers including Environment Manager, Mine Foremen and Mining Mates. The Mine Manager will be made responsible for the proper implementation of the proposals made for the protection of the environment and also regular monitoring of the pollution level.

The proponent will setup an independent environmental management cell headed by a manger/assistant manager. The manager will report directly to the unit head. He will be responsible for maintaining all the environmental parameters within the prescribed limit. The team will be responsible for regular monitoring & implementation of proposed control/mitigation measures and sending the compliance reports to the SPCB/MoEF&CC through the Mines Manager. Role, duties & responsibility of the mine manager, environmental manager & environmental monitoring cell have been defied very clearly in this environmental plan. Proposed Mitigation Measures of the deleterious environmental impacts will be practiced meticulously after the commencement of the mine operations by implementing the provisions made in the Environment Management Plan. In order to reiterate

firm commitment of the top management and employees of this mine, Environment Policy has been framed and given here. Apart from this, procedure adopted by the Mine Administration to address Environmental Non-conformances/Complaints has been included in this section. All comprehensive details of these aspects are given in the chapter 9 of the main EIA report.

11.7 Anticipated Impact on Environment and Mitigation Measures

Anticipated impact has been identified due to various activities in course of mining and its proposed mitigation are proposed as follows:

Table 11.3: Showing Anticipated Impact on Environment and Mitigation Measures

S. No.	Activity	Anticipated Impacts	Mitigation Measures
Impact on Land:			
1.	**Mining activitylike remove over burden,formation of mining pits and stacking of waste dump and minerals**	Land degradation due to remove over burden, Formation of mining pits & waste dumps affecting the causing loss to top soil.	Before opening new pit, whatever top soil will be scrapped out and store/dump on earmarked site for utilizing in plantation. No waste will be generated and no dumps will come to exists. Out of the total mining lease area of 3.9859 Ha.,3.1526 Ha. of area will be excavated up to a depth of 25 meter in the course of mining. The end of the mine life 0.4242 Hect. excavated portion will be backfilled and remaining 2.7284 Hect. excavated portion will be converted in to a water reservoir for storing rain water. The store water can be used for irrigation as well as supporting the life of animals. It will help of recharge the ground water as well.
2.	**Construction of infrastructure like office, approach roads and rest shelter etc.**	Degradation of land affecting the aesthetic beauty. (Since approach roads are already there, no more road construction will be required)	The area of mining lease is 3.9859 Hect. The lease area is situated all most flat land. having little top soil. Adequate plantation along road sides and vacant places. Haulage roads will be kept moist by water sprinkling and plantation on both sides will minimize the propagation of

			air borne dust.
3.	**waste dumping**	Erosion from west dump and surrounding areas during rainy season. Choking of water courses and siltation of agricultural fields.	Since practically no over burden in the area, no land will be degraded due to dumping. As far as buffer zone is concern, its land will not undergo any type of change because of mining.
4.	**Mining activity and mineral stack**	Choking of watercourses and siltation of agricultural fields.	Construction of garland drains, catch drains, siltation ponds etc. and desiltation of the siltation ponds from time to time.
5.	**Formation of mining pits and waste dump,**	Loss of Aesthetic Environment	**Reclaimedandrehabilitated of the core zone:** **Waste (Dump) management** **OB/waste will be** generated during plan period, waste will be covered under area of 0.1245 Hect, but the end of the mine life waste will be use in backfilling for the excavated portion(0.4242 Hact.) so no waste will be end of the mine life, so no management will be required. **Excavated Portion (Mining Pit) management** As per Geological reserves and targeted production the anticipated mine life will be approximately 8 years Out of the total mining lease area of 3.9859 Ha., 3.1526 Ha. of area will be excavated up to a depth of 25 meterin the course of mining. 0.8333 Ha. of area will be used in green belt (Statutory Boundary). The out of the total excavated area of 2.7284 Ha. area will be converted in to a water reservoir for storing rain water. The store water can be used for irrigation as well as supporting the life of animals. It will help of recharge the ground water as well.
6.	**Formation of**	Danger to the man and animal due to	Erection of proper fencing around the mining pits as per

	mining pits	formation of mining pits	rules.
7.	**Mining activity**	Deposition of dust particles on the agriculture land and top soil nearby area.	Development of the green belt and adequate plantation will be along the haulage roads. 0.8333 Ha. area will be used in green belt (Statutory Boundary).
Impact on Soil:			
1.	Mining operation [Mine pit development]	Pit development may cause the loose of top soil.	Before the commencement of pit formation the top soil will be removed separately and immediately used for plantation work. However, the surplus top soil, if any will be stored and covered with dry husk of rice or wheat; to maintain its nutrient contents. It will be used for plantation work in future as soon as possible.
2.	Dumping of overburden	Dumping of overburden if not removed before hand, the top soil may get buried under the waste dump and lost forever.	The top soil will be removed from the dumping site before commencement of waste dumping over there and immediately used for plantation purpose.
3.		The quality of top soil removed from the pitting site and dumping site may deteriorate due to loss in soil microbial community/ soil biota.	It will be used for plantation work as soon as possible after adding organic matter (Compost, animal manure & plant manure).
4.	Various mining	Soil contamination may take place if	Mining machinery will be maintained properly to avoid any

	activities and vehicular movement	used motor oil (containing metals such as Al, Cr, Cu, Fe, Pb, Mn, Ni, Si and Sn), grease are thrown here & there at the mine site (workshop) and spilling of contaminants such as oil from mining machinery.	spillage of oil. Used motor oil and Grease will be stored in separate containers and sold to the persons / Dealers duly authorized by CPCB/ RPCB.
5.		The deposition of contaminated windblown dust may lead to soil contamination and deteriorate the soil fertility as a result of blockage of soil pores of the nearby agricultural fields soils.	Regular water sprinkling will be done on haulage roads and dusty place such as loading and unloading points, mineral stock yard. Green belt will be developed along the approach road/ haulage roads and boundary barriers (statutory boundary).
Impact on Surface water			
i.	**On Surface Water** 1. Contamination of surface water in the buffer zone.	There is no water come from outside the lease area. Only during rainy season water is come into the mines for this we construct proper garland drains (16178 m) will be constructed around the mining pit (UPL).All water from rainy season will be channelized through 9 constructed settling ponds (6*3*3m) and then get collected into mining pits due to natural slope and used for mining activities. If heavy rainfall in the area is occur excess water from settling pond will be drain into natural course after proper siltation by settling pond and discharge into natural drain.	

ii.	Surface water contamination due to discharge of mine water	Due to mining activity surface water will not be contaminated due to discharge of mine water because all mine water will be siltation after proper settling pond and discharge into natural drain. So surface water sample taken from buffer zone is under permissible limit as per 2296:1982.
iii.	Impact on surface water due to overburden and top soil handling	In order to control the wash off from the overburden dump proper garland drains and catch drains will be constructed around the waste dump so that the rainwater will be collected at mining pit and used for mining activity.
2.Impact on Ground water		
i.	Contamination of ground water due to water table intersection during proposed mining.	The ground water table varies from 50-55 m BGL i.e. 463-458 mRL and mining will be reached up to 25 m done up to 488 mRL. Hence, during proposed mining ground water table will not be intersected.
ii.	Contamination of ground water	The wastewater generated from the domestic front will be mainly from toilets. The effluent coming out the toilet will be treated with septic tank.
iii.	3. Diminution of water table due to withdrawal of ground water (0.5	Following measures will be taken to obviate the adverse effect: 1. Rainwater harvesting will be carried out in the core zone. 2. No runoff water from the mining area will be allowed to escape as it will be collected in the pits. Beside its use in the mining, this will also result in the ground water recharge.

	m^3/15 Days)	3. Due to above measures, ground water recharge per annum will be 8818 m^3 (0.008818mcm),whichis much more than the water withdrawn for drinking purposes at the mine. Consequently, there will not be any effect on the water table of this area due to proposed water withdrawal.	
Impact on Air:			
1.	Formation of mining pits and waste dump	Generation of airborne dust during excavation (pit formation) and other operational stages of the mine, exposure to which may affect adversely the healthof operators/workers of nearby villagers.	Moisture content of the exposed area will be increased by water sprinkling to control the dust emissions and contain silt formation. Dust emissions will be checked at each stage of mine operation. Ambient Air Quality Monitoring will be done regularly as per regulatory schedule.
2.	Particulate Matter (Dust) from mineral loading & unloading	The manual mining operations will generate some dust due to loading & unloading in truck/tippers.	Secured covering the mineral loaded trucks by tarpaulin sheet before moving out from the mines. A helper will be deployed for instruction to the excavator's operator, which the heights from which material are dropped, should be reduce to a practical minimum height to control to fugitive dust emission arising during materials handling.
3.	Transportation	Dust generated due to plying of	Adequate plantation along road sides and vacant places.

		trucks, loaded with mineral transportation may produce adverse effect on health as like loss of visualization of workers which engaged in near operational phase and also affected to plants which is growing near the road	Haulage roads will be kept moist by water sprinkling and plantation on both sides will minimize the propagation of air borne dust. The speed of dumpers/ tippers plying on haul road will be controlled. Proper maintenance, oiling and greasing of vehicles and machines at regular intervals. Contracting only those vehicles to ply who have valid PUC certificate. Regular monitoring of AAQ will be done to assess the effectiveness of mitigation measures.
4.	Overburden Dumping	Adverse effect on the health of mine workers, due to dust emissions from the stacking of mine over burden.	At the end of mine life, about 3.1526 Ha., area will be excavated. About 0.4242 Ha., of area will be backfilled and 2.7284 Ha., will be converted into water reservoir. And about 0.8333 Ha., of statutory boundary area will be developed as green belt by plantation over it.
5.	Mining activity	Dust generates due to loading, unloading, handling materials.	Development of the green belt and adequate plantation will be along the haulage roads.
Impact of Noise:			
1.	JCB/Earth moving machines/Hydraulic	Sound level of 86 dB measure at 20 m distance and is an unavoidable source. However the	i) No such mitigation measures will be required, for people working near, 79.2 dB is

	excavator Mining will be carried out by semi mechanised method, thus earth moving machines will come into play.	pressure of 79.2 dB is low for mining activity and since the machine will mostly works in pits its impact will not make any significant difference beyond 50 m.	safe noise level for continuous noise dose for 8 hrs. ii) Providing Sound proof operator's cabin for equipment's like dumpers, shovel, tippers, etc. iii) Planting trees at various places within the lease area and haul road to act as acoustic barriers. iv) Providing workers with earmuffs & earplugs, as a protection from exposed to higher noise level.
2.	Jackhammer cause extremely high noise levels of upto 72-75 dB at a distance of 20 m because of the impact of the tool onto the rock/ground and also because of its pneumatic operation	High noise levels within the distance of up to 500 meter from the project site	There is no mitigation possible for this source of noise, as the rock/ground id broken using an impact which generates noise which cannot be reduced. Regular oiling and maintenance to be conducted on the jackhammer in order to reduce noise generated due to its pneumatic operation. The inlet air lubricator to be used for smooth operation of this machine. Operator and the people in the vicinity of this machine to wear earmuff of noise reduction rating at least 20 dB in order to protect themselves from this noise.
Impact on Flora & Fauna:			
1.	Mine pit development & waste dumping	Clearance of Herbs, Shrubs and Grass from core zone in the course of mine pit development & waste dumping.	✓ The mining lease area is sparsely vegetated, dominated by few Herbs, Shrubs and Grass. Herbs and Grass were seen after rainy season but they dried after some time. Thus there will be no significant impact. But plantation will be carried

			out along both the sides of the approach route/ haulage road and over inactive dumps.
2.		During the extraction of minerals from the mine pit, dust may be deposited on the vegetation of the forest area and crops of the nearby agricultural field. Deposited dust decrease the (i) Light availability for photosynthesis (ii) and affects gaseous exchange.	Dust suppression will be affected by regular sprinkling of water at the source of formation like haulage roads and loading & unloading points (Stock yard) etc. resulting in minimized damage to crops and flora (Wild plants). Adequate green belt will be developed along the statutory boundary, both sides of the approach road/ haulage roads of the lease area, in order to restrict spreading of dust. Proper maintenance of the mining machinery and machine efficiency to ensure reduction in the generation of dust and gases (CO_2, SO_2& NOx) during various mining operations. This would reduce adverse impact on vegetation and human life.
3.	Various other mining activities and vehicular movement	Disturbance (like behavioral effects) may be caused to the local fauna (Birds & Mammals) due to movement of mining machinery like Dumpers, Tippers and Excavators (increase in noise level).	✓ Regular maintenance of mining machinery in order to have a check on their noise level. ✓ Avoiding overloading of Transport vehicles. ✓ Transport of material will be avoided during the night time. ✓ Orientation training will be imparted to the mine employees to develop a sense of sympathy towards fauna. ✓ Special care will be taken for fauna during reproductive (e.g., courtship, nesting) seasons. ✓ Dense plantation will be carried out along the approach route/ haulage roads and in safety **barrier** zone of **7.5 m.** along lease boundary. ✓ Instructing the drivers of transport vehicles to allow the fauna to cross the road by slowing down the speed of the vehicle.

Impact on Socio Economic:			
1.	Mining activity	Deposition of dust particles on the agriculture land top soil nearby area.	Development of the green belt and adequate plantation will be along the haulage road.
2.	Mining activity	Possibility of conflict between miners and communities	As a result of various welfare measures to be implemented by the project proponent availability and quality of clean water to the local inhabitants will be ensured.
3.	Mining activity	Changing aesthetic beauty for greenery.	Plantation will be done around the mining area. Trees will be planted around school boundary, road sites and at near villages.
4.	Mining activity	Improved health care and sanitation in and around the mine area and nearby villages.	Time to time health check-up and health awareness camps conducted by the project proponent will enhance the health scenario of the area. Special camps for maternal health and eyes health will be beneficial to the people.
5.	Mining activity	The waste coming out of the OB/waste dump may choke the water course and may get deposited over agriculture field, affecting their fertility any negative impact on fertility of land will have negative economic impact on local residents who mainly depend upon	Garland drain and catch drains will construct around the waste dumps and the waste will be channelized in to settling ponds. The ponds will be desalted from time to time. Well efforts will be done to same nearby agriculture field from getting affected by air and water pollution, so the fertility of soil is protected and no negative impact is there on the health of the local people.

		agriculture for their subsistence.	
6.	Mining operations (construction, pit formation and waste dump)	Deleterious effects on public health.	Likely contamination/pollution resulting from the various activities will be contained by taking appropriate remediation measures as described under management of air, water, soil, wastes and biodiversity sections.
7.	Mining activity	Economic impact.	Increase in economic activities, economic diversity and empowerment of infrastructural facilities. Some indirect employment potential to the petty trader like grocers, tea stalls, etc., will also be created
8.	Mining activity	Resettlement and conflict among the affected communities	Well designed displacement/R & R plans have been chalked out for minimizing the adverse impacts (to be given only, when applicable)
9.	Mining activity	General well-being and health.	Employment generation will result in general well-being of the people. Economic change will also bring about social and cultural change particularly with regard to female literacy which is very low (50.16%) as compare to male literacy (70.83%). Providing better drinking water facilities. As per results of various welfare measures be implements by project proponent.
10.	Mining activity	Dust and sound pollution due to quarrying activities	Modern technique should be adopted while quarrying to reduce pollution like dust and sound which are the main problems faced to the inhabitants.

11.8 Overall justification for implementation of the project

With the upcoming of this project on Red Ochre mining, the local people as well as the State & Central Governments will get benefitted. Red Ochre to be produced from this mine is in good demand in the native and neighboring states.

The project will of course, create some environmental problems, which have been identified clearly. Mitigation measures of the deleterious environmental impacts have been worked out and the same will be practiced meticulously after the commencement of the mine operations by implementing the provisions made in the Environment Management Plan.

In other words, all the likely adverse impacts due to the proposed Red Ochre mining are reversible & amenable to remedial measures and have been well taken care of in the EIA report. In view of this, upcoming of the proposed Red Ochre project is quite justifiable & highly desirable for the overall prosperity of the region.

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Chapter -12

Disclosure of Consultant

12.1 Introduction:

Present Environmental Impact Assessment (EIA) and Environment Management Plan (EMP) report has been prepared by carrying out various relevant& requisite scientific studies. These EIA studies have been carried out by engaging scientists/engineers/experts&empanelled associates of M/s Apex Mintech Consultants, on the basis of terms of reference prescribed by the EAC/SEAC.

12.2 Profile of the Consultant

This consultancy firm viz., Apex Mintech Consultants was established by Shri R.D. Saxena, a first class mine manager, in the year 1993. The firm was duly recognized by the Indian Bureau of Mines, Govt. of India on 10.06.2003 for preparing Mining Plans.

The firm is a NABET accredited for both mining and metallurgical sectors & ISO-9001 certified since 09/05/2011 and 26/04/2013 respectively.

Our core competence and expertise consist of the following:

Consultancy works for obtaining license from the competent authority for handling diesel and explosives.

Offering consultancy to the various mines/industries aspiring to seek environmental clearance & consent to establish and consent to operate from the concerned statutory bodies.

Carrying out environmental impact assessment and preparing environmental management plans in line with the Terms of Reference prescribed by the concerned authorities.

12.3 In-House Testing Laboratory

Apex Mintech Consultants have set up a well-equipped in-house testing laboratory under the name of Apex Enviro Laboratory (AEL).

AEL acquired NABL accreditation in 2014.

AEL provides quality testing services in thereas of environmental assessment, analytical testing, mineral analysis and research & development studies.

That is AEL is capable of undertaking sampling and analyses of Air, Stack, Noise, Water/Waste Water and Soil required for EIA and Compliance Monitoring

Environment Division of the firm containing the most qualified and experienced professionals both from the industries and academic institutions, is capable of proving comprehensivequality environmental service, assisting and guiding the mines & industries to

achieve a sustainable development. Our mission is to protect and preserve the natural resources on earth for future generations.

With its rich experience, multidisciplinary expertise and with the support of its state-of the art analytical equipments, the services offered by the division are in commensuration with requirements of environment management and monitoring works for mines and industries.

The firm is planning to get AEL accredited from MOEF within 1 year, for which necessary preparations are ongoing.

Our in-house laboratoryhas the following equipment:

S. No.	Name of Equipment
1	Gas Chromatograph
2	Atomic Absorption Spectrophotometer
3	Double Distil Water Unit
4	Heating Plates
5	Water baths (12 holes &6 holes)
6	Bacteriological Incubator
7	Hot Air Oven
8	Laminar Air flow
9	Fully Automatic Vertical Autoclave
10	Digital Colony counter
11	High Precision Analytical balances
12	Centrifuge Machine
13	Fine Particulate Samplers (12Nos)
14	Respirable Dust Samplers (12Nos)
15	Carbon Monoxide Meter
16	Automatic Weather Station
17	C.O.D. Digester
18	B.O.D. Incubator
19	Platinum crucibles
20	Stereomicroscope
21	Spectrophotometer
22	Sound Level Meter(2Nos)

23	Stack Monitoring Kit(2Nos)
24	Flame Photometer
25	GPS(3Nos)
26	conductivity meter
27	Turbidity meter

12.4 Quality Policy

APEX MINTECH CONSULTANTS, UDAIPUR, offering consultancy services in mining, industries & infrastructures is fully committed to realize its ever propelling dream of becoming a national figure by providing & maintaining high standards of services in quality at all levels. To achieve this goal, the company reiterates to implement the following principals of Quality Management System and NABET requirements:

To conform to all statutory, regulatory and customers' requirements.

To comply all the elements of ISO-9001 & NABET requirements and make incessant efforts to improve effectiveness of the management system continually.

To execute all EIA projects promptlyto the entire satisfaction of its customers.

To ensure all round sustainable organizational development by creating safe, secure and conducive working environment.

To impart requisite training to its employees on quality improvements.

To review Quality Policy and progress of the organization at planned intervals to ensure continuing suitability, adequacy and effectiveness of the former.

To communicate quality Policy properly amongst its employees, customers and patrons.

DATE: **C.E.O.**

PLACE: Udaipur

Photograph 12.1: Showing working on Gas Chromatography

Photograph 12.2: Showing atomic Absorption Spectrometer

Photograph 12.3: Showing front view of Apex Enviro Laboratory

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Disclosure of Consultants

APEX MINTECH CONSULTANTS

(QCI-NABET Accredited organization)

3, DHEBAR COLONY, IN FRONT OF I.T.I, PRATAPNAGAR, UDAIPUR

E-mail: rd saxena@yahoo.co.in

Name of the Project:	**ShivpuraRed Ochre Mine** **M/s Quality Minerals**	
Nature of consultancy	**Name and address of the Consultants/expert**	**Approvals, if any from (NABL/ DGMS / IBM / NRBPT / MOEF / CPCB / others etc)* give reference**
EIA/EMP Organization	Apex Mintech Consultants, 3, Dhebar Colony, Near ITI, Pratapnagar, Udaipur (Raj.)	Regd. by Indian Bureau of Mines Reg. No. RQP/UDP/244/2003/B Telefax No. - e-mail-rd_saxena@yahoo.co.in
Env. Coordinator	SHRI AMIT SAXENA 12, Vinayak Nagar, Bohra Ganeshji, Udaipur, Mobile: 9829161803 e-mail: rkminerals_udr@yahoo.com	
FAE-Land Use	MISS REENA TRIVEDI 5, Mahaveer Colony, Sector4, Hiran Magri, Udaipur Mobile: 9983117141 e-mail: reenatrivedi95@yahoo.com	
FAE-Air Pollution	DR. Y.L. MEHTA 57, Gokul Nagar, Bohra Ganeshji, Udaipur,Mobile: 9829600859, e-mail: ylmehta@gmail.com DEEPIKA AMETA 23, Samrat Nagar, Bohra Ganeshji, Udaipur, Mobile : 9784279150 e-mail:miliameta212@gmail.com	
FAE-Air Quality	SHRI K.V. RAMESH 291/1, Hiran Magri, Sector No.11, Udaipur e-mail: kvr_001@yahoo.com DEEPIKA AMETA 23, Samrat Nagar, Bohra Ganeshji, Udaipur, Mobile : 9784279150 e-mail:miliameta212@gmail.com	
FAE-Water Pollution	DR. Y.L. MEHTA 57, Gokul Nagar, Bohra Ganeshji, Udaipur,Mobile: 9829600859, e-mail: ylmehta@gmail.com DHANUSHA KARKI 142,C-Block, Sector 9, Savina, Udaipur, Mobile: 9785227337, e-mail:dhanusha17@gmail.com GAJENDRA DANGI	
FAE-Ecology & Biodiversity	DR. ANITA JAIN and GAJENDRA DANGI	
FAE-Noise & Vibration	SHRI AMIT SAXENA 12, Vinayak Nagar, Bohra Ganeshji, Udaipur Mobile: 9829161803	

	e-mail: rkminerals_udr@yahoo.com DHANUSHA KARKI 142,C-Block, Sector 9, Savina, Udaipur, Mobile: 9785227337, e-mail:dhanusha17@gmail.com
FAE-Socio-Economics	Dr. MRIDULA BAIRWA House no. 3, Jyoti Nagar, New Shobhagpura, 100 ft. Road, Near shiv temple, Mobile: 9460822496 e-mail:mridullikab@gmail.com. REEMA SAXENA- 12 Vinayak Nagar, Near Bohra Ganesh Ji, Udaipur REENA TRIVEDI and NARENDRA SUTHAR as a TM
FAE-Hydro-Geology	SHRI R. K.AGARWAL 11/500, Malviya Nagar, Jaipur (Rajasthan) – 302 017
FAE-Geology	SHRI R. K.AGARWAL 11/500, Malviya Nagar, Jaipur (Rajasthan) – 302 017
FAE-Risk Assessment & Hazard Management	SHRI AMIT SAXENA 12, Vinayak Nagar, Bohra Ganeshji, Udaipur Mobile: 9829161803 e-mail: rkminerals_udr@yahoo.com
AE-Solid Waste & Hazardous Waste Management	DR. Y.L. MEHTA 57, Gokul Nagar, Bohra Ganeshji, Udaipur,Mobile: 9829600859, e-mail: ylmehta@gmail.com
FAE- Soil	DR. ANITA JAIN

For: M/s Quality Minerals **FOR: APEX MINTECH CONSULTANTS**

(Authorized Signatory) **(R.D. Saxena)**

ANNEXURE No. 1

Secretariat of State Level Expert Appraisal Committee (SEAC) Rajasthan
4, Institutional Area, Jhalana Doongri, Jaipur-302004
Phone: 0141-5159661;E-mail: seacseiaa2010@gmail.com

F1 (4)/SEIAA/SEAC-Raj/Sectt/Project / Cat.1(a)B2(16655)/ 2019-20/11968 Dated: 27.2.2020

To,

M/s Quality Minerals, Add-9-A, Arihant Vihar Rajasthan, Near Power House, 100 feet Road, Kankroli, District-Rajsamand, (Raj). E-mail- singhbp198342@gmail.com

Sub:- ToR for Shivpura Red Ochre Mining Project, (ML no.- 07/2018, , Area 3.9859 ha.), Production capacity 2,99,995 TPA (ROM) at Khasra No- 349/2361 & 355/2364 near Vill.- Shivpura, Tehsil- Choti Sadri & District- Pratapgarh, Rajasthan **(Proposal No.-35096).**

Ref: Decision taken in the 4.35th meeting of SEAC.

Consultant:- Apex Mintech Consultant, Add:- 3 Dhebar Colony, Near I.T.I., Pratapnagar, Distt. Udaipur, (Raj.). Email:- apex.mintech.udr@gamil.com, ael.udz@gmail.com.

Sir,

Apropos above. Your project proposal was considered in the 4.35th meeting of SEAC held **on 3rd ,4th ,5th ,6th ,10th, 11th and 12th February 2020 at Agenda no. 70.**

Observations & Resolution of the committee:-

The SEAC considered/examined the project proposal submitted by the PP and also the presentation made by him during the meeting. The PP has applied EC for Shivpura Red Ochre Mining Project, (ML no.- 07/2018, , Area 3.9859 ha.), Production capacity 2,99,995 TPA (ROM) at Khasra No- 349/2361 & 355/2364 near Vill.- Shivpura, Tehsil- Choti Sadri & District- Pratapgarh, Rajasthan **(Proposal No.-35096)**. The DMG, Udaipur has granted LOI of mineral on 21.12.18. The mining plan has been approved by the SME, Udaipur vide letter dated 20.02.19. ME, Pratapgarh in his certificate dated 06.08.19 has stated that the mining lease does not fall in Aravalli hills. DCF, Chittorgarh in his certificated dated 28.06.19 stated that there is no Wildlife Sanctuary/National Park/ Conservation Reserve within 10 km periphery of the mine. The project does not involve approval/ clearance under the Forest (Conservation) Act, 1980 and Wild Life Protection Act, 1972 as no forest land is involved and neither there is any Wild Life Sanctuary/ National Park within 10 Km from the project site.

It is a project having capital cost of Rs. 40 Lacs. As per cluster certificate dated 06.08.2019 issued by ME, Pratapgarh the total area of all the mining leases in the cluster is 8.189 ha. The project is, therefore, to be dealt with as B1 category.

The SEAC therefore, observed that the PP is required to conduct Environmental Impact Assessment Study and prepare Environmental Management Plan for the entire cluster in order to capture all the possible externalities. These reports are required to incorporate carrying capacity of the cluster, transportation and related issues, replenishment and recharge issues, geo-hydrological study of the cluster.

The EIA/EMP may be prepared by the state or state nominated agency or group of PP in the cluster or the PP in the cluster. As per the provisions of the EIA Notification the PP should get one public consultation done covering all the mining leases in the cluster and prepare final EIA/EMP reports. Keeping in view the presentation made by the PP and examination of documents submitted by him the SEAC prescribed the **ToR** with public hearing for carrying out detailed EIA and preparing comprehensive EIA report as per the provisions of the EIA notification 2006. **The ToR is enclosed at Annexed 'B'.**

This TOR letter has been e-mailed to you at the e-mail address provided by you.

Yours faithfully,

(Rajeev Pareek)
Member Secretary, SEAC, Rajasthan.

ANNEXURE-"B"

TERMS OF REFERENCE FOR CONDUCTING ENVIRONMENT IMPACT ASSESSMENT STUDY FOR NON-COAL MINING PROJECTS AND INFORMATION TO BE INCLUDED IN EIA/EMP REPORT

1) Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.
2) A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.

3) All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.

4) All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ toposheet, topographic sheet, geomorphology and geology of the areashould be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).

5) Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.

6) Details about the land proposed for mining activities should be givenwith information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.

7) It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with

description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large,may also be detailed in the EIA Report.

8) Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.

9) The study rea will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.

10) Land use of the study rea delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.

11) Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.

12) A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.

13) Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.

14) Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.

15) The vegetation in the RF / PF areas in the study area, with necessary details, should be given.

16) A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.

17) Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife

Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.

18) A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan alongwith budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.

19) Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.

20) R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.

21) One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)]primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.

22) Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.

23) The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.

24) Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.

25) Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.

26) Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.

27) Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.

28) Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.

29) Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.

30) A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should begiven. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.

31) Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.

32) Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.

33) Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.

34) Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.

35) Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.

36) Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.

37) Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.

38) Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.

39) Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.

40) The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.

41) A Disaster management Plan shall be prepared and included in the EIA/EMP Report.

42) Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.

43) Besides the above, the below mentioned general points are also to be followed:-

a) Executive Summary of the EIA/EMP Report

b) All documents to be properly referenced with index and continuous page numbering.

c) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.

d) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.

e) Where the documents provided are in a language other than English, an English translation should be provided.

f) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.

g) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF&CC vide O.M. No. J-11013/41/2006-IA.II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.

h) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.

i) As per the circular no. J-11011/618/2010-IA.II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry ofEnvironment, Forest and Climate Change, as may be applicable.

j) The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.

Specific ToR in the cases of cluster situation:

1. The PP shall conduct Environmental Impact Assessment Study and prepare Environmental Management Plan for the entire cluster in order to capture all the possible externalities. These reports are required to incorporate carrying capacity of the cluster, transportation and related issues, replenishment and recharge issues, geo- hydrological study of the cluster.
2. The EIA/EMP shall be prepared by the state or state nominated agency or group of PP in the cluster or the PP in the cluster. The PP shall get one public consultation done for the entire cluster and after which prepare final EIA/EMP reports.

Specific ToRs applicable, in the cases of violation in terms of the Notification dated 14.3.2017 and 8.3.2018 and OMs dated 30.5.2018, 4.7.2018 of the MoEF&CC :

1. The PP shall undertake assessment of ecological damage, remediation plan and natural and community resource augmentation plan. Such plan shall be prepared as an independent chapter in the Environment Impact Assessment report. The report shall be prepared by the accredited consultant. Collection and analyses of data for assessment of ecological damage, preparation of remediation plan and natural and community resource augmentation plan shall be done by an environmental laboratory duly notified under the Environment (Protection) Act, 1986 or an environmental Laboratory, accredited by the National Accreditation Board for Testing and Calibration Laboratories or a Laboratory of the Council of Scientific and Industrial Research Institution working in the field of environment.

2. The Environment Management Plan shall comprise remediation plan and natural and community resource augmentation plan corresponding to ecological damage assessed and economic benefit derived due to the violation.
3. The PP shall undertake Final Environment Impact Assessment and prepare Final Environment Management Plan after conducting Public Hearing.
4. The PP shall be required to submit a bank guarantee equivalent to the amount of remediation plan and natural and community resource augmentation plan with the State Pollution Control Board and the PP shall deposit the bank guarantee prior to the grant of Environmental Clearance and which shall be released after successful implementation of the remediation plan and natural and community resource augmentation plan and after recommendation by Regional Office of the Ministry, State Level Expert Appraisal Committee and approval of SEIAA.
5. The project proponent shall give an undertaking by way of affidavit to comply with all the statutory requirements and judgment of Hon'ble Supreme Court dated the 2nd August 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of Common Cause versus Union of India and Ors. before grant of ToR/ EC the undertaking inter-alia include commitment of the PP not to repeat any such violation in future.
6. In case of violation of above undertaking, the Environmental Clearance shall be liable to be terminated forthwith as per OM dated 30.5.2018 of the MoEF&CC.
7. The Environmental Clearance will not be operational till such time the project proponent complies with all the statutory requirements and judgment of Hon'ble Supreme Court dated the 2nd August 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of Common Cause versus Union of India and Ors.
8. State Government concerned shall ensure that mining operation shall not commence till the entire compensation levied, if any, for illegal mining is paid by the Project Proponent through their respective Department of Mining & Geology in strict compliance of judgment of Hon'ble Supreme Court dated 2nd August 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of Common Cause versus Union of India and Ors.

In the final EIA /EMP report , compliance of points of ToRs should be reported point wise in a statement of three columns as indicated

S. No	Items in the letter of the ToRs	Reply / Response by the PP

ANNEXURE No. 2

राजस्थान सरकार
Government of Rajasthan
निदेशालय, खान एवं भू विज्ञान विभाग
DIRECTORATE OF MINES & GEOLOGY,
खनिज भवन/Khanij Bhawan, उदयपुर/Udaipur-313001.
दूरभाष/Phones: 2415091-95, फेक्स/ Fax: (0294)-2410526

क्रमांक: निखाभू/प्रताप/सीसी.I/प.1(1)7/2018/4459 दिनांक:— 21.12.2018

मैसर्स क्वालिटी मिनरल्स,
8ए, अरिहन्त विहार, पॉवर हाउस के पास, 100 फीट रोड,
कांकरोली, जिला–राजसमंद (राज0)।

विषय:–अनुदान खनन पट्टा आवेदन पत्र वास्ते खनिज–रेडऑकर, क्षेत्र 3.9859 हैक्टेयर, निकट ग्राम–शिवपुरा, तहसील–छोटी सादडी, जिला–प्रतापगढ में आप द्वारा आवेदित दिनांक 20.08.2018

महोदय,

विषयान्तर्गत निर्देशानुसार लेख है कि आप द्वारा विषयांकित क्षेत्र निकट ग्राम–शिवपुरा, तहसील छोटीसादडी, जिला–प्रतापगढ में स्वयं की खातेदारी भूमि खसरा संख्या 349/2361, 355/2364 में खनिज रेडऑकर का खनन पट्टा चाहने हेतु आवेदन पत्र दिनांक 20.08.2018 को प्रस्तुत किया गया है। आपके पक्ष में खनिज रेडऑकर का क्षेत्र 3.9859 हैक्टेयर का खनन पट्टा स्वीकृत करने की राज्य सरकार की मंशा है।

अतः आपके पक्ष में खनन पट्टा स्वीकृति हेतु लेटर ऑफ इंटेंट(मंशा पत्र) जारी किया जाकर लेख है कि निम्नलिखित दस्तावेज निर्धारित समयावधि में आवश्यक रूप से निदेशालय, उदयपुर एवं खनि अभियन्ता, प्रतापगढ को प्रस्तुत करे ताकि खनन पट्टा स्वीकृति हेतु औपचारिक स्वीकृति जारी की जा सके :–

1– राजस्थान अप्रधान खनिज रियायत नियम, 2017 के नियम–17ए के अन्तर्गत वार्षिक स्थिर भाटक का 5 गुना के बराबर प्रीमीयम राशि जमा कराई जावेगी, उक्त राशि का समायोजन वार्षिक स्थिर भाटक व आंधेशुल्का में नहीं होगा, इस आशय की अण्डटेकिंग प्रस्तुत करे।

2– राजस्थान अप्रधान खनिज रियायत नियम,2017 के नियम–16(2)(ii) के अन्तर्गत नियमानुसार Performance security लेटर ऑफ इंटेंट जारी होने की तिथि से छः माह की अवधि में प्रस्तुत करे।

3– राजस्थान अप्रधान खनिज रियायत नियम,2017 के नियम–16(2)(ii) के अन्तर्गत लेटर ऑफ इंटेंट जारी होने की तिथि से छः माह की अवधि में आवेदित क्षेत्र की खनन योजना सक्षम अधिकारी से अनुमोदित करा प्रस्तुत करनी होगी।

राजस्थान अप्रधान खनिज रियायत नियम,2017 के नियम–16(2)(iii) के अन्तर्गत लेटर ऑफ इंटेंट जारी होने की तिथि से 18 माह की अवधि में सक्षम अथॉरिटी से उक्त क्षेत्र में आपके पक्ष में खनन पट्टा स्वीकृति हेतु इन्वायरनमेण्ट क्लीयरेंस प्राप्त कर प्रस्तुत करना होगा।

भवदीय,

अनुमोदित
APPROVED

(डी.पी.गोड़)
अधीक्षण खनि अभियन्ता(मु0 II)

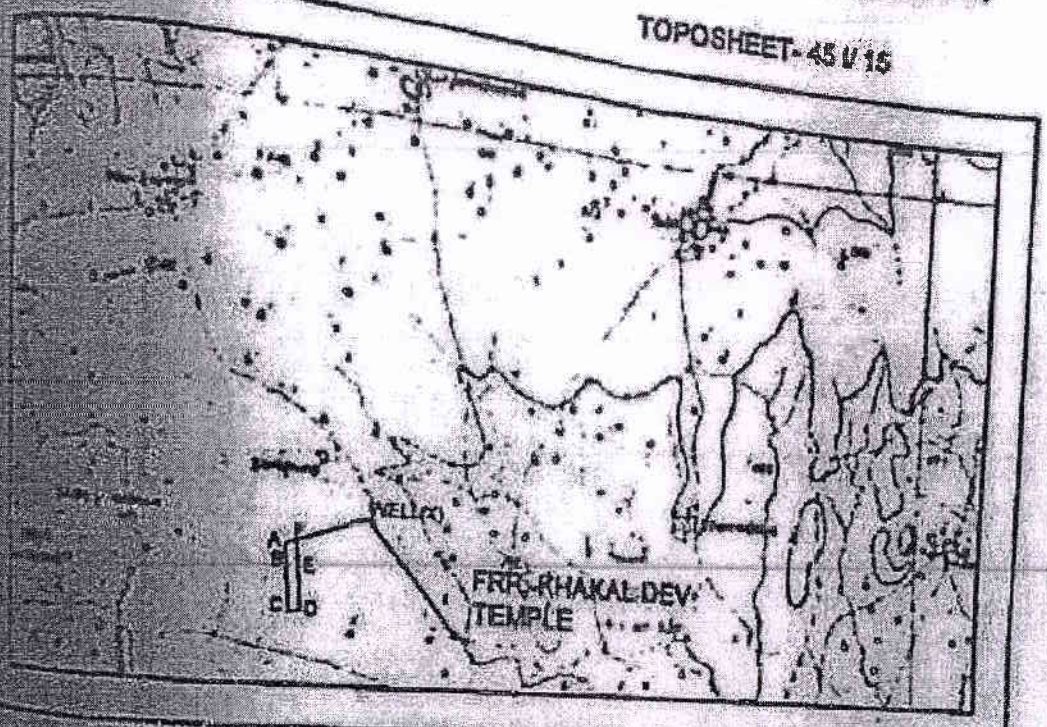
क्रमांक: निखाभू/प्रताप/सीसी.I/प.1(1)7/2018/4460 -4466 दिनांक:— 21.12.2018

प्रतिलिपि निम्न को सूचनार्थ एवं आवश्यक कार्यवाही हेतु :–

1– अधीक्षण खनि अभियन्ता, उदयपुर–वृत, उदयपुर।
2– खनि अभियन्ता, प्रतापगढ को उनके पत्र क्रमांक: 3168 दिनांक 11.10.2018 के सन्दर्भ में।
3– वरिष्ठ भूवैज्ञानिक, बांसवाडा।
4– रक्षित फाईल।

MAP SHOWING APPLIED AREA FOR MINERAL- RED OCHRE
N/V- SHIVPURA ,TEHSIL- CHOTISADRI , DISTRICT- PRATAPGARH (RAJ.)
APPLIED BY :- M/S QUALITY MINERALS
SCALE- 1CM.= 500Mts.

TOPOSHEET- 45 I/ 15



MP- TEMPLE OF KHAKAL DEV -LATTITUDE- 24° 23' 01.5"
LONGITUDE- 74° 47' 36.9"

WELL (X) -LATTITUDE- 24° 23' 28.0"
LONGITUDE- 74° 47' 12.0"

DESCRIPTION REPORT:-

FROM	TO	BEARING	DISTANCE
FRP	WELL (X)	319°- 00'-00"	1077.00 Mts.
WELL (X)	A	250°- 00'-00"	624.00 Mts.
	B	171°- 00'	40.00 Mts.
	C	176°- 15'	440.00 Mts.
	D	86°- 15'	83.00 Mts.
	E	356°- 15'	290.00 Mts.
	F	353°- 45'	208.50 Mts.
	A	252°- 53'-12"	79.9722 Mts.

APPLICANT.

TOTAL AREA- 3.9039Hect.

APPLIED AREA FOR MINERAL- RED OCHRE, AREA - 3.9859 Hect. N/V- SHIVPURA, TEHSIL- CHOTISADRI, DISTRICT.- PRATAPGARH, APPLIED BY -M/S QUALITY MINERALS

PILLAR	LOCATION	
	LATTITUDE	LONGITUDE
FRP. - KHAKHAL DEV TEMPLE	24° 23' 01.5"	74° 47' 36.9"
WELL (X)	24° 23' 28.0"	74° 47' 12.0"
A	24° 23' 21.2"	74° 46' 51.1"
B	24° 23' 19.9"	74° 46' 51.4"
C	24° 23' 05.7"	74° 46' 52.4"
D	24° 23' 05.6"	74° 46' 55.4"
E	24° 23' 15.2"	74° 46' 04.7"
F	24° 23' 21.8"	74° 46' 53.8"

अनुमोदित
APPROVED

राजस्थान सरकार

कार्यालय खनि अभियन्ता, खान एवं भू-विज्ञान विभाग, प्रतापगढ़

11/09/18

पूर्व सीमांकन रिपोर्ट

01	विषय	खातेदारी गाईड लाईन के तहत अप्रधान खनिज [illegible] का आवेदन क्रमांक- 2018100005[illegible]5 [illegible] ग्राम शिवपुरा तहसील [illegible] छोटी सादड़ी जिला प्रतापगढ़ की पूर्व सीमांकन रिपोर्ट।
02	सीमांकन तिथि	6/9/18
03	सर्वे उपकरण	[illegible]
04	सीमांकनकर्ता	(1) श्री मति [illegible] (2) श्री [illegible] राजपूत
05	स्थाई बिन्दु (FRP)	F.R.P – Temple of Khetal [illegible] Kedu Khera Long — 74° 47' 36.3333 Latitude – 24° 23' 1.4333

विषयांकित आवेदित क्षेत्र का पूर्व सीमांकन खातेदारी गाईड लाइन 8/8/2018 के अनुसार आवेदित क्षेत्र के [illegible] के माध्यम से खातेदारी भूमि में आने वाले क्षेत्र के [illegible] पटवारी के साथ मौके पर लिये गये [illegible] मौके पर पटवारी द्वारा [illegible] का [illegible] के [illegible] में [illegible] किया गया। एवं पटवारी के [illegible] [illegible] [illegible] [illegible] सीमांकन लिये गये [illegible]

[illegible]

अनुमोदित
APPROVED

06	विवरण सूची:		
कहां से	कहां को		
C.R.P	WELL (X)	बियरिंग	दूरी (मीटर में)
X	A	319°	1077.00 mts
A	B	250°	624 mts
B	C	171°	40.00 mts
C	D	176°-15'	440 mts
D	E	86°-15'	83.00 mts
E	F	356°-15'	290.00 mts
F	A	353°-49'	208.50 mts
		251°-53'-22"	79.9722 mts
		अनुमोदित APPROVED	
Total	area		= 3.98559 hect

सीमा स्तम्भ एवं लोकल रेफरेन्स :-

① सीमा स्तम्भ Ⓐ ⇒ यह सीमा A समतल खातेदारी भूमि में आता है।

N – 24° 23' 20.9236"
E – 74° 46 51.0648"

सीमा स्तम्भ A से पावर हाउस का गेट 65° एवं 261 मीटर पर है।

N – 24° 23' 24.71"
E – 74° 46' 59.5"

(ii) सीमा स्तम्भ A से रोड के किनारे स्थित E.P. with Transformer 66° एवं 198 मीटर दूरी पर स्थित है।

N – 24° 23' 23.7"
E – 74° 46' 57.5"

(8)

② सीमा स्तम्भ (B) → यह सीमा स्तम्भ B समतल खातेदारी भूमि 349/2361 खसरे में मेड के किनारे आता है

N – 24° 23' 19.8393
E – 74° 46' 51.4891

(i) सीमा स्तम्भ B से पावर हाउस का गेट 57° एवं 272 मीटर है।

N – 24° 23' 24.7"
E – 74° 46' 59.5"

अनुमोदित APPROVED

(ii) सीमा स्तम्भ B से E.P रोड के किनारे 56° एवं 207 मीटर है

N – 24° 23' 23.7"
E – 74° 46' 57.5"

(iii) सीमा स्तम्भ B से खसरा संख्या 240 में स्थित कुँआ 66°-15' एवं 631 मीटर दूरी पर है।

N – 24° 23' 28.0"
E – 74° 47' 12.0"

(iii) सीमास्तम्भ (C) -> यह सीमा स्तम्भ C समतल खातेदारी भूमि खसरा संख्या $\frac{355}{2364}$ के कोने पर आता है। (5)

N - 24° 23' 05.3652
E - 74° 46 52.3354

(i) सीमा स्तम्भ से E.P पोल पास के खेत में पिल्लर से उत्तर पश्चिम दिशा में 10 मीटर 305° 15" पर है।

N - 24° 23' 05.9"
E - 74° 46 52.1"

(ii) सीमा स्तम्भ से पूर्व दिशा में स्थित 61-86° एवं 49 मीटर पर है।

N - 24° 23' 05.8"
E - 74° 46 54.1"

अनुमोदित
APPROVED

(iv) सीमा स्तम्भ (D) -> यह सीमा स्तम्भ समतल खाते दारी भूमि $\frac{355}{2364}$ के पूर्वी कोने में आता है

N - 24° 23' 05.5459
E - 74° 46 55.2753

(i) सीमा स्तम्भ D से बड़ का पेड़ 19° एवं 21 मीटर पर है।

N - 24° 23' 06.6"
E - 74° 46' 55.7

(ii) सीमा स्तम्भ - D से खसरा संख्या 435 में कुआ 102° 15' एवं 392 मीटर

N – 24° 23' 03.1"
E – 74° 47' 09.0"

(v) सीमा स्तम्भ (E) ⇒ यह सीमा स्तम्भ E समतल खातेदारी भूमि 355/2364 में किनारे पर आता है।

N – 24° 23' 14.9531
E – 74° 46' 54.5858

(i) सीमा स्तम्भ E से बड़ का पेड़ 174° एवं 266 मीटर दूरी पर है।

N – 24° 23' 06.6"
E – 74° 46 55.7"

(ii) सीमा स्तम्भ से कुँआ उत्तरी संपा 43° में 133° एवं 549 मीटर दूरी पर है।

N – 24° 23' 03.1"
E – 74° 47' 09.0"

(vi) सीमा स्तम्भ F ⇒ यह सीमा स्तम्भ समतल खातेदारी भूमि 349/2361 में किनारे पर आता है।

N – 24° 23' 21.6925
E – 74° 46 53.8769

(i) रोड़ एक किनारे E.P. 61° एवं 120 मीटर दूरी पर है।

अनुमोदित
APPROVED

N - 24° 23' 23.7"
E - 74° 46 57.5"

(ii) सीमा स्तम्भ से कुंआं 69° एवं 547 मीटर की पर स्थित है।

N — 24° 23' 28.0"
E — 74° 47' 12.0"

अनुमोदित
APPROVED

उक्त सीमांकन कार्यालय से प्राप्त ऑन लाइन आवेदन के साथ दिये गये दस्तावेज के आधार पर किया गया एवं जारी गाइड लाइन 08/8/2018 के अनुसार एवं RMMCR - 2017 के नियमों के तहत एवं कार्यालय से प्राप्त पत्र क्रमांक 2750 के आधार पर सभी बिन्दुओं को मौके पर ध्यान रखते हुये हल्का पटवारी की उपस्थिती में आवेदक एवं पटवारी द्वारा बताये गये खसरों के सभी कॉरनर पोइन्टस के लेटीट्यूड एवं लोन्गीट्यूड मौके पर लिये गये एवं इसके अलावा पटवारी द्वारा बताये गये दो मुस्तकिल बिन्दु कुंआ (i) कुंआ खसरा संख्या 240 में

N — 24° 23' 28.0"
E — 74° 47' 12.0"

(ii) कुंआ खसरा संख्या 435 में

N — 24° 23' 03.1"
E — 74° 47' 09.0"

के मौके पर लेटीट्यूड एवं लोन्गीट्यूड लिये गये। सीमांकित क्षेत्र में माननीय उच्चतम न्यायालय द्वारा याचिका संख्या 202/95 में दिये गये निर्णय दिनांक 12/12/1996 के डिक्शनरी मीनिंग परिभाषा अनुसार वन क्षेत्र नहीं है।

एवं आवेदित क्षेत्र में खातेदारी भूमि है। आने वाली समस्त भूमि पर टेन्च गढ्ढा आदि नहीं। जिसमें नम्बर सीमांकन कोई कार्य हेतु सिंगल फेस लाइन, ट्यूबवेल के लिये आवेदित क्षेत्र में से होकर गुजरती है एवं गाँव में आने वाला कच्चा रास्ता भी आवेदित क्षेत्र के पास से गुजरता है जिसकी आवेदित क्षेत्र से औसतन दूरी - 6 से 15 मीटर है। आवेदित क्षेत्र के 45 मीटर परिधि में कोई सार्वजनिक स्थान भवन नदी नाला, मन्दिर मस्जिद, सड़क इत्यादि नहीं है।

हल्का पटवारी

[stamp] आवेदक

खनि अभियंता प्रति. / खनि कार्यदेशक
क्रिन्ति

अनुमोदित
APPROVED

हल्का पटवारी रिपोर्ट :-

महोदय जी निवेदन है कि आवेदित क्षेत्र के दोनों खसरे $\frac{354}{2361}$ एवं $\frac{355}{2364}$ को मौके पर खनिज विभाग के तकनीकी कर्मचारी को बताये गये एवं उनके कोने बताये गये एवं नक्शे में मुस्ताकिल बिन्दु कुआं से मार्क कर उपलब्ध करवाये गये एवं आवेदित क्षेत्र के 45 मीटर की परिधि में कोई सार्वजनिक स्थान मंदिर, मस्जिद, कब्रिस्तान, श्मशान, गौशाला, विद्यालय, आबादी, मकान, नदी-नाले, नहर, नेशनल हाइवे, रेलवे लाईन, जलाशय, बाँध, वन सीमा, इत्यादि नहीं है तथा न ही आवेदित क्षेत्र के अन्दर चरागाह भूमि व सरहद नहीं है।

अतः रिपोर्ट पेश है।

26/07/2019
पटवारी

GOVERNMENT OF RAJASTHAN
Demarcation of Mines & Geology, Rajasthan
Office of the Mining Engineer Pratapgarh

Joint Demarcation Report

संयुक्त सर्वेक्षण अप्रधान खनिज रियायत नियमावली 2017 एवं खातेदारी गाईडलाईन के तहत अप्रधान खनिज रेड स्टोन 2 का REF. No. 2018100000565 निकटग्राम शिवपुरी तहसील छोटीसादड़ी जिला प्रतापगढ़ की पूर्व सीमांकन रिपोर्ट, सीमांकन कर्ता श्री ललित राजपूत दिनांक 6/9/18 को हल्का पटवारी एवं आवेदनकर्ता श्री श्रीमति सजना व्यास नेहल पाटीदार की उपस्थिति में किया गया।

Sr.No.	Khasara No.	Title of the land	Type of the Land	Applied Area of Khasara	If Demarcated area falls in Charagah then it's area falling in
1	349/2361	खातेदारी	माल-2	0.9607	-
2	355/2364	खातेदारी	-"-	3.0252	-
		Total area		= 3.9859	

अनुमोदित APPROVED

Joint Demarcation report is prepared along with the demarcated area superimposed on the revised revenue map.

Applicant/Representative

Circle Patwari
पटवारी
हल्का शिवपुरी
06/03/2018

Mines Foreman/Sureveyor

ANNEXURE No. 4

GOVERNMENT OF RAJASTHAN
OFFICE OF THE SUPERINTENDING MINING ENGINEER, UDAIPUR – CIRCLE
DEPARTMENT OF MINES AND GEOLOGY, UDAIPUR (RAJ.).
PHONE – (0294) 2583393

No. SME/UD-Cir/Mine Plan/Pratap/ F –19 /18/ Dated: / 02 /2019

To,

M/s Quality Minerals.
Address – 9-A, Arihant Vihar, Near Power House,
100 Feet Road, Kankroli,
Dist. Rajsamand (Raj)

Sub: Approval of Mining Plan with Progressive Mine Closure Plan in respect of your Red Ochre, Mines (M.L. No.- 07/2018, Area- 3.9859 Hect), for Mineral- Red Ochre, Near Village – Shivpura, Tehsil – Chhoti Sadri, District- Pratapgarh (Raj.), Submitted under Rule 29 of R.M.M.C.R. 2017.

Ref.: Your R.Q.P.'s letter dated: - **19/02/2019**

Dear Sir,

With Reference to above subject & in exercise of the power conferred by Govt. of Rajasthan w.r.t. RMMCR 2017, Rule No. 29. I hereby **APPROVE** the above said **Mining Plan with Progressive Mine Closure Plan.** This approval is subject to the following conditions:-

1. The **Mining Plan with Progressive Mine Closure Plan** is approved without prejudice to any other laws applicable to the mine/area from time to time whether made by the central Government, State Government or any other authority.
2. It is clarified that the approval of your aforesaid **Mining Plan with Progressive Mine Closure Plan** does not in any way imply the approval of the Government in terms of any other provisions of the **R.M.M.C.R. 2017, M.M.D.R. (Amendment) Act. 2015, Mines Act** the Rules framed there under and any other laws as may be applicable from time to time.
3. It is further clarified that approval of the **Mining Plan with Progressive Mine Closure Plan** is subject to the provisions of Forest (Conservation) Act 1980, Forest (conservation) Rules, 1981 and other relevant statues, orders and guidelines as may be applicable to the lease from time to time.
4. The approval of the **Mining Plan with Progressive Mine Closure Plan** is subject to the compliance of the instruction contained in the order dated 21.10.2003 and subsequent orders of the Hon'ble High Court, Jodhpur in D.B. Civil Writ Petition No.3879/2002 or any order or direction from any court of the competent jurisdiction.
5. The approval of the **Mining Plan with Progressive Mine Closure Plan** is subject to the condition that the lessee would not dump the overburden in forest land or charagah land. The lessee is advised to dump the overburden on the identified dumping site.
6. Mining activities outside lease area, if any shall not be considered as Approved through this **Mining Plan with Progressive Mine Closure Plan**. The Assistant ME/ Mining Engineer Concern will check the location of the pillars from time to time and action as per laws shall be taken in case of working outside the lease area.
7. Financial Assurance/Security may be submitted to **Mining Engineer / AME Concern,** as per Rajasthan M.M.C.R.
8. The lessee himself would be responsible for wrong information /data provided by him/her. If anything found concealed as required by the Act and Rule in the contents of the **Mining Plan with Progressive Mine Closure Plan** and the proposal for rectification has not been made the approval shall be deemed to have been withdrawn with immediate effect. Any mistake due to oversight may be rectified as soon as comes in knowledge of the office/deptt.
9. Lessee will also follow the provisions of Environment Management Plan.

Encl. One Copy of
Approved Mining Plan
with Progressive Mine Closure Plan

Yours Faithfully,

(A. K. Nandwana)
Suptdg. Mining Engineer,
Department of Mines & Geology,
Udaipur – Circle, Udaipur (Raj.)

PTO ---------- (Page- 2)

No. SME/UD-Cir/Mine Plan / Pratap/F – 19 /18/ 10656 Dated: 20 / 02/2019

Copy forwarded for kind information to: -

1. The Addl. Dirctor (Mines) Mines & Geology Deptt. Udaipur (Raj.) along with a copy of the approved **Mining Plan with Progressive Mine Closure Plan.**
2. **Mining Engineer Pratapgarh** along with a copy of approved **Mining Plan with Progressive Mine Closure Plan.**
3. Shri Nimish Singhwi, RQP, 15, New Glass Factory Colony, Sunderwas, Udaipur.
4. Guard File.

(A. K. Nandwana)
Suptdg. Mining Engineer,
Department of Mines & Geology,
Udaipur – Circle, Udaipur (Raj.)

CATEGORY-A-OTEM
Opencast mine

Mining Plan

With Progressive Mine closure Plan

(Submitted under Rule 29 (1) and Rule 29(5) (vi) of R.M.M.C.R., 2017)

of

Shivpura Red Ochre area

Approved vide Letter No.
SME/UD-Cir./Mining Plan/Scheme/ /Part
F. 19 /2018 /10654-/10658
Dted. 24/10/19

ML NO.	:	7/2018
NEAR VILLAGE	:	SHIVPURA
TEHSIL, DISTRICT, STATE	:	CHHOTI SADRI, PRATAPGARH, RAJASTHAN
LEASE AREA	:	3.9859HECT
LAND TYPE	:	NONE FOREST LAND = 3.9859HECT FOREST LAND = 0.0
MINING LEASE PERIOD	:	NEW LEASE
LEASE PERIOD	:	50 YEARS FROM THE DATE OF REGISTRATION OF LEASE DEED
PERIOD OF MINING PLAN WITH PROGRESSIVE MINE CLOSURE PLAN	:	5 YEARS FROM THE DATE OF REGISTRATION OF LEASE DEED

अनुमोदित
APPROVED

APPLICANT

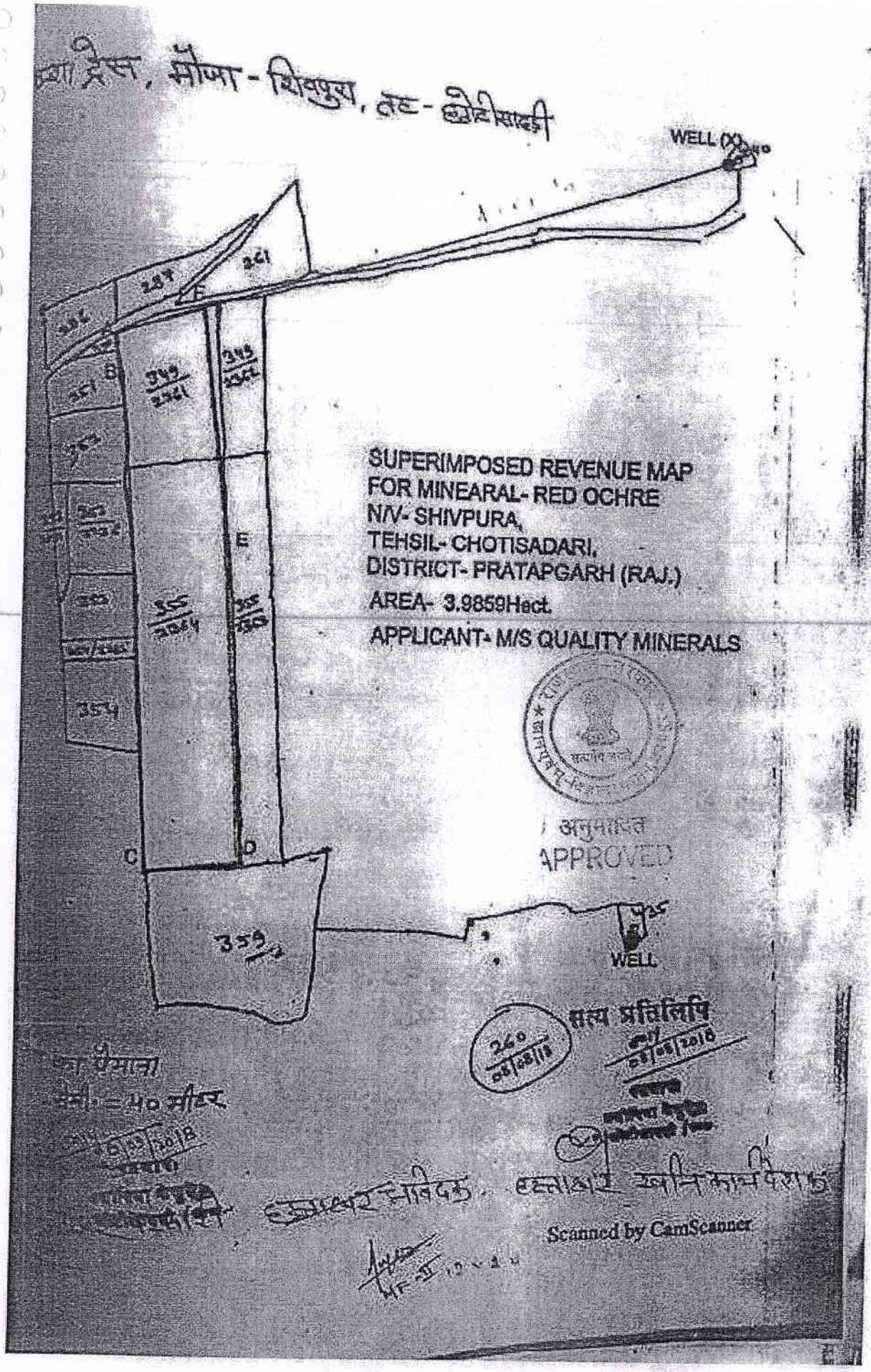
M/s Quality Minerals,

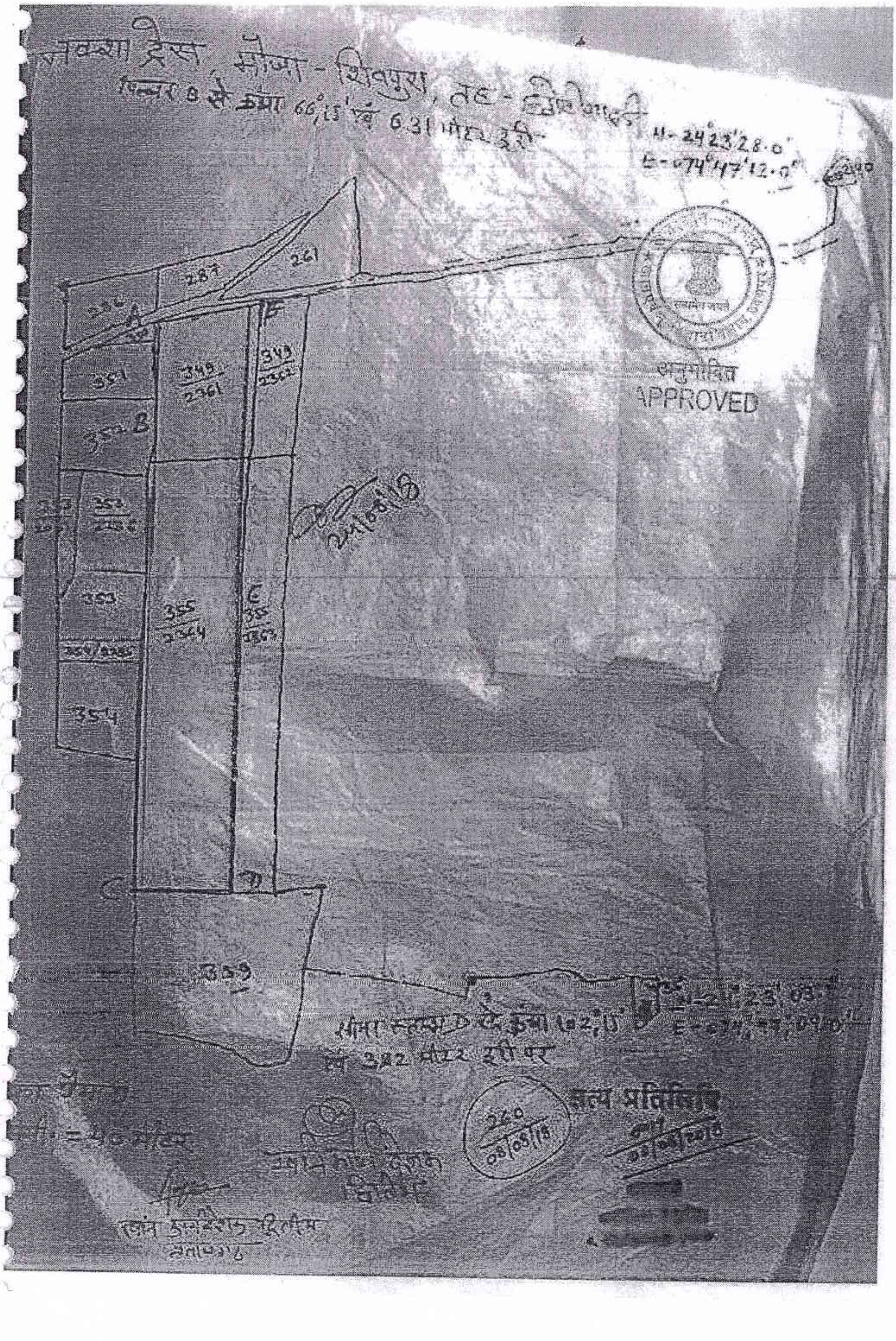
Address- 9-A, Arihant Vihar,
Near Power house, 100 feet Road, Kankroli,
Dist.- Rajsamand (Raj)
Email- Not Available,
Mo. no.- Not Available

अनुमोदित
उपखनि अभियन्ता
खान एवं भू-विज्ञान विभाग,
उदयपुर वृत, उदयपुर

PREPARED BY
Nimish Singhvi, Mining Engineer,
15, New Glass Factory Colony, Sunderwas Udaipur (Raj).
Mobile No.: 94141-10360
Email- nimesh.singhvi@gmail.com

ANNEXURE No. 5





261
349/2361
355/2364
353
354
अनुमोदित
APPROVED
सत्य प्रतिलिपि

GOVERNMENT OF RAJASTHAN
Demarcation of Mines & Geology, Rajasthan
Office of the Mining Engineer Pratapgarh

Joint Demarcation Report

संयुक्त सर्वेक्षण अप्रधान खनिज रियायत नियमावली 2017 एवं खातेदारी गाईडलाईन के तहत अप्रधान खनिज ... का REF. No. 2018100000565 निकटग्राम ... तहसील छोटी सादड़ी जिला प्रतापगढ़ की पूर्व सीमांकन रिपोर्ट, सीमांकन कर्ता श्री ... राजपूत दिनांक 6/9/18 को हल्का पटवारी एवं आवेदनकर्ता श्री ... की उपस्थिति में किया गया।

APPROVED

Sr.No.	Khasara No.	Title of the land	Type of the Land	Area of Khasara	If Demarcated area falls in Charagah then it's area falling in
1	84-9/2361	खातेदारी	[illegible]	0.9607	
2	855/2364	खातेदारी	-"-	3.0252	-
		Total area		= 3.9859	

The Demarcation report is prepared along with the demarcated area superimposed on the enclosed revenue map.

Applicant/Representative

Circle Patwari

Mines Foreman/Sureveyor

ANNEXURE No. 06

राजस्थान सरकार

कार्यालय खनि अभियन्ता, खान एवं भू–विज्ञान विभाग, प्रतापगढ़(राज.)

क्रमांकः–खअ / प्रताप / सी.सी अप्रधान / ख.प.–07 / 2018 / 2019–20 / 1823 दिनांकः–06/08/19

प्रमाण–पत्र

आवेदक मैसर्स क्वालिटी मिनरल्स द्वारा दिनांक 14.06.2019 को इस कार्यालय में प्रार्थना पत्र प्रस्तुत कर उनके पक्ष में जारी मंशा पत्र क्षेत्र का क्लस्टर संबंधी प्रमाण–पत्र चाहा है।

भारत सरकार के पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय की अधिसूचना दिनांक 15.01.2016 व 01.07.2016 के अनुसार क्लस्टर बनाये जाने की स्थिति में क्लस्टर दिनांक 09.09.2013 के बाद स्वीकृत खनन पट्टों का ही बनाया जाना है। जिसकी पालना में मैसर्स क्वालिटी मिनरल्स के पक्ष में मंशा पत्र जारी खनन पट्टा संख्या 07 / 2018 वास्ते खनिज रेडऑकर क्षेत्रफल 3.9859 हैक्टर निकटग्राम शिवपुरा, तहसील छोटीसादड़ी जिला प्रतापगढ में मंशा पत्र जारी क्षेत्र से 500 मीटर दूरी के आधार पर क्लस्टर निर्माण किये जाने पर उपरोक्त क्लस्टर क्षेत्र के अन्तर्गत मंशा पत्र जारी एवं धारित क्षेत्र का **कुल क्षेत्रफल 8.189 हैक्टर** आता है।

उक्त क्लस्टर में आवेदक के मंशा पत्र जारी क्षेत्र 3.9859 हैक्टर के अतिरिक्त धारित खनन पट्टा संख्या 3 / 2014 श्री अरविन्द तेली वास्ते खनिज रेडऑकर क्षेत्रफल 4.2031 हैक्टर आते हैं, जो दिनांक 09.09.2013 के बाद के क्षेत्र है। इस प्रकार उक्त क्लस्टर क्षेत्र में **कुल 8.189 हैक्टर** क्षेत्र आता है।

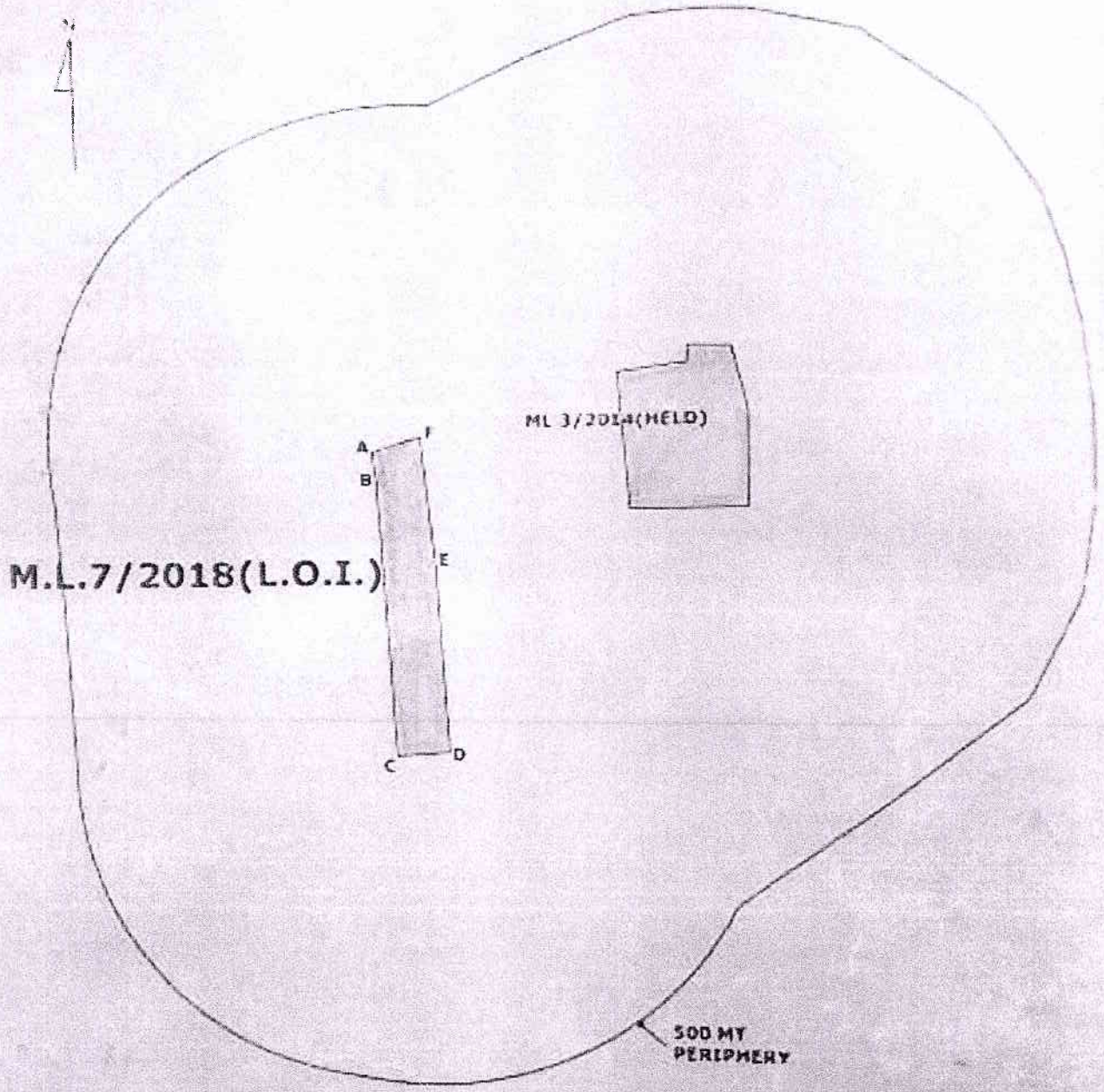
(पुष्पेन्द्र कुमार मीणा)
खनि अभियन्ता, प्रतापगढ

COMPOSITE MAP SHOWING LOCATION OF MINING LEASES FALLING WITHIN 500 MTS PERIPHERY FROM L.O.I. ISSUED M.L. AREA 7/2018 FOR MINERAL RED OCHER, NEAR VILL-SHIVPURA, TEH.CHOTISADARI, DISTT.-PRATAPGARH

L.O.I. HOLDER- M/S QUALITY MINERALS

G.T.SHEET No.45 L/15

SCALE 1CM=100 MTS.



L.O.I. ISSUED M.L. AREA (ML. 7/2018)=3 . 9859 HECT.

OTHER MINING LEASES FALLING WITHIN 500 MTS. PERIPHERY FROM M.L.7/2018

SR	ML NO	NAME OF LESSEE	AREA OF MINE	NAME OF MINERAL	MINOR	REMARK(IF ANY) LEASE AREA IN PERIPHERY
1	3/2014	SH. ARVIND TEJI (HELD)	4.2031 HECT	RED OCHRE	MINOR	4.2031 HECT
TOTAL			4.2031 HECT			4.2031 HECT.

PREPAIRED BY-

SR.D/MAN
(B.N. KHAMGAVA)

MINING ENGINEER
PRATAPGARH

ANNEXURE No. (12) 7.

(५)

कार्यालय उप वन संरक्षक, वन्यजीव, चितौड़गढ़

क्रमांक :एफ( ) सर्वे/उवसं/वजी/19–20/ 3345 दिनांकः 28.6.19

–: प्रमाण–पत्र :–

प्रमाणित किया जाता है कि खनन पट्टा आवेदक M/S Quality Minerals के द्वारा प्रस्तुत आवेदन के अनुसार आवेदित रेड ऑकर खनन क्षेत्र (3.9859 हैक्टेयर) निकट ग्राम–शिवपुरा, तहसील–छोटीसादडी, जिला–प्रतापगढ़ मे स्थित है, आवेदन के साथ संलग्न GPS Coordinate के अनुसार आवेदित खनन क्षेत्र वन्यजीव अभ्यारण्य/नेशनल पार्क के 10 कि.मी. की परिधी में स्थित नही है। प्रस्तावित खनन क्षेत्र के GPS Coordinate निम्न है:–

S.No.	Point No.	Latitude	Logitude
1	A	24°23'20.1236"N	74°46'51.0648"E
2	B	24°23'19.8393"N	74°46'51.2891"E
3	C	24°23'05.3652"N	74°46'52.3354"E
4	D	24°23'05.5459"N	74°46'55.4753"E
5	E	24°23'14.9537"N	74°46'54.5858"E
6	F	24°23'21.6125"N	74°46'53.8769"E

यह प्रमाण पत्र खनन पट्टा आवेदक से प्राप्त आवेदन की पूर्ति में दिया गया है।

(सविता दहिया)
उप वन संरक्षक
वन्यजीव, चितौड़गढ़

(5)

ANNEXURE No. (8)

राजस्थान सरकार

कार्यालय खनि अभियन्ता, खान एवं भू–विज्ञान विभाग, प्रतापगढ (राज.)

क्रमांक–खअ/प्रताप/सीसी–अज्ञान/ख.प. 07/2018/2019–20/1824 दिनांक 05/08/19

प्रमाण पत्र

यह प्रमाणित किया जाता है कि मैसर्स क्वालिटी मिनरल्स के पक्ष में जारी मंशा पत्र क्षेत्र खनन पट्टा संख्या 07/2018 क्षेत्रफल 3.9859 हैक्टर खनिज रेडऑकर निकटग्राम शिवपुरा तहसील छोटी सादडी जिला प्रतापगढ जो राजस्व ग्राम शिवपुरा के खसरा संख्या 349/2361 व 355/2364 मे आता है एवं निम्न अक्षांश व देशान्तर के अन्तर्गत आता है। उक्त मंशा पत्र जारी खनन पट्टा सम्बन्धित प्रमाणित जी.टी. शीट 45 L/15 के अनुसार एवं माननीय सर्वोच्च न्यायालय के रिट याचिका संख्या 202/1995 (गोदावर्मन बनाम युनियन ऑफ इण्डिया) के संदर्भ मे पारित आदेश दिनांक 08.04.2005 (कन्टेम्प्ट पिटीशन (सी) 412/2004) के अनुसार अरावली में नहीं आता है एवं उक्त आदेश की अवहेलना मे नहीं आता है।

FRP- Temple of Khakal Devji, n/v Jalodiya Kelukhera

PILLERS	Longitude (Degree-min-sec)	Latitude (Degree-min-sec)
FRP	74-47-36.9999	24-23-01.4999
A	74-46-51.0648	24-23-20.9236
B	74-46-51.2891	24-23-19.6393
C	74-46-52.3354	24-23-05.3652
D	74-46-55.2753	24-23-05.5459
E	74-46-54.5858	24-23-14.9537
F	74-46-53.7769	24-23-21.6925

(उमेश कुमार मीणा)
खनि अभियन्ता, प्रतापगढ

APEX Enviro Laboratory

(Unit of Apex Mintech Consultants)

NABL Accredited, OHSAS Certified & Recognized by MoEF&CC, GOI,
Under Environment (Protection) Act, 1986 Vide F.No. 15018/16/2017-CPW

Date:-10/10/2019

TEST REPORT

Report No.:- W/3030

Proponent Name :- M/S Quality Minerals

District :- Pratapgarh (Raj.)

Location:- Near village- Shivpura, Tehsil- Choti Sadari

Type of Unit :- Mine

Date of Sample Collection :- 06/10/2019

Date of Receipt :- 07/10/2019

Date of Sample Test :- 07/10/2019 to 10/10/2019

Sample Collected by :- Pankaj & Team

Type of Sample :- Ground Water

Testing Protocol :- Bureau of Indian Standard

RESULTS

S. No	Parameter	Observed value	Requirement (Acceptable Limit) as per IS 10500: 2012	Permissible limits in the Absence of Alternate Source as per IS 10500: 2012	Test Methods
1	pH	6.85	6.5 to 8.5	-	IS-3025 (Part-11): 1983 (RA2002)
2	Turbidity (NTU)	-	1	5	IS-3025 (Part-10): 1984 (RA2002)
3	Conductivity at 25°C (µs/cm)	980	-	-	IS-3025 (Part-14): 1984 (RA2013)
4	Total Hardness ($CaCO_3$) (mg/l)	350	200	600	IS-3025 (Part-21): 1983 (RA2009)
5	Chlorides as Cl (mg/l)	95	250	1000	IS-3025 (Part-32): 1988 (RA2003)
6	Total dissolved solids (mg/l)	680	500	2000	IS-3025 (Part-16): 1984 (RA2006)
7	Odour	Agreeable	Agreeable	-	IS-3025 (Part-5): 1983 (RA2002)
8	Sulphates as SO_4 (mg/l)	65	200	400	IS-3025 (Part-24): 1986 (RA2003)
9	Alkalinity as $CaCO_3$ (mg/l)	420	200	600	IS-3025 (Part-23): 1986 (RA2006)
10	Fluoride as F (mg/l)	0.35	1	1.5	IS-3025 (Part-60): 2008 Clause. 5
11	Nitrates as NO_3 (mg/l)	14	45	45	IS-3025 (Part-34): 1988 (RA2003)
12	Magnesium as mg (mg/l)	36	30	100	IS-3025 (Part-46): 1994 (RA2003)
13	Calcium as Ca (mg/l)	80	75	200	IS-3025 (Part-40): 1991 (RA2003)
14	Sodium as Na (mg/l)	123	-	-	IS-3025 (Part-45): 1993 (RA2003)
15	Potassium as K (mg/l)	11.25	-	-	IS-3025 (Part-45): 1993 (RA2003)

Note: -

1. The results listed refer only to the tested sample (s) & parameters (s). Endorsement of products is neither inferred nor implied.
2. This report is not to be reproduced wholly or in part and can not be used evidence in the court of law and should not be used in any advertising media without our special permission in writing.
3. The samples will be destroyed after 15 days from the date of issue of test report unless otherwise specified.

(Tested By)

Apex Enviro Laboratory, 3, Dhebar Colony Near I.T.I. Pratapnagar, Udaipur (Raj.)

K.L. Agrawal
Technical Manager

9511588380, 9829161803
9160300850, 9352505728
ael.udz@gmail.com, ael.hydra@gmail.com
apex.mintech.udr@gmail.com
3, Dhebar Colony, Opposite ITI, Pratapnagar, Udaipur 313001

APEX Enviro Laboratory

(Unit of Apex Mintech Consultants)

NABL Accredited, OHSAS Certified & Recognized by MoEF&CC, GOI,
Under Environment (Protection) Act, 1986 Vide F.No. 15018/16/2017-CPW

Date:-10/10/2019

TEST REPORT

Report No.:- W/3033

Proponent Name :- Buffer Zone Of Shivpura Red Ochre Mine(Village- Nanayan Kheri)

District :- Pratapgarh (Raj.)

Location:- Near village- Nanayan Kheri, Tehsil- Choti Sadari

Type of Unit :- Mine

Date of Sample Collection :- 06/10/2019

Date of Receipt :- 07/10/2019

Date of Sample Test :- 07/10/2019 to 10/10/2019

Sample Collected by :- Pankaj & Team

Type of Sample :- Ground Water

Testing Protocol :- Bureau of Indian Standard

RESULTS

S. No	Parameter	Observed value	Requirement (Acceptable Limit) as per IS 10500: 2012	Permissible limits in the Absence of Alternate Source as per IS 10500: 2012	Test Methods
1	pH	7	6.5 to 8.5	-	IS-3025 (Part-11): 1983 (RA2002)
2	Turbidity (NTU)	-	1	5	IS-3025 (Part-10): 1984 (RA2002)
3	Conductivity at 25°C (µs/cm)	161	-	-	IS-3025 (Part-14): 1984 (RA2013)
4	Total Hardness ($CaCO_3$) (mg/l)	80	200	600	IS-3025 (Part-21): 1983 (RA2009)
5	Chlorides as Cl (mg/l)	15	250	1000	IS-3025 (Part-32): 1988 (RA2003)
6	Total dissolved solids (mg/l)	110	500	2000	IS-3025 (Part-16): 1984 (RA2006)
7	Odour	Agreeable	Agreeable	-	IS-3025 (Part-5): 1983 (RA2002)
8	Sulphates as SO_4 (mg/l)	9	200	400	IS-3025 (Part-24): 1986 (RA2003)
9	Alkalinity as $CaCO_3$ (mg/l)	70	200	600	IS-3025 (Part-23): 1986 (RA2006)
10	Fluoride as F (mg/l)	0.20	1	1.5	IS-3025 (Part-60): 2008 Clause. 5
11	Nitrates as NO_3 (mg/l)	5	45	45	IS-3025 (Part-34): 1988 (RA2003)
12	Magnesium as mg (mg/l)	4.8	30	100	IS-3025 (Part-46): 1994 (RA2003)
13	Calcium as Ca (mg/l)	24	75	200	IS-3025 (Part-40): 1991 (RA2003)
14	Sodium as Na (mg/l)	8.5	-	-	IS-3025 (Part-45): 1993 (RA2003)
15	Potassium as K (mg/l)	1.7	-	-	IS-3025 (Part-45): 1993 (RA2003)

Note: -

1. The results listed refer only to the tested sample (s) & parameters (s). Endorsement of products is neither inferred nor implied.
2. This report is not to be reproduced wholly or in part and can not be used evidence in the court of law and should not be used in any advertising media without our special permission in writing.
3. The samples will be destroyed after 15 days from the date of issue of test report unless otherwise specified.

(Tested By)

Apex Enviro Laboratory 3, Dhebar Colony Near I.T.I. Pratapnagar, Udaipur (Raj.)

K.L. Agrawal
Technical Manager

9511588380, 9829161803
9160300850, 9352505728
ael.udz@gmail.com, ael.hydra@gmail.com
apex.mintech.udr@gmail.com
3, Dhebar Colony, Opposite ITI, Pratapnagar, Udaipur 313001

APEX Enviro Laboratory

(Unit of Apex Mintech Consultants)

NABL Accredited, OHSAS Certified & Recognized by MoEF&CC, GOI,
Under Environment (Protection) Act, 1986 Vide F.No. 15018/16/2017-CPW

Date:-10/10/2019

TEST REPORT

Report No.:- W/3031

Proponent Name :- Buffer Zone Of Shivpura Red Ochre Mine(Village- Choti Sadari)

District :- Pratapgarh (Raj.)

Location:- Near village- Choti Sadari, Tehsil- Choti Sadari

Type of Unit :- Mine

Date of Sample Collection :- 06/10/2019

Date of Receipt :- 07/10/2019

Date of Sample Test :- 07/10/2019 to 10/10/2019

Sample Collected by :- Pankaj & Team

Type of Sample :- Ground Water

Testing Protocol :- Bureau of Indian Standard

RESULTS

S. No	Parameter	Observed value	Requirement (Acceptable Limit) as per IS 10500: 2012	Permissible limits in the Absence of Alternate Source as per IS 10500: 2012	Test Methods
1	pH	7.43	6.5 to 8.5	-	IS-3025 (Part-11): 1983 (RA2002)
2	Turbidity (NTU)	-	1	5	IS-3025 (Part-10): 1984 (RA2002)
3	Conductivity at 25°C (µs/cm)	1499	-	-	IS-3025 (Part-14): 1984 (RA2013)
4	Total Hardness ($CaCO_3$) (mg/l)	500	200	600	IS-3025 (Part-21): 1983 (RA2009)
5	Chlorides as Cl (mg/l)	215	250	1000	IS-3025 (Part-32): 1988 (RA2003)
6	Total dissolved solids (mg/l)	973	500	2000	IS-3025 (Part-16): 1984 (RA2006)
7	Odour	Agreeable	Agreeable	-	IS-3025 (Part-5): 1983 (RA2002)
8	Sulphates as SO_4 (mg/l)	128	200	400	IS-3025 (Part-24): 1986 (RA2003)
9	Alkalinity as $CaCO_3$ (mg/l)	340	200	600	IS-3025 (Part-23): 1986 (RA2006)
10	Fluoride as F (mg/l)	0.65	1	1.5	IS-3025 (Part-60): 2008 Clause. 5
11	Nitrates as NO_3 (mg/l)	90	45	45	IS-3025 (Part-34): 1988 (RA2003)
12	Magnesium as mg (mg/l)	50.4	30	100	IS-3025 (Part-46): 1994 (RA2003)
13	Calcium as Ca (mg/l)	116	75	200	IS-3025 (Part-40): 1991 (RA2003)
14	Sodium as Na (mg/l)	165	-	-	IS-3025 (Part-45): 1993 (RA2003)
15	Potassium as K (mg/l)	1	-	-	IS-3025 (Part-45): 1993 (RA2003)

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Apex Enviro Laboratory 3, Dhebar Colony Near I.T.I. Pratapnagar, Udaipur (Raj.)

(Tested By)

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APEX Enviro Laboratory

(Unit of Apex Mintech Consultants)

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Under Environment (Protection) Act, 1986 Vide F.No. 15018/16/2017-CPW

Date:-10/10/2019

TEST REPORT

Report No.:- W/3032

Proponent Name :- Buffer Zone Of Shivpura Red Ochre Mine(Village- Subi)

District :- Pratapgarh (Raj.)

Location:- Near village- Subi, Tehsil- Choti Sadari

Type of Unit :- Mine

Date of Sample Collection :- 06/10/2019

Date of Receipt :- 07/10/2019

Date of Sample Test :- 07/10/2019 to 10/10/2019

Sample Collected by :- Pankaj & Team

Type of Sample :- Ground Water

Testing Protocol :- Bureau of Indian Standard

RESULTS

S. No	Parameter	Observed value	Requirement (Acceptable Limit) as per IS 10500: 2012	Permissible limits in the Absence of Alternate Source as per IS 10500: 2012	Test Methods
1	pH	7.1	6.5 to 8.5	-	IS-3025 (Part-11): 1983 (RA2002)
2	Turbidity (NTU)	-	1	5	IS-3025 (Part-10): 1984 (RA2002)
3	Conductivity at 25°C (µs/cm)	1404	-	-	IS-3025 (Part-14): 1984 (RA2013)
4	Total Hardness ($CaCO_3$) (mg/l)	450	200	600	IS-3025 (Part-21): 1983 (RA2009)
5	Chlorides as Cl (mg/l)	80	250	1000	IS-3025 (Part-32): 1988 (RA2003)
6	Total dissolved solids (mg/l)	1003	500	2000	IS-3025 (Part-16): 1984 (RA2006)
7	Odour	Agreeable	Agreeable	-	IS-3025 (Part-5): 1983 (RA2002)
8	Sulphates as SO_4 (mg/l)	348	200	400	IS-3025 (Part-24): 1986 (RA2003)
9	Alkalinity as $CaCO_3$ (mg/l)	390	200	600	IS-3025 (Part-23): 1986 (RA2006)
10	Fluoride as F (mg/l)	0.50	1	1.5	IS-3025 (Part-60): 2008 Clause. 5
11	Nitrates as NO_3 (mg/l)	10	45	45	IS-3025 (Part-34): 1988 (RA2003)
12	Magnesium as mg (mg/l)	60	30	100	IS-3025 (Part-46): 1994 (RA2003)
13	Calcium as Ca (mg/l)	80	75	200	IS-3025 (Part-40): 1991 (RA2003)
14	Sodium as Na (mg/l)	185	-	-	IS-3025 (Part-45): 1993 (RA2003)
15	Potassium as K (mg/l)	1.8	-	-	IS-3025 (Part-45): 1993 (RA2003)

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(Tested By)

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Under Environment (Protection) Act, 1986 Vide F.No. 15018/16/2017-CPW

Date:-10/10/2019

TEST REPORT

Report No.:- W/3034

Proponent Name :- Buffer Zone Of Shivpura Red Ochre Mine(Village- Kasbi)

District :- Pratapgarh (Raj.)

Location:- Near village- Kasbi, Tehsil- Choti Sadari

Type of Unit :- Mine

Date of Sample Collection :- 06/10/2019

Date of Receipt :- 07/10/2019

Date of Sample Test :- 07/10/2019 to 10/10/2019

Sample Collected by :- Pankaj & Team

Type of Sample :- Ground Water

Testing Protocol :- Bureau of Indian Standard

RESULTS

S. No	Parameter	Observed value	Requirement (Acceptable Limit) as per IS 10500: 2012	Permissible limits in the Absence of Alternate Source as per IS 10500: 2012	Test Methods
1	pH	6.95	6.5 to 8.5	-	IS-3025 (Part-11): 1983 (RA2002)
2	Turbidity (NTU)	-	1	5	IS-3025 (Part-10): 1984 (RA2002)
3	Conductivity at 25°C (µs/cm)	745	-	-	IS-3025 (Part-14): 1984 (RA2013)
4	Total Hardness ($CaCO_3$) (mg/l)	270	200	600	IS-3025 (Part-21): 1983 (RA2009)
5	Chlorides as Cl (mg/l)	55	250	1000	IS-3025 (Part-32): 1988 (RA2003)
6	Total dissolved solids (mg/l)	473	500	2000	IS-3025 (Part-16): 1984 (RA2006)
7	Odour	Agreeable	Agreeable	-	IS-3025 (Part-5): 1983 (RA2002)
8	Sulphates as SO_4 (mg/l)	56	200	400	IS-3025 (Part-24): 1986 (RA2003)
9	Alkalinity as $CaCO_3$ (mg/l)	240	200	600	IS-3025 (Part-23): 1986 (RA2006)
10	Fluoride as F (mg/l)	0.20	1	1.5	IS-3025 (Part-60): 2008 Clause. 5
11	Nitrates as NO_3 (mg/l)	38	45	45	IS-3025 (Part-34): 1988 (RA2003)
12	Magnesium as mg (mg/l)	19.2	30	100	IS-3025 (Part-46): 1994 (RA2003)
13	Calcium as Ca (mg/l)	76	75	200	IS-3025 (Part-40): 1991 (RA2003)
14	Sodium as Na (mg/l)	45	-	-	IS-3025 (Part-45): 1993 (RA2003)
15	Potassium as K (mg/l)	37.5	-	-	IS-3025 (Part-45): 1993 (RA2003)

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Date:-10/10/2019

TEST REPORT

Report No.:- W/3035

Proponent Name :- Buffer Zone Of Shivpura Red Ochre Mine(Village- Sandi Khera)

District :- Pratapgarh (Raj.)

Location:- Near village- Sandi Khera, Tehsil- Choti Sadari

Type of Unit :- Mine

Date of Sample Collection :- 06/10/2019

Date of Receipt :- 07/10/2019

Date of Sample Test :- 07/10/2019 to 10/10/2019

Sample Collected by :- Pankaj & Team

Type of Sample :- Ground Water

Testing Protocol :- Bureau of Indian Standard

RESULTS

S. No	Parameter	Observed value	Requirement (Acceptable Limit) as per IS 10500: 2012	Permissible limits in the Absence of Alternate Source as per IS 10500: 2012	Test Methods
1	pH	7	6.5 to 8.5	-	IS-3025 (Part-11): 1983 (RA2002)
2	Turbidity (NTU)	-	1	5	IS-3025 (Part-10): 1984 (RA2002)
3	Conductivity at 25°C (µs/cm)	930	-	-	IS-3025 (Part-14): 1984 (RA2013)
4	Total Hardness ($CaCO_3$) (mg/l)	410	200	600	IS-3025 (Part-21): 1983 (RA2009)
5	Chlorides as Cl (mg/l)	95	250	1000	IS-3025 (Part-32): 1988 (RA2003)
6	Total dissolved solids (mg/l)	530	500	2000	IS-3025 (Part-16): 1984 (RA2006)
7	Odour	Agreeable	Agreeable	-	IS-3025 (Part-5): 1983 (RA2002)
8	Sulphates as SO_4 (mg/l)	47	200	400	IS-3025 (Part-24): 1986 (RA2003)
9	Alkalinity as $CaCO_3$ (mg/l)	320	200	600	IS-3025 (Part-23): 1986 (RA2006)
10	Fluoride as F (mg/l)	0.25	1	1.5	IS-3025 (Part-60): 2008 Clause. 5
11	Nitrates as NO_3 (mg/l)	5	45	45	IS-3025 (Part-34): 1988 (RA2003)
12	Magnesium as mg (mg/l)	43.2	30	100	IS-3025 (Part-46): 1994 (RA2003)
13	Calcium as Ca (mg/l)	92	75	200	IS-3025 (Part-40): 1991 (RA2003)
14	Sodium as Na (mg/l)	45	-	-	IS-3025 (Part-45): 1993 (RA2003)
15	Potassium as K (mg/l)	7.8	-	-	IS-3025 (Part-45): 1993 (RA2003)

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(Tested By)

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Date:-10/10/2019

TEST REPORT

Report No.:- W/3036

Proponent Name :- Buffer Zone Of Shivpura Red Ochre Mine(Kesund Pond)

District :- Pratapgarh (Raj.)

Location:- Near village- Kesunda, Tehsil- Choti Sadari

Type of Unit :- Mine

Date of Sample Collection :- 06/10/2019

Date of Receipt :- 07/10/2019

Date of Sample Test :- 07/10/2019 to 10/10/2019

Sample Collected by :- Pankaj & Team

Type of Sample :- Surface Water

Testing Protocol :- Bureau of Indian Standard

RESULTS

S. No	Parameter	Observed value	Requirement (Acceptable Limit) as per IS 10500: 2012	Permissible limits in the Absence of Alternate Source as per IS 10500: 2012	Test Methods
1	pH	8.4	6.5 to 8.5	-	IS-3025 (Part-11): 1983 (RA2002)
2	Turbidity (NTU)	-	1	5	IS-3025 (Part-10): 1984 (RA2002)
3	Conductivity at 25°C (µs/cm)	260	-	-	IS-3025 (Part-14): 1984 (RA2013)
4	Total Hardness ($CaCO_3$) (mg/l)	110	200	600	IS-3025 (Part-21): 1983 (RA2009)
5	Chlorides as Cl (mg/l)	20	250	1000	IS-3025 (Part-32): 1988 (RA2003)
6	Total dissolved solids (mg/l)	173	500	2000	IS-3025 (Part-16): 1984 (RA2006)
7	Odour	Agreeable	Agreeable	-	IS-3025 (Part-5): 1983 (RA2002)
8	Sulphates as SO_4 (mg/l)	14	200	400	IS-3025 (Part-24): 1986 (RA2003)
9	Alkalinity as $CaCO_3$ (mg/l)	110	200	600	IS-3025 (Part-23): 1986 (RA2006)
10	Fluoride as F (mg/l)	0.30	1	1.5	IS-3025 (Part-60): 2008 Clause. 5
11	Nitrates as NO_3 (mg/l)	10	45	45	IS-3025 (Part-34): 1988 (RA2003)
12	Magnesium as mg (mg/l)	14.4	30	100	IS-3025 (Part-46): 1994 (RA2003)
13	Calcium as Ca (mg/l)	20	75	200	IS-3025 (Part-40): 1991 (RA2003)
14	Sodium as Na (mg/l)	25	-	-	IS-3025 (Part-45): 1993 (RA2003)
15	Potassium as K (mg/l)	2.4	-	-	IS-3025 (Part-45): 1993 (RA2003)

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Date:-10/10/2019

TEST REPORT

Report No.:- W/3037

Proponent Name :- Buffer Zone Of Shivpura Red Ochre Mine(Gomana Pond)

District :- Pratapgarh (Raj.)
Location:- Near village- Gomana, Tehsil- Choti Sadari
Type of Unit :- Mine
Date of Sample Collection :- 06/10/2019
Date of Receipt :- 07/10/2019
Date of Sample Test :- 07/10/2019 to 10/10/2019
Sample Collected by :- Pankaj & Team
Type of Sample :- Surface Water
Testing Protocol :- Bureau of Indian Standard

RESULTS

S. No	Parameter	Observed value	Requirement (Acceptable Limit) as per IS 10500: 2012	Permissible limits in the Absence of Alternate Source as per IS 10500: 2012	Test Methods
1	pH	8.1	6.5 to 8.5	-	IS-3025 (Part-11): 1983 (RA2002)
2	Turbidity (NTU)	-	1	5	IS-3025 (Part-10): 1984 (RA2002)
3	Conductivity at 25°C (µs/cm)	220	-	-	IS-3025 (Part-14): 1984 (RA2013)
4	Total Hardness ($CaCO_3$) (mg/l)	100	200	600	IS-3025 (Part-21): 1983 (RA2009)
5	Chlorides as Cl (mg/l)	15	250	1000	IS-3025 (Part-32): 1988 (RA2003)
6	Total dissolved solids (mg/l)	137	500	2000	IS-3025 (Part-16): 1984 (RA2006)
7	Odour	Agreeable	Agreeable	-	IS-3025 (Part-5): 1983 (RA2002)
8	Sulphates as SO_4 (mg/l)	3.4	200	400	IS-3025 (Part-24): 1986 (RA2003)
9	Alkalinity as $CaCO_3$ (mg/l)	110	200	600	IS-3025 (Part-23): 1986 (RA2006)
10	Fluoride as F (mg/l)	0.10	1	1.5	IS-3025 (Part-60): 2008 Clause. 5
11	Nitrates as NO_3 (mg/l)	5	45	45	IS-3025 (Part-34): 1988 (RA2003)
12	Magnesium as mg (mg/l)	7.2	30	100	IS-3025 (Part-46): 1994 (RA2003)
13	Calcium as Ca (mg/l)	28	75	200	IS-3025 (Part-40): 1991 (RA2003)
14	Sodium as Na (mg/l)	9	-	-	IS-3025 (Part-45): 1993 (RA2003)
15	Potassium as K (mg/l)	2.7	-	-	IS-3025 (Part-45): 1993 (RA2003)

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(Tested By)

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Date:-16/01/2020

TEST REPORT

ANNEXURE No. 10

Report No	**: A/4546**
Issued to	: M/s. Apex Mintech Consultants, Udaipur
Concerned Mines	: Shivpura Red Ochre Mining Project M/s Quality Minerals, Near village - Shivpura, Tehsil Chhoti Sadari, District: Pratapgarh (Raj.) Area: 3.9859 Hect. & M.L.No. 07/2018
Type of Sampling	: Ambient Air Quality Monitoring
Date of Receipt	: 07/10/2019
Date of Test	: 07/10/2019 to 09/10/2019
Sample Collected by	: Pankaj & Team
Duration of Sampling	: 24 Hours
Sampling Instrument	: Respirable Dust Sampler AAS 217 BL & AAS 109 Fine Particulate Sampler for $PM_{2.5}$
Testing Protocol	: Bureau of Indian Standard

RESULTS

S. No	Location	Date of Sampling Collection	Type of Area	PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_x µg/m³
1.	Mine site	04/10/2019	Mine	80.4	38.5	10.2	13.2
2.	Subi	04/10/2019	Rural	68.2	32.7	8.1	15.8
3.	Sandi Khera	04/10/2019	Rural	80.3	34.6	8.1	14.7
4.	Kasbi	04/10/2019	Rural	70.4	31.4	8.5	15.2
5.	Nawakheri	04/10/2019	Rural	69.9	33.4	10.5	15.3
6.	Chhoti Sadari	04/10/2019	Forest	60.4	30.3	9.3	15.1
7.	Mine site	05/10/2019	Mine	81.7	39.4	10.1	17.0
8.	Subi	05/10/2019	Rural	68.5	33.1	10.0	16.1
9.	Sandi Khera	05/10/2019	Rural	80.4	33.8	9.6	16.2
10.	Kasbi	05/10/2019	Rural	70.6	31.2	9.7	15.3
11.	Nawakheri	05/10/2019	Rural	68.5	33.9	9.0	14.5
12.	Chhoti Sadari	05/10/2019	Forest	61.3	29.8	7.8	14.1

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(Tested By)

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TC - 7531

Date:-16/01/2020

TEST REPORT

Report No : **A/4547**
Issued to : M/s. Apex Mintech Consultants, Udaipur
Concerned Mines : Shivpura Red Ochre Mining Project
M/s Quality Minerals,
Near village - Shivpura, Tehsil Chhoti Sadari, District: Pratapgarh (Raj.)
Area: 3.9859 Hect. & M.L.No. 07/2018
Type of Sampling : Ambient Air Quality Monitoring
Date of Receipt : 14/10/2019
Date of Test : 14/10/2019 to 16/10/2019
Sample Collected by : Pankaj & Team
Duration of Sampling : 24 Hours
Sampling Instrument : Respirable Dust Sampler AAS 217 BL & AAS 109 Fine Particulate Sampler for $PM_{2.5}$
Testing Protocol : Bureau of Indian Standard

RESULTS

S. No	Location	Date of Sampling Collection	Type of Area	PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_x µg/m³
1.	Mine site	11/10/2019	Mine	82.6	39.3	9.8	16.3
2.	Subi	11/10/2019	Rural	66.9	32.4	8.5	16.5
3.	Sandi Khera	11/10/2019	Rural	79.7	34.9	8.0	15.4
4.	Kasbi	11/10/2019	Rural	72.2	32.2	9.5	14.9
5.	Nawakheri	11/10/2019	Rural	69.8	34.8	10.8	13.9
6.	Chhoti Sadari	11/10/2019	Forest	63.1	29.8	9.5	14.6
7.	Mine site	12/10/2019	Mine	80.7	39.8	9.2	13.3
8.	Subi	12/10/2019	Rural	68.8	32.6	8.8	15.1
9.	Sandi Khera	12/10/2019	Rural	79.8	34.9	9.9	15.0
10.	Kasbi	12/10/2019	Rural	71.9	31.8	9.1	14.2
11.	Nawakheri	12/10/2019	Rural	69.5	34.4	8.6	15.8
12.	Chhoti Sadari	12/10/2019	Forest	60.5	29.8	8.1	14.5

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(Tested By)

Apex Enviro Laboratory 3, Dhebar Colony Near I.T.I. Pratapnagar, Udaipur (Raj.)

K. L. Agrawal
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Date:-16/01/2020

TEST REPORT

Report No : **A/4548**
Issued to : M/s. Apex Mintech Consultants, Udaipur
Concerned Mines : Shivpura Red Ochre Mining Project
M/s Quality Minerals,
Near village - Shivpura, Tehsil Chhoti Sadari, District: Pratapgarh (Raj.)
Area: 3.9859 Hect. & M.L.No. 07/2018
Type of Sampling : Ambient Air Quality Monitoring
Date of Receipt : 21/10/2019
Date of Test : 21/10/2019 to 23/10/2019
Sample Collected by : Pankaj & Team
Duration of Sampling : 24 Hours
Sampling Instrument : Respirable Dust Sampler AAS 217 BL & AAS 109 Fine Particulate Sampler for $PM_{2.5}$
Testing Protocol : Bureau of Indian Standard

RESULTS

S. No	Location	Date of Sampling Collection	Type of Area	PM_{10} $\mu g/m^3$	$PM_{2.5}$ $\mu g/m^3$	SO_2 $\mu g/m^3$	NO_x $\mu g/m^3$
1.	Mine site	18/10/2019	Mine	80.5	39.9	9.1	14.8
2.	Subi	18/10/2019	Rural	68.3	33.1	9.2	15.7
3.	Sandi Khera	18/10/2019	Rural	79.2	35.0	10.1	17.3
4.	Kasbi	18/10/2019	Rural	71.7	31.3	8.2	14.6
5.	Nawakheri	18/10/2019	Rural	68.8	32.9	8.9	15.6
6.	Chhoti Sadari	18/10/2019	Forest	60.4	30.3	7.5	14.3
7.	Mine site	19/10/2019	Mine	80.7	40.4	9.9	16.1
8.	Subi	19/10/2019	Rural	66.8	32.5	8.1	16.0
9.	Sandi Khera	19/10/2019	Rural	80.2	33.4	10.4	15.8
10.	Kasbi	19/10/2019	Rural	72.1	31.1	8.3	13.9
11.	Nawakheri	19/10/2019	Rural	68.8	34.6	9.3	13.8
12.	Chhoti Sadari	19/10/2019	Forest	63.1	30.1	9.2	13.4

Note: -

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APEX Enviro Laboratory

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Under Environment (Protection) Act, 1986 Vide F.No. 15018/16/2017-CPW

TC - 7531

Date:-16/01/2020

TEST REPORT

Report No	**: A/4549**
Issued to	: M/s. Apex Mintech Consultants, Udaipur
Concerned Mines	: Shivpura Red Ochre Mining Project M/s Quality Minerals, Near village - Shivpura, Tehsil Chhoti Sadari, District: Pratapgarh (Raj.) Area: 3.9859 Hect. & M.L.No. 07/2018
Type of Sampling	: Ambient Air Quality Monitoring
Date of Receipt	: 28/10/2019
Date of Test	: 28/10/2019 to 30/10/2019
Sample Collected by	: Pankaj & Team
Duration of Sampling	: 24 Hours
Sampling Instrument	: Respirable Dust Sampler AAS 217 BL & AAS 109 Fine Particulate Sampler for $PM_{2.5}$
Testing Protocol	: Bureau of Indian Standard

RESULTS

S. No	Location	Date of Sampling Collection	Type of Area	PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_x µg/m³
1.	Mine site	25/10/2019	Mine	83.3	38.7	9.9	17.1
2.	Subi	25/10/2019	Rural	67.7	33.5	9.2	15.0
3.	Sandi Khera	25/10/2019	Rural	78.7	34.8	9.9	14.7
4.	Kasbi	25/10/2019	Rural	71.1	31.8	8.9	16.1
5.	Nawakheri	25/10/2019	Rural	69.0	32.9	9.9	14.6
6.	Chhoti Sadari	25/10/2019	Forest	60.1	29.6	7.7	13.7
7.	Mine site	26/10/2019	Mine	81.8	38.9	10.2	13.2
8.	Subi	26/10/2019	Rural	67.4	31.9	8.9	14.8
9.	Sandi Khera	26/10/2019	Rural	80.1	35.0	8.2	17.2
10.	Kasbi	26/10/2019	Rural	70.3	31.1	8.3	14.8
11.	Nawakheri	26/10/2019	Rural	69.8	33.3	10.6	15.7
12.	Chhoti Sadari	26/10/2019	Forest	60.0	29.7	9.4	15.0

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(Tested By)

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Date:-16/01/2020

TEST REPORT

Report No : **A/4550**
Issued to : M/s. Apex Mintech Consultants, Udaipur
Concerned Mines : Shivpura Red Ochre Mining Project
M/s Quality Minerals,
Near village - Shivpura, Tehsil Chhoti Sadari, District: Pratapgarh (Raj.)
Area: 3.9859 Hect. & M.L.No. 07/2018
Type of Sampling : Ambient Air Quality Monitoring
Date of Receipt : 04/11/2019
Date of Test : 04/11/2019 to 06/11/2019
Sample Collected by : Pankaj & Team
Duration of Sampling : 24 Hours
Sampling Instrument : Respirable Dust Sampler AAS 217 BL & AAS 109 Fine Particulate Sampler for $PM_{2.5}$
Testing Protocol : Bureau of Indian Standard

RESULTS

S. No	Location	Date of Sampling Collection	Type of Area	PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_x µg/m³
1.	Mine site	01/11/2019	Mine	84.1	40.2	9.5	13.7
2.	Subi	01/11/2019	Rural	68.5	32.9	8.5	16.3
3.	Sandi Khera	01/11/2019	Rural	79.4	34.3	10.7	14.7
4.	Kasbi	01/11/2019	Rural	71.0	31.2	8.7	15.5
5.	Nawakheri	01/11/2019	Rural	69.7	34.7	9.3	14.1
6.	Chhoti Sadari	01/11/2019	Forest	62.6	30.3	8.0	14.1
7.	Mine site	02/11/2019	Mine	83.4	39.2	8.7	16.3
8.	Subi	02/11/2019	Rural	67.6	32.1	9.4	15.6
9.	Sandi Khera	02/11/2019	Rural	79.5	35.8	8.7	16.1
10.	Kasbi	02/11/2019	Rural	71.2	32.1	8.9	16.5
11.	Nawakheri	02/11/2019	Rural	69.5	34.8	8.6	15.4
12.	Chhoti Sadari	02/11/2019	Forest	63.1	29.6	8.7	15.1

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TC - 7531

Date:-16/01/2020

TEST REPORT

Report No	**: A/4551**
Issued to	: M/s. Apex Mintech Consultants, Udaipur
Concerned Mines	: Shivpura Red Ochre Mining Project M/s Quality Minerals, Near village - Shivpura, Tehsil Chhoti Sadari, District: Pratapgarh (Raj.) Area: 3.9859 Hect. & M.L.No. 07/2018
Type of Sampling	: Ambient Air Quality Monitoring
Date of Receipt	: 11/11/2019
Date of Test	: 11/11/2019 to 13/11/2019
Sample Collected by	: Pankaj & Team
Duration of Sampling	: 24 Hours
Sampling Instrument	: Respirable Dust Sampler AAS 217 BL & AAS 109 Fine Particulate Sampler for $PM_{2.5}$
Testing Protocol	: Bureau of Indian Standard

RESULTS

S. No	Location	Date of Sampling Collection	Type of Area	PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_x µg/m³
1.	Mine site	08/11/2019	Mine	81.1	39.6	9.0	15.3
2.	Subi	08/11/2019	Rural	66.9	33.0	9.9	15.0
3.	Sandi Khera	08/11/2019	Rural	79.3	35.6	10.0	14.4
4.	Kasbi	08/11/2019	Rural	70.9	31.7	9.6	14.3
5.	Nawakheri	08/11/2019	Rural	69.4	34.3	10.8	14.4
6.	Chhoti Sadari	08/11/2019	Forest	62.9	30.1	7.7	15.0
7.	Mine site	09/11/2019	Mine	81.5	39.0	8.5	17.1
8.	Subi	09/11/2019	Rural	66.6	32.8	9.6	16.6
9.	Sandi Khera	09/11/2019	Rural	79.8	35.7	9.3	16.4
10.	Kasbi	09/11/2019	Rural	70.6	31.6	9.5	15.4
11.	Nawakheri	09/11/2019	Rural	69.1	33.5	9.5	14.6
12.	Chhoti Sadari	09/11/2019	Forest	62.9	30.3	8.3	13.9

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Date:-16/01/2020

TEST REPORT

Report No : **A/4552**
Issued to : M/s. Apex Mintech Consultants, Udaipur
Concerned Mines : Shivpura Red Ochre Mining Project
M/s Quality Minerals,
Near village - Shivpura, Tehsil Chhoti Sadari, District: Pratapgarh (Raj.)
Area: 3.9859 Hect. & M.L.No. 07/2018
Type of Sampling : Ambient Air Quality Monitoring
Date of Receipt : 18/11/2019
Date of Test : 18/11/2019 to 20/11/2019
Sample Collected by : Pankaj & Team
Duration of Sampling : 24 Hours
Sampling Instrument : Respirable Dust Sampler AAS 217 BL & AAS 109 Fine Particulate Sampler for $PM_{2.5}$
Testing Protocol : Bureau of Indian Standard

RESULTS

S. No	Location	Date of Sampling Collection	Type of Area	PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_x µg/m³
1.	Mine site	15/11/2019	Mine	84.1	38.9	9.7	15.4
2.	Subi	15/11/2019	Rural	67.2	33.2	9.0	14.7
3.	Sandi Khera	15/11/2019	Rural	79.2	34.8	8.0	14.7
4.	Kasbi	15/11/2019	Rural	72.0	31.6	9.5	15.2
5.	Nawakheri	15/11/2019	Rural	69.6	33.0	9.9	15.6
6.	Chhoti Sadari	15/11/2019	Forest	59.9	29.5	9.0	14.2
7.	Mine site	16/11/2019	Mine	82.2	39.4	9.4	15.8
8.	Subi	16/11/2019	Rural	67.9	32.6	8.1	16.5
9.	Sandi Khera	16/11/2019	Rural	79.7	35.5	7.8	17.0
10.	Kasbi	16/11/2019	Rural	72.2	31.8	9.7	15.5
11.	Nawakheri	16/11/2019	Rural	69.3	34.1	10.8	13.8
12.	Chhoti Sadari	16/11/2019	Forest	61.3	29.5	7.5	14.0

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TC - 7531

Date:-16/01/2020

TEST REPORT

Report No : **A/4553**
Issued to : M/s. Apex Mintech Consultants, Udaipur
Concerned Mines : Shivpura Red Ochre Mining Project
M/s Quality Minerals,
Near village - Shivpura, Tehsil Chhoti Sadari, District: Pratapgarh (Raj.)
Area: 3.9859 Hect. & M.L.No. 07/2018
Type of Sampling : Ambient Air Quality Monitoring
Date of Receipt : 25/11/2019
Date of Test : 25/11/2019 to 27/11/2019
Sample Collected by : Pankaj & Team
Duration of Sampling : 24 Hours
Sampling Instrument : Respirable Dust Sampler AAS 217 BL & AAS 109
Fine Particulate Sampler for $PM_{2.5}$
Testing Protocol : Bureau of Indian Standard

RESULTS

S. No	Location	Date of Sampling Collection	Type of Area	PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_x µg/m³
1.	Mine site	22/11/2019	Mine	83.4	40.1	9.7	14.3
2.	Subi	22/11/2019	Rural	68.1	33.5	8.8	15.3
3.	Sandi Khera	22/11/2019	Rural	78.8	34.4	9.4	15.3
4.	Kasbi	22/11/2019	Rural	71.8	31.8	8.3	16.4
5.	Nawakheri	22/11/2019	Rural	68.6	34.4	8.4	13.4
6.	Chhoti Sadari	22/11/2019	Forest	61.8	29.6	7.6	13.3
7.	Mine site	23/11/2019	Mine	81.8	39.1	9.0	17.1
8.	Subi	23/11/2019	Rural	67.1	31.9	10.1	14.9
9.	Sandi Khera	23/11/2019	Rural	79.3	35.5	8.3	16.2
10.	Kasbi	23/11/2019	Rural	72.2	31.7	8.3	15.8
11.	Nawakheri	23/11/2019	Rural	69.1	33.0	9.7	14.7
12.	Chhoti Sadari	23/11/2019	Forest	60.9	30.2	8.6	13.6

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TC - 7531

Date:-16/01/2020

TEST REPORT

Report No : **A/4554**
Issued to : M/s. Apex Mintech Consultants, Udaipur
Concerned Mines : Shivpura Red Ochre Mining Project
M/s Quality Minerals,
Near village - Shivpura, Tehsil Chhoti Sadari, District: Pratapgarh (Raj.)
Area: 3.9859 Hect. & M.L.No. 07/2018
Type of Sampling : Ambient Air Quality Monitoring
Date of Receipt : 02/12/2019
Date of Test : 02/12/2019 to 04/12/2019
Sample Collected by : Pankaj & Team
Duration of Sampling : 24 Hours
Sampling Instrument : Respirable Dust Sampler AAS 217 BL & AAS 109 Fine Particulate Sampler for $PM_{2.5}$
Testing Protocol : Bureau of Indian Standard

RESULTS

S. No	Location	Date of Sampling Collection	Type of Area	PM_{10} $\mu g/m^3$	$PM_{2.5}$ $\mu g/m^3$	SO_2 $\mu g/m^3$	NO_x $\mu g/m^3$
1.	Mine site	29/11/2019	Mine	81.0	39.4	9.3	14.6
2.	Subi	29/11/2019	Rural	67.1	33.4	8.9	15.0
3.	Sandi Khera	29/11/2019	Rural	79.1	33.8	9.0	16.5
4.	Kasbi	29/11/2019	Rural	70.5	31.7	9.8	16.1
5.	Nawakheri	29/11/2019	Rural	69.0	34.5	10.4	15.6
6.	Chhoti Sadari	29/11/2019	Forest	61.4	30.2	8.0	14.5
7.	Mine site	30/11/2019	Mine	81.7	38.5	8.7	15.1
8.	Subi	30/11/2019	Rural	67.0	33.6	9.7	14.9
9.	Sandi Khera	30/11/2019	Rural	79.9	34.0	10.5	15.8
10.	Kasbi	30/11/2019	Rural	71.8	31.2	9.5	15.5
11.	Nawakheri	30/11/2019	Rural	68.6	34.3	8.8	13.1
12.	Chhoti Sadari	30/11/2019	Forest	60.7	29.6	7.8	14.2

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Date:-16/01/2020

TEST REPORT

Report No : **A/4555**
Issued to : M/s. Apex Mintech Consultants, Udaipur
Concerned Mines : Shivpura Red Ochre Mining Project
M/s Quality Minerals,
Near village - Shivpura, Tehsil Chhoti Sadari, District: Pratapgarh (Raj.)
Area: 3.9859 Hect. & M.L.No. 07/2018
Type of Sampling : Ambient Air Quality Monitoring
Date of Receipt : 09/12/2019
Date of Test : 09/12/2019 to 11/12/2019
Sample Collected by : Pankaj & Team
Duration of Sampling : 24 Hours
Sampling Instrument : Respirable Dust Sampler AAS 217 BL & AAS 109 Fine Particulate Sampler for $PM_{2.5}$
Testing Protocol : Bureau of Indian Standard

RESULTS

S. No	Location	Date of Sampling Collection	Type of Area	PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_x µg/m³
1.	Mine site	06/12/2019	Mine	81.0	39.2	9.7	15.2
2.	Subi	06/12/2019	Rural	68.3	33.6	10.4	14.8
3.	Sandi Khera	06/12/2019	Rural	80.1	34.9	7.8	16.0
4.	Kasbi	06/12/2019	Rural	71.3	31.5	9.7	14.5
5.	Nawakheri	06/12/2019	Rural	69.6	34.4	10.9	15.6
6.	Chhoti Sadari	06/12/2019	Forest	60.2	29.9	7.6	13.6
7.	Mine site	07/12/2019	Mine	80.8	39.6	10.2	16.8
8.	Subi	07/12/2019	Rural	67.1	32.3	9.1	15.8
9.	Sandi Khera	07/12/2019	Rural	79.4	35.7	10.2	16.3
10.	Kasbi	07/12/2019	Rural	72.0	32.0	9.2	14.8
11.	Nawakheri	07/12/2019	Rural	69.5	33.6	9.6	14.3
12.	Chhoti Sadari	07/12/2019	Forest	60.9	30.3	7.6	14.8

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Date:-16/01/2020

TEST REPORT

Report No : **A/4556**
Issued to : M/s. Apex Mintech Consultants, Udaipur
Concerned Mines : Shivpura Red Ochre Mining Project
M/s Quality Minerals,
Near village - Shivpura, Tehsil Chhoti Sadari, District: Pratapgarh (Raj.)
Area: 3.9859 Hect. & M.L.No. 07/2018
Type of Sampling : Ambient Air Quality Monitoring
Date of Receipt : 16/12/2019
Date of Test : 16/12/2019 to 18/12/2019
Sample Collected by : Pankaj & Team
Duration of Sampling : 24 Hours
Sampling Instrument : Respirable Dust Sampler AAS 217 BL & AAS 109 Fine Particulate Sampler for $PM_{2.5}$
Testing Protocol : Bureau of Indian Standard

RESULTS

S. No	Location	Date of Sampling Collection	Type of Area	PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_x µg/m³
1.	Mine site	13/12/2019	Mine	81.4	39.1	9.4	15.3
2.	Subi	13/12/2019	Rural	68.1	32.6	9.0	16.6
3.	Sandi Khera	13/12/2019	Rural	79.1	36.1	9.7	17.1
4.	Kasbi	13/12/2019	Rural	71.1	31.9	9.6	16.1
5.	Nawakheri	13/12/2019	Rural	68.9	34.3	10.3	14.6
6.	Chhoti Sadari	13/12/2019	Forest	60.3	30.2	8.8	14.4
7.	Mine site	14/12/2019	Mine	80.8	39.1	9.7	16.1
8.	Subi	14/12/2019	Rural	68.4	33.1	10.3	16.4
9.	Sandi Khera	14/12/2019	Rural	79.4	35.7	8.8	16.3
10.	Kasbi	14/12/2019	Rural	71.0	31.4	10.1	14.0
11.	Nawakheri	14/12/2019	Rural	69.4	34.5	9.6	14.7
12.	Chhoti Sadari	14/12/2019	Forest	59.9	29.7	9.0	14.5

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3. The samples will be destroyed after 15 days from the date of issue of test report unless otherwise specified.

(Tested By)

Apex Enviro Laboratory 3, Dhebar Colony Near I.T.I. Pratapnagar, Udaipur (Raj.)

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Date:-16/01/2020

TEST REPORT

Report No	**: A/4557**
Issued to	: M/s. Apex Mintech Consultants, Udaipur
Concerned Mines	: Shivpura Red Ochre Mining Project M/s Quality Minerals, Near village - Shivpura, Tehsil Chhoti Sadari, District: Pratapgarh (Raj.) Area: 3.9859 Hect. & M.L.No. 07/2018
Type of Sampling	: Ambient Air Quality Monitoring
Date of Receipt	: 23/12/2019
Date of Test	: 23/12/2019 to 25/12/2019
Sample Collected by	: Pankaj & Team
Duration of Sampling	: 24 Hours
Sampling Instrument	: Respirable Dust Sampler AAS 217 BL & AAS 109 Fine Particulate Sampler for $PM_{2.5}$
Testing Protocol	: Bureau of Indian Standard

RESULTS

S. No	Location	Date of Sampling Collection	Type of Area	PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_x µg/m³
1.	Mine site	20/12/2019	Mine	81.7	39.3	9.1	13.7
2.	Subi	20/12/2019	Rural	67.1	32.3	8.4	16.5
3.	Sandi Khera	20/12/2019	Rural	78.9	34.9	9.8	17.0
4.	Kasbi	20/12/2019	Rural	70.6	31.3	9.4	15.4
5.	Nawakheri	20/12/2019	Rural	68.6	34.4	9.4	14.6
6.	Chhoti Sadari	20/12/2019	Forest	61.3	29.7	8.8	13.3
7.	Mine site	21/12/2019	Mine	82.1	39.9	8.7	17.2
8.	Subi	21/12/2019	Rural	66.8	33.2	9.9	15.8
9.	Sandi Khera	21/12/2019	Rural	79.8	34.9	10.6	15.9
10.	Kasbi	21/12/2019	Rural	71.6	31.2	9.0	13.8
11.	Nawakheri	21/12/2019	Rural	69.3	32.9	10.8	13.5
12.	Chhoti Sadari	21/12/2019	Forest	60.5	30.3	8.6	14.1

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(Tested By)

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Under Environment (Protection) Act, 1986 Vide F.No. 15018/16/2017-CPW
TC - 7531

Date:-16/01/2020

TEST REPORT

Report No : **A/4558**
Issued to : M/s. Apex Mintech Consultants, Udaipur
Concerned Mines : Shivpura Red Ochre Mining Project
M/s Quality Minerals,
Near village - Shivpura, Tehsil Chhoti Sadari, District: Pratapgarh (Raj.)
Area: 3.9859 Hect. & M.L.No. 07/2018
Type of Sampling : Ambient Air Quality Monitoring
Date of Receipt : 30/12/2019
Date of Test : 30/12/2019 to 01/01/2020
Sample Collected by : Pankaj & Team
Duration of Sampling : 24 Hours
Sampling Instrument : Respirable Dust Sampler AAS 217 BL & AAS 109 Fine Particulate Sampler for $PM_{2.5}$
Testing Protocol : Bureau of Indian Standard

RESULTS

S. No	Location	Date of Sampling Collection	Type of Area	PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_x µg/m³
1.	Mine site	27/12/2019	Mine	82.7	39.8	9.7	14.2
2.	Subi	27/12/2019	Rural	68.3	32.2	9.4	15.2
3.	Sandi Khera	27/12/2019	Rural	79.5	34.1	8.1	14.7
4.	Kasbi	27/12/2019	Rural	71.7	32.1	8.1	15.7
5.	Nawakheri	27/12/2019	Rural	69.2	32.8	9.1	13.1
6.	Chhoti Sadari	27/12/2019	Forest	60.3	29.9	9.0	14.4
7.	Mine site	28/12/2019	Mine	83.6	39.0	8.7	16.3
8.	Subi	28/12/2019	Rural	67.0	33.1	9.9	15.9
9.	Sandi Khera	28/12/2019	Rural	79.1	33.9	10.8	16.7
10.	Kasbi	28/12/2019	Rural	71.4	31.6	9.9	15.4
11.	Nawakheri	28/12/2019	Rural	68.7	33.0	8.8	14.5
12.	Chhoti Sadari	28/12/2019	Forest	62.0	30.2	7.8	13.7

Note: -

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(Tested By)

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ANNEXURE No. II

Date:-08/10/2019

TEST REPORT

Report No.	**Noise/2609**
Proponent Name	:- Buffer Zone of Shivpura Red Ochre Mine(village-Chhoti Sadari)
District	:- Pratapgarh (Raj.)
Location	:- Near village- Chhoti Sadari, Tehsil- Choti Sadari
M.L.No.	: 07/2018
Lease Area	: 3.9859 Hect.
Type of Unit	:- Mine
Date of Monitoring	:- 06/10/2019
Date of Receipt	:- 07/10/2019
Sample Collected by	:- Pankaj & Team
Type of Monitoring	:- Ambient Noise Monitoring
Monitoring Instrument use	:- Sound Level Meter
Testing Protocol	:- Bureau of Indian Standard

RESULTS

S. No	Point of Monitoring	Observed Value [in dB (A)] Leq Day Time	Observed Value [in dB (A)] Leq Night Time
1	Govt. Sr. Sec. School	52.8	42.9

Note: Standard Limits [in dB (A)]Leq:

Category of Area/ Zone (Ambient)	Day Time	Night Time
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Silence Zone	50	40

Note: -

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ANNEXURE No II

Date:-08/10/2019

TEST REPORT

Report No.	**Noise/2608**
Proponent Name	:- Buffer Zone of Shivpura Red Ochre Mine(village-Nawa Khedi)
District	:- Pratapgarh (Raj.)
Location	:- Near village- Nawakhedi, Tehsil- Choti Sadari
M.L.No.	: 07/2018
Lease Area	: 3.9859 Hect.
Type of Unit	:- Mine
Date of Monitoring	:- 06/10/2019
Date of Receipt	:- 07/10/2019
Sample Collected by	:- Pankaj & Team
Type of Monitoring	:- Ambient Noise Monitoring
Monitoring Instrument use	:- Sound Level Meter
Testing Protocol	:- Bureau of Indian Standard

RESULTS

S. No	Point of Monitoring	Observed Value [in dB (A)] Leq Day Time	Observed Value [in dB (A)] Leq Night Time
1	Shree Charbhuja Nath Temple	51.9	41.8

Note: Standard Limits [in dB (A)]Leq:

Category of Area/ Zone (Ambient)	Day Time	Night Time
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Silence Zone	50	40

Note: -

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TC - 7531

Date:-08/10/2019

TEST REPORT

Report No.	**Noise/2607**
Proponent Name	:- Buffer Zone of Shivpura Red Ochre Mine(village-Kasbi)
District	:- Pratapgarh (Raj.)
Location	:- Near village- Kasbi, Tehsil- Choti Sadari
M.L.No.	: 07/2018
Lease Area	: 3.9859 Hect.
Type of Unit	:- Mine
Date of Monitoring	:- 05/10/2019
Date of Receipt	:- 07/10/2019
Sample Collected by	:- Pankaj & Team
Type of Monitoring	:- Ambient Noise Monitoring
Monitoring Instrument use	:- Sound Level Meter
Testing Protocol	:- Bureau of Indian Standard

RESULTS

S. No	Point of Monitoring	Observed Value [in dB (A)] Leq Day Time	Observed Value [in dB (A)] Leq Night Time
1	Shashkiya Primery School, Kasbi	50	40.2

Note: Standard Limits [in dB (A)]Leq:

Category of Area/ Zone (Ambient)	Day Time	Night Time
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Silence Zone	50	40

Note: -

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TC - 7531

Date:-08/10/2019

TEST REPORT

Report No.	**Noise/2606**
Proponent Name	:- Buffer Zone of Shivpura Red Ochre Mine(village-sandi khera)
District	:- Pratapgarh (Raj.)
Location	:- Near village- Sandi Khera, Tehsil- Choti Sadari
M.L.No.	: 07/2018
Lease Area	: 3.9859 Hect.
Type of Unit	:- Mine
Date of Monitoring	:- 05/10/2019
Date of Receipt	:- 07/10/2019
Sample Collected by	:- Pankaj & Team
Type of Monitoring	:- Ambient Noise Monitoring
Monitoring Instrument use	:- Sound Level Meter
Testing Protocol	:- Bureau of Indian Standard

RESULTS

S. No	Point of Monitoring	Observed Value [in dB (A)] Leq Day Time	Observed Value [in dB (A)] Leq Night Time
1	Govt. Primery School, Sandi Khera	54.6	44.1

Note: Standard Limits [in dB (A)]Leq:

Category of Area/ Zone (Ambient)	Day Time	Night Time
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Silence Zone	50	40

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TC - 7531

Date:-08/10/2019

TEST REPORT

Report No.	**Noise/2605**
Proponent Name	:- Buffer Zone of Shivpura Red Ochre Mine(village-subi)
District	:- Pratapgarh (Raj.)
Location	:- Near village- Subi, Tehsil- Choti Sadari
M.L.No.	: 07/2018
Lease Area	: 3.9859 Hect.
Type of Unit	:- Mine
Date of Monitoring	:- 04/10/2019
Date of Receipt	:- 07/10/2019
Sample Collected by	:- Pankaj & Team
Type of Monitoring	:- Ambient Noise Monitoring
Monitoring Instrument use	:- Sound Level Meter
Testing Protocol	:- Bureau of Indian Standard

RESULTS

S. No	Point of Monitoring	Observed Value [in dB (A)] Leq Day Time	Observed Value [in dB (A)] Leq Night Time
1	Aganwadi center, Subi	53.2	43.6

Note: Standard Limits [in dB (A)]Leq:

Category of Area/ Zone (Ambient)	Day Time	Night Time
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Silence Zone	50	40

Note: -

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(Tested By)

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TC - 7531

Date:-08/10/2019

TEST REPORT

Report No.	**Noise/2604**
Proponent Name	:- M/s Quality Minerals
District	:- Pratapgarh (Raj.)
Location	:- Near village- Shivpura, Tehsil- Choti Sadari
M.L.No.	: 07/2018
Lease Area	: 3.9859 Hect.
Type of Unit	:- Mine
Date of Monitoring	:- 04/10/2019
Date of Receipt	:- 07/10/2019
Sample Collected by	:- Pankaj & Team
Type of Monitoring	:- Ambient Noise Monitoring
Monitoring Instrument use	:- Sound Level Meter
Testing Protocol	:- Bureau of Indian Standard

RESULTS

S. No	Point of Monitoring	Observed Value [in dB (A)] Leq Day Time	Observed Value [in dB (A)] Leq Night Time
1	Mine Site	60.2	58.7

Note: Standard Limits [in dB (A)]Leq:

Category of Area/ Zone (Ambient)	Day Time	Night Time
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Silence Zone	50	40

Note: -

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(Tested By)

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TC - 7531

ANNEXURE No.12 Date:-25/10/2019

TEST REPORT

Report No. :- Soil /1920

Proponent Name :- M/s Quality Minerals

District :- Pratapgarh (Raj.)
Location :- Near Village- Shivpura, Tehsil- Choti Sadari
M.L. No. 07/2018
Lease Area 3.9859
Type of Unit :- Mine
Date of Sample Collection :- 17/10/2019 to 18/10/2019
Date of Receipt :- 18/10/2019
Date of Test :- 22/10/2019 to 25/10/2019
Sample Collected by Pankaj & Team
Duration of Sampling Soil Sample
Point of Collection :- Mine Site

RESULTS

S. No	Parameter	Observed	Testing Protocol
1	pH	6.80	IS: 2720 (P-26) 1987 RA 2002
2	Conductivity µmho/cm	508	IS: 14767:2000
3	Total Soluble Sulphate as SO_4%	0.004	IS: 2720 (P-27) 1977
4	Organic Carbon %	0.93	IS: 2720 (P-XXII) 1972 RA 2010
5	Organic Matter %	1.6	IS: 2720 (P-XXII) 1972 RA 2010
6	Calcium as CaCO3%	4.0	IS: 2720 (P-23) 1976 RA 2006
7	Available Nitrogen	-	Method Manual**
8	Available Phosphorus as P%	0.0008	Method Manual**
9	Available Potassium as K%	0.0066	Method Manual**
10	Moisture Content	-	IS: 2720 (P-II) 1973 RA 2002
11	Water Soluble Nitrate as NO_3%	0.0007	Method Manual**
12	Cation Exchange Capacity	-	IS: 2720 (P-24) 1976
13	Water Retention Capacity	-	Laboratory Testing Procedure for Soil & water Sample Analysis DIRD Pune
14	Bulk Density gm/cc	-	IS: 2720 (P-III) 1980
*15	Available Sodium as Na%	0.0105	Method Manual**
*16	Soil Color	Brown	Method Manual**

Note: -

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3. The samples will be destroyed after 15 days from the date of issue of test report unless otherwise specified.
4. The parameter marked with an '*' are not coverd in NABL".
5. ** Method Manual Soil Testing in India (Govt. of India).

(Tested By)

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TC - 7531

Date:-25/10/2019

TEST REPORT

Report No. :- Soil /1921

Proponent Name :- Buffer Zone of Shivpura Red Ochre Mine(Village- Choti Sadari)
District :- Pratapgarh (Raj.)
Location :- Near Village- Choti Sadari, Tehsil- Choti Sadari
M.L. No. 07/2018
Lease Area 3.9859
Type of Unit :- Mine
Date of Sample Collection :- 17/10/2019 to 18/10/2019
Date of Receipt :- 18/10/2019
Date of Test :- 22/10/2019 to 25/10/2019
Sample Collected by Pankaj & Team
Duration of Sampling Soil Sample
Point of Collection :- Forest land

RESULTS

S. No	Parameter	Observed	Testing Protocol
1	pH	7.10	IS: 2720 (P-26) 1987 RA 2002
2	Conductivity µmho/cm	642	IS: 14767:2000
3	Total Soluble Sulphate as SO_4%	0.0064	IS: 2720 (P-27) 1977
4	Organic Carbon %	0.79	IS: 2720 (P-XXII) 1972 RA 2010
5	Organic Matter %	1.36	IS: 2720 (P-XXII) 1972 RA 2010
*6	Calcium as CaCO3%	12.0	IS: 2720 (P-23) 1976 RA 2006
7	Available Nitrogen	-	Method Manual**
8	Available Phosphorus as P%	0.0003	Method Manual**
9	Available Potassium as K%	0.008	Method Manual**
10	Moisture Content	-	IS: 2720 (P-II) 1973 RA 2002
11	Water Soluble Nitrate as NO_3%	0.004	Method Manual**
12	Cation Exchange Capacity	-	IS: 2720 (P-24) 1976
13	Water Retention Capacity	-	Laboratory Testing Procedure for Soil & water Sample Analysis DIRD Pune
14	Bulk Density gm/cc	-	IS: 2720 (P-III) 1980
*15	Available Sodium as Na%	0.0140	Method Manual**
*16	Soil Color	Brown	Method Manual**

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5. ** Method Manual Soil Testing in India (Govt. of India).

(Tested By)

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APEX Enviro Laboratory

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Under Environment (Protection) Act, 1986 Vide F.No. 15018/16/2017-CPW

TC - 7531

Date:-25/10/2019

TEST REPORT

Report No. :- Soil /1922

Proponent Name :- Buffer Zone of Shivpura Red Ochre Mine(Village- Subi)

District :- Pratapgarh (Raj.)
Location :- Near Village- Subi, Tehsil- Choti Sadari
M.L. No. 07/2018
Lease Area 3.9859
Type of Unit :- Mine
Date of Sample Collection :- 17/10/2019 to 18/10/2019
Date of Receipt :- 18/10/2019
Date of Test :- 22/10/2019 to 25/10/2019
Sample Collected by Pankaj & Team
Duration of Sampling Soil Sample
Point of Collection :- Agriculture Land

RESULTS

S. No	Parameter	Observed	Testing Protocol
1	pH	7.85	IS: 2720 (P-26) 1987 RA 2002
2	Conductivity µmho/cm	562	IS: 14767:2000
3	Total Soluble Sulphate as SO_4%	0.008	IS: 2720 (P-27) 1977
4	Organic Carbon %	1.34	IS: 2720 (P-XXII) 1972 RA 2010
5	Organic Matter %	2.31	IS: 2720 (P-XXII) 1972 RA 2010
*6	Calcium as CaCO3%	14.5	IS: 2720 (P-23) 1976 RA 2006
7	Available Nitrogen	-	Method Manual**
8	Available Phosphorus as P%	0.0008	Method Manual**
9	Available Potassium as K%	0.036	Method Manual**
10	Moisture Content	-	IS: 2720 (P-II) 1973 RA 2002
11	Water Soluble Nitrate as NO_3%	0.002	Method Manual**
12	Cation Exchange Capacity	-	IS: 2720 (P-24) 1976
13	Water Retention Capacity	-	Laboratory Testing Procedure for Soil & water Sample Analysis DIRD Pune
14	Bulk Density gm/cc	-	IS: 2720 (P-III) 1980
*15	Available Sodium as Na%	0.0220	Method Manual**
*16	Soil Color	Brown	Method Manual**

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TC - 7531

Date:-25/10/2019

TEST REPORT

Report No. :- Soil /1923

Proponent Name :- Buffer Zone of Shivpura Red Ochre Mine(Village- Nanayan Kheri)
District :- Pratapgarh (Raj.)
Location :- Near Village- Nawa Khedi, Tehsil- Choti Sadari
M.L. No. 07/2018
Lease Area 3.9859
Type of Unit :- Mine
Date of Sample Collection :- 17/10/2019 to 18/10/2019
Date of Receipt :- 18/10/2019
Date of Test :- 22/10/2019 to 25/10/2019
Sample Collected by Pankaj & Team
Duration of Sampling Soil Sample
Point of Collection :- Agriculture Land

RESULTS

S. No	Parameter	Observed	Testing Protocol
1	pH	7.67	IS: 2720 (P-26) 1987 RA 2002
2	Conductivity µmho/cm	1235	IS: 14767:2000
3	Total Soluble Sulphate as SO_4%	0.0278	IS: 2720 (P-27) 1977
4	Organic Carbon %	1.76	IS: 2720 (P-XXII) 1972 RA 2010
5	Organic Matter %	3.03	IS: 2720 (P-XXII) 1972 RA 2010
*6	Calcium as CaCO3%	12.5	IS: 2720 (P-23) 1976 RA 2006
7	Available Nitrogen	-	Method Manual**
8	Available Phosphorus as P%	0.0009	Method Manual**
9	Available Potassium as K%	0.028	Method Manual**
10	Moisture Content	-	IS: 2720 (P-II) 1973 RA 2002
11	Water Soluble Nitrate as NO_3%	0.002	Method Manual**
12	Cation Exchange Capacity	-	IS: 2720 (P-24) 1976
13	Water Retention Capacity	-	Laboratory Testing Procedure for Soil & water Sample Analysis DIRD Pune
14	Bulk Density gm/cc	-	IS: 2720 (P-III) 1980
*15	Available Sodium as Na%	0.0250	Method Manual**
*16	Soil Color	Dark brown	Method Manual**

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TC - 7531

Date:-25/10/2019

TEST REPORT

Report No. :- Soil /1924

Proponent Name :- Buffer Zone of Shivpura Red Ochre Mine(Village- Kasbi)

District :- Pratapgarh (Raj.)
Location :- Near Village- Kasbi, Tehsil- Choti Sadari
M.L. No. 07/2018
Lease Area 3.9859
Type of Unit :- Mine
Date of Sample Collection :- 17/10/2019 to 18/10/2019
Date of Receipt :- 18/10/2019
Date of Test :- 22/10/2019 to 25/10/2019
Sample Collected by Pankaj & Team
Duration of Sampling Soil Sample
Point of Collection :- Agriculture Land

RESULTS

S. No	Parameter	Observed	Testing Protocol
1	pH	7.70	IS: 2720 (P-26) 1987 RA 2002
2	Conductivity µmho/cm	798	IS: 14767:2000
3	Total Soluble Sulphate as SO_4%	0.0229	IS: 2720 (P-27) 1977
4	Organic Carbon %	1.53	IS: 2720 (P-XXII) 1972 RA 2010
5	Organic Matter %	2.64	IS: 2720 (P-XXII) 1972 RA 2010
6	Calcium as CaCO3%	6.0	IS: 2720 (P-23) 1976 RA 2006
7	Available Nitrogen	-	Method Manual**
8	Available Phosphorus as P%	0.0019	Method Manual**
9	Available Potassium as K%	0.0188	Method Manual**
10	Moisture Content	-	IS: 2720 (P-II) 1973 RA 2002
11	Water Soluble Nitrate as NO_3%	0.0017	Method Manual**
12	Cation Exchange Capacity	-	IS: 2720 (P-24) 1976
13	Water Retention Capacity	-	Laboratory Testing Procedure for Soil & water Sample Analysis DIRD Pune
14	Bulk Density gm/cc	-	IS: 2720 (P-III) 1980
*15	Available Sodium as Na%	0.0250	Method Manual**
*16	Soil Color	Dark brown	Method Manual**

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TC - 7531

Date:-25/10/2019

TEST REPORT

Report No. :- Soil /1925

Proponent Name :- Buffer Zone of Shivpura Red Ochre Mine(Village- Sandi Khera)
District :- Pratapgarh (Raj.)
Location :- Near Village- Sandi Khera, Tehsil- Choti Sadari
M.L. No. 07/2018
Lease Area 3.9859
Type of Unit :- Mine
Date of Sample Collection :- 17/10/2019 to 18/10/2019
Date of Receipt :- 18/10/2019
Date of Test :- 22/10/2019 to 25/10/2019
Sample Collected by Pankaj & Team
Duration of Sampling Soil Sample
Point of Collection :- Agriculture Land

RESULTS

S. No	Parameter	Observed	Testing Protocol
1	pH	7.60	IS: 2720 (P-26) 1987 RA 2002
2	Conductivity µmho/cm	529	IS: 14767:2000
3	Total Soluble Sulphate as SO_4%	0.0111	IS: 2720 (P-27) 1977
4	Organic Carbon %	1.18	IS: 2720 (P-XXII) 1972 RA 2010
5	Organic Matter %	2.03	IS: 2720 (P-XXII) 1972 RA 2010
6	Calcium as CaCO3%	4.0	IS: 2720 (P-23) 1976 RA 2006
7	Available Nitrogen	-	Method Manual**
8	Available Phosphorus as P%	0.0008	Method Manual**
9	Available Potassium as K%	0.0156	Method Manual**
10	Moisture Content	-	IS: 2720 (P-II) 1973 RA 2002
11	Water Soluble Nitrate as NO_3%	0.0022	Method Manual**
12	Cation Exchange Capacity	-	IS: 2720 (P-24) 1976
13	Water Retention Capacity	-	Laboratory Testing Procedure for Soil & water Sample Analysis DIRD Pune
14	Bulk Density gm/cc	-	IS: 2720 (P-III) 1980
*15	Available Sodium as Na%	0.0205	Method Manual**
*16	Soil Color	Brown	Method Manual**

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TC - 7531

Date:-25/10/2019

TEST REPORT

Report No. :- Soil /1926

Proponent Name :- Buffer Zone of Shivpura Red Ochre Mine(village-Kararіya)

District :- Pratapgarh (Raj.)
Location :- Near Village- Kararіya, Tehsil- Choti Sadari
M.L. No. 07/2018
Lease Area 3.9859
Type of Unit :- Mine
Date of Sample Collection :- 17/10/2019 to 18/10/2019
Date of Receipt :- 18/10/2019
Date of Test :- 22/10/2019 to 25/10/2019
Sample Collected by Pankaj & Team
Duration of Sampling Soil Sample
Point of Collection :- Agriculture Land

RESULTS

S. No	Parameter	Observed	Testing Protocol
1	pH	7.75	IS: 2720 (P-26) 1987 RA 2002
2	Conductivity µmho/cm	567	IS: 14767:2000
3	Total Soluble Sulphate as SO_4%	0.008	IS: 2720 (P-27) 1977
4	Organic Carbon %	1.11	IS: 2720 (P-XXII) 1972 RA 2010
5	Organic Matter %	1.91	IS: 2720 (P-XXII) 1972 RA 2010
*6	Calcium as CaCO3%	10.5	IS: 2720 (P-23) 1976 RA 2006
7	Available Nitrogen	-	Method Manual**
8	Available Phosphorus as P%	0.0008	Method Manual**
9	Available Potassium as K%	0.0138	Method Manual**
10	Moisture Content	-	IS: 2720 (P-II) 1973 RA 2002
11	Water Soluble Nitrate as NO_3%	0.0015	Method Manual**
12	Cation Exchange Capacity	-	IS: 2720 (P-24) 1976
13	Water Retention Capacity	-	Laboratory Testing Procedure for Soil & water Sample Analysis DIRD Pune
14	Bulk Density gm/cc	-	IS: 2720 (P-III) 1980
*15	Available Sodium as Na%	0.0210	Method Manual**
*16	Soil Color	Brown	Method Manual**

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TC - 7531

Date:-25/10/2019

TEST REPORT

Report No. :- Soil /1927

Proponent Name :- Buffer Zone of Shivpura Red Ochre Mine(Shivpura)

District :- Pratapgarh (Raj.)
Location :- Near Village- Shivpura, Tehsil- Choti Sadari
M.L. No. 07/2018
Lease Area 3.9859
Type of Unit :- Mine
Date of Sample Collection :- 17/10/2019 to 18/10/2019
Date of Receipt :- 18/10/2019
Date of Test :- 22/10/2019 to 25/10/2019
Sample Collected by Pankaj & Team
Duration of Sampling Soil Sample
Point of Collection :- Agriculture Land

RESULTS

S. No	Parameter	Observed	Testing Protocol
1	pH	7.68	IS: 2720 (P-26) 1987 RA 2002
2	Conductivity µmho/cm	543	IS: 14767:2000
3	Total Soluble Sulphate as SO_4%	0.0069	IS: 2720 (P-27) 1977
4	Organic Carbon %	0.91	IS: 2720 (P-XXII) 1972 RA 2010
5	Organic Matter %	1.57	IS: 2720 (P-XXII) 1972 RA 2010
6	Calcium as CaCO3%	4.0	IS: 2720 (P-23) 1976 RA 2006
7	Available Nitrogen	-	Method Manual**
8	Available Phosphorus as P%	0.0005	Method Manual**
9	Available Potassium as K%	0.013	Method Manual**
10	Moisture Content	-	IS: 2720 (P-II) 1973 RA 2002
11	Water Soluble Nitrate as NO_3%	0.0015	Method Manual**
12	Cation Exchange Capacity	-	IS: 2720 (P-24) 1976
13	Water Retention Capacity	-	Laboratory Testing Procedure for Soil & water Sample Analysis DIRD Pune
14	Bulk Density gm/cc	-	IS: 2720 (P-III) 1980
*15	Available Sodium as Na%	0.0200	Method Manual**
*16	Soil Color	Brown	Method Manual**

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ANNEXURE No. 13.

Quality Council of India

National Accreditation Board for Education & Training

Certificate of Accreditation

Apex Mintech Consultants

3, Dhebar Colony, Near ITI, Pratapnagar, Udaipur-313002, Rajasthan

Accredited as Category - A *organization under the QCI-NABET Scheme for Accreditation of EIA Consultant Organizations: Version 3 for preparing EIA-EMP reports in the following Sectors:*

Sl.No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1	Mining of minerals – Opencast only	1	1 (a) (i)	A

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in SA AC minutes dated November 01, 2019 posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no. QCI/NABET/ENV/ACO/20/1202 dated Jan. 15, 2020.The accreditation needs to be renewed before the expiry date by Apex Mintech Consultants, Udaipur following due process of assessment.

Sr. Director, NABET
Dated: Jan. 15, 2020

Certificate No.
NABET/EIA/1821/ SA 101

Valid up to
16.04.2021

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